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## An Estimation of the Logistics Potential of Enterprises in the Region's Management

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### ABSTRACT

The article is devoted to the problem of researching the logistic potential of the region. The logistics capacity of the region is defining characteristic for the development level of regional logistics system. Accordingly, the definition of its components and their estimation are important for drafting the strategic guidelines of its development. The purpose of the study is to investigate the main factors necessary for assessing the current logistics potential of the region and planning for its further development. The increase of economic performance of the region is directly related to the formation and development of regional logistics capacity, its components and methods of assessment. The article studies the method of assessment of logistical capacity of the region. As the main method of research, qualitative and quantitative analysis of statistical data is used. This method involves the calculation of an integrated index of logistic potential in the region on the basis of geographic, socio-economic, transport, infrastructure, and institutional components. For testing the methodology the logistics potential of Dnipropetrovsk region was analyzed. This region was compared to the Kiev and Odessa regions. These regions were chosen as regions with optimal location of logistics centers. It is assumed that if the proposed measures to improve the development of the regions are implemented, the logistics potential will increase, which will lead to an increase in the level of logistic support of the regions. Based on the results of the research components of the region's logistics potential, the strategy of regional development was proposed with the aim of increasing the program for the development of logistic potential. The developed strategies for the development of the regional logistics system allow to form a logistical potential, to ensure a high level of development of the regional economy. As a consequence, this approach will contribute to the development of the regional logistics system as a whole. A synergistic effect will arise in this case if a new quality of economic processes is formed both at the level of a single region and at the national level.

## INTRODUCTION

New economic conditions in Ukraine caused the transformation of scientific-innovative sphere and necessity of its adaptation to radical changes in the economy. Smart government innovation policies could lead the economy out of the crisis, as evidenced by the experience of many developed countries. Therefore, Ukraine needs to establish appropriate mechanisms to stimulate investments in scientific-innovative processes, in the recovery of domestic production that is capable producing the competitive products. It is possible only if production intensifies by bringing new advanced technologies, retaining highly qualified scientific and innovative potential.

Management of innovative activity in the state, regions and enterprises should be based on the study of the basic problems of innovative activities such as organizational and economic relations in scientific-innovative sphere, methods of increased innovative activity, preservation of personnel potential and the competitiveness of enterprises and the development of new forms of innovative entrepreneurship (Zelazny and Pietrucha, 2017; Zygmunt, 2017).

Dynamics of world scientific and technological progress contributes to a significant change in the economy of all countries. The passive reactions of the state authorities, slow response of managers in enterprises of all forms of ownership to new requirements for activities and manufacturing products, belated adaptation to the new conditions entail negative economic consequences, as well as a sharp decline in the profitability of their own products compared to similar competitive (Becerra-Alonso et al., 2016). Most of the large industrial enterprises and organizations in Ukraine realized the need for innovative policy and tend to strengthen their innovation activity, particularly in the fields of product and process innovation, despite its dire economic situation, the imperfect legislative base of the state, the braking of reforms, uncertainty in the structural transformation of the economy in modern conditions.

The development process is one of the most important subjects in management and the management system. The lack of attention of managers to the development of regions and ignoring the necessity of choice plan for the development of logistics infrastructure leads to the deterioration of the investment attractiveness not only in the regions but also companies in the area, as well as macroeconomic indicators. It involves the use of the logistics principles in a regions management.

Logistics is now seen as an innovative approach that ensures the optimization of flow processes in economic activities through the use of reserves for organizational improvement. Logistics has both strategic and dynamic. A strategic option can be determined material stock and dynamic of the material flow. Dynamics in logistics represents the development, or change of a phenomenon or process in support of entrepreneurial activities (Velychko, 2013; Kovács and Kot, 2017).

## 1. INTERNATIONAL LOGISTICS RATING

According to research by the World Bank, the level of development of the logistics industry (Logistics Performance Index (LPI)) of Ukraine in 2016, it is ranked 80 out of 160 countries (World Bank, 2016).

First place logistics rating was occupied by Germany, Luxembourg, Sweden and the Netherlands. Besides these, ten indicators make up the LPI, Singapore, Belgium, Austria, UK, Hong Kong and the United States. China was on the 27th place (1 tier higher than the rating of 2014). India (fastest growing economy) were not included in the top 30, but was on 35. This is 19 places higher than 2014's (Kuchkova and Arkhireiska, 2017).

The ranking of countries according to the LPI for 2012 -2016 shows that Ukraine's place in world offset deteriorating (Table 1).

**Table 1.** Logistics Performance Index (LPI) of countries

Country	2012	2014	2016	Deviation 2016/2012
Germany	4	1	1	+3
Poland	30	31	33	-3
Romania	54	40	60	-6
Russian Federation	95	90	99	-4
Ukraine	66	61	80	-14
Moldova	132	94	93	+39
Hungary	40	33	31	+9
Slovakia	51	43	41	+10
Belarus	91	99	120	-29

Source: compiled according to World Bank, 2016.

In 2016 Ukraine dropped from 61 to 80th position. This is due to the fact that other countries develop their logistics system more rapidly than Ukraine. Another reason for the downgrade is a complex socio-economic and political situation in the country. In 2012, Germany ranked 4th place in the rankings, and 2016 has become a role model. Poland in 2016 have reduced their positions and was on 33. Romania is in 2016, 60, Russian Federation – 99, Hungary – 31, Slovakia – 41. The worst situation is in Belarus, which in 2016 was 120 seats, and in 2012 was at 91 position. Rapidly developing logistics in Moldova. For a short period of time, it has increased its level of 39 positions (2012 – 132 place, 2016 – 93). Complete the list: Equatorial Guinea, Mauritania, Somalia, Haiti and Syria (World Bank, 2016).

From the analysed data it is clear that for the development of logistics in Ukraine lags far behind the leading countries and neighboring countries. Therefore there is an urgent need to restructure the logistics system of Ukraine (Kuchkova and Arkhireiska, 2017; O. Velychko and L. Velychko, 2017).

The purpose of the article is a scientific rationale and development of theoretical and methodological foundations and practical guidance on the effective management of the logistic capacity in region.

To achieve this goal following tasks are solved in the work:

- to analyze the theoretical and methodological approaches to the management of logistics potential in the region;
- to clarify the concept of "logistic capacity of the region";
- to explore the structure of the logistics capacity in the regions;
- to assess the efficiency of management mechanism of logistic capacity in the regions.

## 2. METHODOLOGICAL FOUNDATIONS OF LOGISTIC POTENTIAL

In the current circumstances the regional development policy of territories should be based on internal capacity and trends of territorial development, form competitive advantage. All this is the reason for new approaches to local economic issues.

So the forming and assessment the current and prospective capabilities are the top of priority to date for the region development, that is, an analysis of the potential of the region. The insufficient research the potential of the region requires the additional theoretical and practical substantiation at the regional level.

Sustainable development of regional economies provides the positive dynamics of satisfaction. And it depends on the economic potential that focused on this area.

Improvement of the current forms and methods of trade logistics in economic relations at the regional level allows for the resolution of key issues of regional governance (Belyakova, 2008), including:

- formulation of the best possible strategy in regulating the structural proportions and material flows of social production;
- optimization of financial and related service, financial, information streams of the region.

Practical implementation of mechanisms of logistic management is related to the forming of regional logistics system. The last one in its nature is an organizational-economic mechanism for coordination of functions of management of flow processes (Oklander, 2008). Thus, the level of development of regional logistics system defines the level of development in the region.

We suggest understand the logistic potential of the region as a set of optimal parameters of economic flows in space and time through the application of logistic management methods (Koblianska et al., 2015).

## 2.1 Assessment of logistics potential

It is necessary to make an assessment of the resources in the region to achieve the effective management of its logistic capacity. The assessment of the resources is needed to ensure better use of resources and sustainable capacity increase.

Effective formation and the choice of directions of development of logistics capacity of the region are impossible without the analytical lines of research on their condition. The analysis of the level of development of logistics potential in the region allows determining the features and level of development of the logistics system. Such analysis allows highlighting the strengths and weaknesses of the development of logistics potential in comparison with other regions. It also determines the optimality of extending the proceeding of material flow from producer to consumer.

Methodical approach to estimation of logistic potential of the region involves the implementation of the comparative analysis.

The purpose of the analysis and estimation of logistic potential of the region is a comprehensive evaluation of the level of logistics potential and developing on this basis the strategic guidelines for the growth in the region.

The main objectives of evaluation are:

- the choice of a system of partial indicators for assessment of logistical capacity in the region;
- qualitative and quantitative analysis of selected indicators;
- integrated estimation of logistic potential of the region.

To assess the components of the logistics potential we use the quantitative method. An integrated assessment should be undertaken by combining various indicators of the development level of individual components of the logistic potential of the region. Evaluation of the potential of the regions will carry out according to the method proposed by I. Kobylecko and N. Rybalko (Koblianska et al., 2015). This method involves the calculation of an integrated index of logistic potential of the region on the basis of five components:

- geographical (proximity to the capital, the length of the border, the area of the region);
- socio-economic (the volume of industrial production sold, freight traffic, passenger traffic, exports and imports of goods and services, retail trade turnover, average monthly wage per employee);
- transport (the number of checkpoints of vehicles, the number of rail nodes, density of roads

- and railways, the volume of cargo transportation by road, transport of goods by rail);
- infrastructure (density of retailers, the density of the enterprises of wholesale trade and mediation, the density of enterprises of transport and communication, the density of enterprises financial activities);
  - institutional (the number of industrial enterprises, number of wholesale and retail trades, the number of enterprises providing services of repair of motor vehicles and motorcycles, the number of enterprises in transport, storage, postal and courier activities, the number of enterprises in the field of insurance and financial activities).

The assessment study of logistic capacity in the region is carried out by calculating the above indicators in selected areas of evaluation. In this case we use the following formulas to calculate partial and cumulative indexes ( $X_{ij}^{(i)}$ ) of the development level of logistic infrastructure of the region (Oklander, 2008).

$$X_{ij}^{(i)} = \frac{X_{ij}}{X_{m+1j}}, \quad (1)$$

$$X_{ij}^{(i)} = \frac{X_{m+1j}}{X_{ij}}, \quad (2)$$

where  $i = 1, 2, \dots, m$ ;  $j = 1, 2, \dots, n$ ;  $X_{m+1j}$  -  $j$ -th index of the reference region (the reference value is the region with the best indicator value for the studied set).

It is important to know that the formula (1) is used when the reference value of the index has a maximum value, and the formula (2) - when the reference value of the index has minimal one.

## 2.2 Comparative characteristic of logistic potential of regions of Ukraine

For testing the methodology we analyze the logistics potential of Dnipropetrovsk region by comparing it to Kiev and Odessa regions. These regions were chosen as regions with optimal location of logistics centers. Information sources for monitoring the development of the regions are the State Statistics Service of Ukraine (2017), Main Department of Statistics in Kyiv Region (2017), Main Department of Statistics in Dnipropetrovsk Region (2017) and Main Department of Statistics in Odessa Region (2017). The results are shown in Table 2.

**Table 2.** Comparative assessment of the components of the logistic capacity in the region for 2014–2016

Components of integral index	Regions	Years		
		2014	2015	2016
Geographic component	Kyiv	0.46	0.46	0.46
	Odessa	0.58	0.58	0.58
	Dnipropetrovsk	0.66	0.66	0.66
Socio-economic component	Kyiv	0.61	0.56	0.54
	Odessa	0.60	0.57	0.56
	Dnipropetrovsk	0.85	0.81	0.59
The transport component	Kyiv	0.61	0.62	0.6
	Odessa	0.68	0.69	0.67
	Dnipropetrovsk	0.91	0.88	0.85
Infrastructural compo-	Kyiv	0.33	0.34	0.38

The institutional component	Odessa	0.59	0.59	0.60
	Dnipropetrovsk	0.94	0.95	0.96
	Kyiv	0.58	0.59	0.52
Cumulative index of logistics capacity	Odessa	0.76	0.79	0.77
	Dnipropetrovsk	0.91	0.91	0.92
	Kyiv	0.53	0.52	0.51
	Odessa	0.65	0.65	0.64
	Dnipropetrovsk	0.86	0.85	0.81

Source: compiled by authors based on the data of State Statistics Service of Ukraine, 2017.

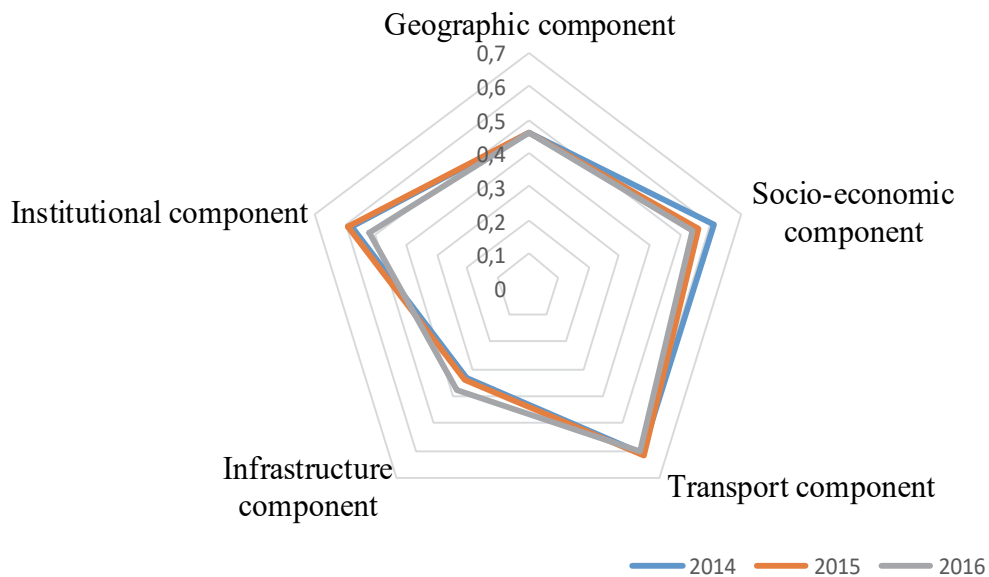
An integrated assessment should be carried out by constructing analytical indicators of development for separate components of the logistics capacity. The integral index of development of logistics capacity in the region (S) determined by the formula:

$$I = \frac{\sqrt{E_g^2 + E_s^2 + E_t^2 + E_p^2 + E_o^2}}{S}, \quad (3)$$

where  $E_g, E_s, E_t, E_p, E_o$  are the corresponding calculated values of the individual partial indexes for the components of the logistics capacity – geographical, socio-economic, transport, infrastructure, and institutional, respectively (Kovalska and Savka, 2012).

The calculation results indicate that the integrated index of logistic potential in the Kyiv region over the last three years decreased from 0.53 to 0.51. Institutional and socio-economic components had significant influence on the calculated value of this indicator. They are decreased by 10 % and 12 % respectively. Positive developments are observed in the infrastructure component of the region. This indicator increased by 15 % (Fig. 1).

**Figure 1.** Diagram of the integral indicator of the logistics capacity in Kyiv region



Source: compiled by authors based on the data of Main Department of Statistics in Kyiv Region, 2017.

The strategy of building up the logistic potential of the region should be aimed at formation and development of logistics infrastructure in the region. In this regard, an important place is occupied by investors. They can direct their investments on the construction of logistics centers and the development of logistics infrastructure. The last one must satisfy the needs of most demanding customers. For instance, building up the logistic capacity of the region implies:

- the presence of specialized storage facilities;
- their high level of security equipment and relevant standards for storage;
- sorting and transportation of goods depending on the specialization of the region.

The objective necessity for a specially equipped places to store exists at all stages of the flow – from the primary source of raw materials to the final consumer. And the problem of transportation plays an important role. This problem requires the development of regional logistics centers or logistics hubs. They are sort of business centers, which play an essential role in managing trade flows as hubs of international trade. There are following main events in delivery of goods (stage in this process):

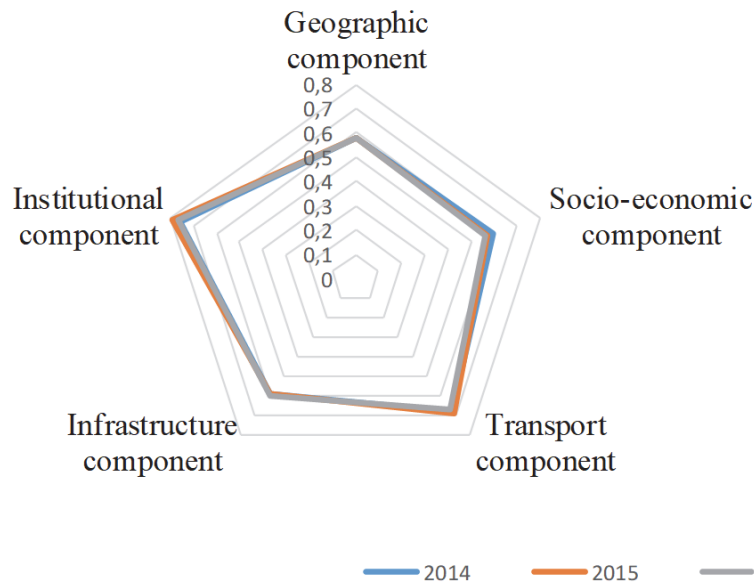
- identification of need for the goods;
- the choice of sources of provenance of goods and their suppliers;
- establishing rational schemes of supply;
- contracting for the supply of goods (supply agreements, purchase and sale of goods);
- the operative monitoring of the implementation of delivery contracts;
- the choice of forms for delivery of goods;
- finding the rational delivery frequency and optimal batch sizes and delivery of goods;
- arranging delivery of goods to the stores;
- the acceptance of the goods and its documentation (Apopii et al., 2005).

The level of development in the theory and practice of logistic systems formation that has achieved proves: to optimize the movement of goods flows in the system should efforts to streamline the system of movement of commodity flows be intensified. This also applies to their concentration and transformation in logistics centers (terminals), the effective management of inventory management and orders, maintain retail enterprises in terms of calendaring in delivery of goods and optimization of its routes.

This strategy thus holds an important place in the regional logistics system. At the regional level the formation of the logistics system within the framework of this strategy should serve as a means of overcoming the crisis phenomena in the economy of the region characteristic of the current stage of development. It also promote creation of appropriate infrastructure, development of interregional, intersectoral and international relations, rational use of financial, material and information flows.

Analysis of the Odessa region showed (Fig. 2) its infrastructure component is expanding moderately. However, attention should be paid to the insufficient level of socio-economic component: in the analyzed period it increased by 7 %. For a more rapid development of the region strategies for regional logistics system formation must be implementing. The main goal is to create the preconditions for the development of regional logistics system and ensuring logistical economy of the region. This is achieved by formation of system for management of material and information flows, which would ensure bringing the right product of the required quality in the required quantity at the stipulated place and time with minimal costs. The basis for the formation of the logistics system must become logistics centers. They should have sufficient material and technical base, experience of delivery of goods, qualified commercial machine, using the possibility of reducing the total logistics costs, obtaining the appropriate discounts and a relative reduction in transport costs per unit.

Figure 2. Diagram of the integral indicator of the logistics capacity in the Odessa region



Source: compiled by authors based on the data of Main Department of Statistics in Odessa Region, 2017.

Implementation of this strategy will involve the following activities:

- to find sources to procure the goods and choose the best reliable suppliers who can offer competitive goods (for price, quality and other parameters), to ensure their supply and payment on favorable terms, to provide a variety of services that increase the value of the goods;
- to establish economic relations with suppliers of goods and documented their issue through the conclusion of supply contracts;
- to determine the optimal batch sizes of delivery of the goods, frequency and methods of delivery, to choose the most effective type (types) of transport for the carriage of goods, to calculate the need for it, to develop the route of delivery of goods etc.;
- to establish operational monitoring of the implementation of supply contracts, availability of stock and turnover, which will give the ability to react and make changes in delivery of goods;
- to create optimal conditions for the accumulation and storage necessary to ensure uninterrupted commodity supplies;
- to ensure proper receipt and preparation of goods for sale.

Among the instruments of implementation for strategies suggested above it is appropriate to identified such as:

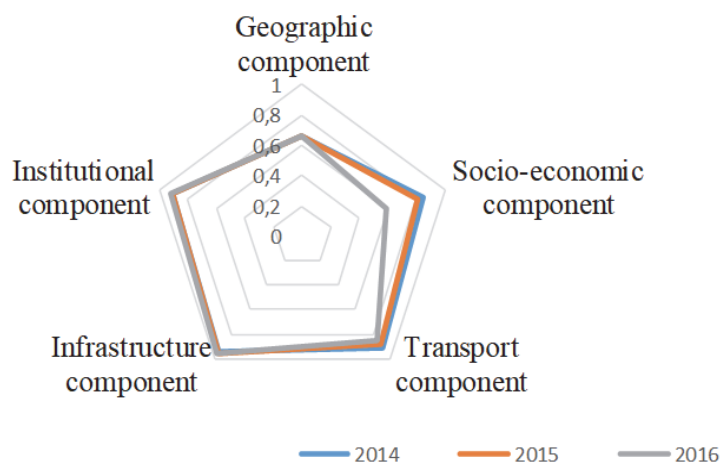
- tariff and non-tariff regulation;
- financial support;
- fiscal adjustment;
- pricing;
- licensing and certification of logistics services;
- the competitive allocation of orders and so on.

Logistics potential of Dnipropetrovsk region (Fig. 3) is growing fast, but the integrated index of logistic capacity is far from an ideal reference. Significant influence on the calculated value of this index is carried out for high values of the partial indicators of the institutional component (0.92), transport (0.8) and the infrastructure component (0.96). However, it is worth noting that develop-



ment of socio-economic (0.56) and geographical (0.66) components are insufficient.

**Figure 3.** Diagram of the integral indicator of the logistics capacity in Dnipropetrovsk region



Source: compiled by authors based on the data of Main Department of Statistics in Dnipropetrovsk Region, 2017.

Each of the estimated components indicates the level of development of the region in a particular industry. It enables to identify directions of strategy of development in the region and strengthen its transport and logistics capacity. The results of the evaluation of logistic capacity allow state and regional authorities, local authorities and businesses make tactical and strategic decisions in the field of investment and development of not only the logistics infrastructure in the region, but also companies with regard to their effectiveness. It is also possible to make a conclusion about the state of the logistics system in the region and identify potential improvement criteria, cost optimization, risk minimization, timely delivery.

Based on the results of the assessment of the level of logistic capacity in the region, we believe that to build logistics capacity of the region as a development programme should take the strategy of innovative logistics development, which includes:

- improving transport accessibility within the region;
- development of innovative and competitive industrial region;
- stimulation of investment activity;
- promoting the development of the business environment on the principles of state-private partnership;
- encourage the development of small and medium business;
- ensuring the effective specialization of regions, with a priority on using its own resource potential;
- achieving a uniform and balanced development of territories, development of inter-regional cooperation, prevention of deepening socio-economic disparities through the formation of “growth points”.

The main activities under this strategy are:

- formation of transport-logistical cluster, the use of an integrated system of logistics potential;

- definition of directions for improving the system of management of enterprises to increase efficiency through innovation and logistics simulation by combining the logistics and innovative aspects of development.

In our opinion, the implementation of these measures will facilitate

- greater specialization of the region,
- improvement of trade services (increasing the range of products, lower prices by reducing costs for managing material flow),
- development of the service sector,
- growth of employment in the region,
- increase tax revenues to budgets of all levels.

And all this will contribute to achieving the goal of sustainable development of the region.

## CONCLUSION

Conducted a regional analysis reflects an analysis of the state of the logistics system in the regions. Thus, a careful analysis gave the opportunity to some shortcomings of this system and makes certain ways to improve the strategy of logistics management in the regions.

The calculated values of individual components and the integral index of the level of development of the Kiev region were given the opportunity to determine strategy to expand logistics potential. For its implementation it is necessary to develop logistics infrastructure, an optimized structure of the regional economy, in order to ensure the specialization and the introduction of modern logistics technologies of management of regional logistics system.

Analysis of logistic potential of the Odessa region showed that it is necessary to apply the strategy of formation of regional logistics system for the region. The main purpose is formation of system of management of material and information flows.

Study of logistics potential of Dnipropetrovsk region showed the necessity of a strategy to increase the transport and logistical capacity. The basic goal of this strategy is to improve transport accessibility within the region, the development of innovative and competitive industrial region, to stimulate investment activity.

Developed strategy of development of regional logistics system give the possibility to form the logistic potential of the region, to ensure the highest level of logistical the region's economy. As a consequence, this approach will facilitate the development of regional logistics system as a whole. Synergies will arise in this case, will form a new quality of economic processes at the level of individual region and at the national level.

The strategies of development of regional logistics system described above give the possibility to form the logistic potential of the region, to ensure the highest level of logistical the region's economy. As a consequence, this approach will facilitate the development of regional logistics system as a whole. Synergies that it would entail will form a new quality of economic processes at the level of individual region and at the national level.

In light of the above the promising direction for further research is to identify opportunities for interregional cooperation for the creation of logistics systems for over-region level.

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