

Innovative logistics as a tool to increase the competitiveness of the polish construction industry

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Abstract

The role of logistics and logistic potential in effective development of building branch of economy is investigated in article. The authors focus on the need to actively implement progressive innovations in logistics activities of Polish companies. The innovative approach in the development of the logistics system will contribute to an increase in the level of competitiveness of Poland and increase the efficiency of operation of related sectors of the national economy.

Keywords: innovative logistics, construction business, government support, construction industry development.

Introduction

The active attention of researchers to the analysis of the role of logistics in the development of the Polish economy has inspired the interest of the authors in an in-depth study of its potential.

Poland's convenient geographical location at the junction of the East-West and North-South European part of the continent makes it the best place to invest in the development of those industries which are focused on supplying manufactured products to any of the EU countries, the former Soviet Union and Asia. Poland is a country where key transport and trade routes, vectorally oriented north-south, west-east and back, intersect. Thanks to this factor, Poland is one of the key countries on the map of the Trans-European Transport Network (Logistics in Poland, 2017). The TEN-T route includes 4 transport routes, which are laid out through Poland. According to the results of the report prepared by "Prologis" and "Eye for Transport" companies, it can be concluded that the country's territory is the most attractive location for capacity placement, investment in development and further development of transport and logistics potential

(Logistics centers, 2016). It should also be noted that at the moment Poland is the leader of warehouse real estate in Central and Eastern Europe. Modern, equipped with the latest technology, logistics centers are successfully operating throughout the country, allowing it to increase the volume of goods transported through the territory. The total area of their storage currently exceeds 7 million sq. m. Moreover, Poland's competitive position on the investment map of Europe is due to relatively low rental rates (Nguyen Hoang Tien, 2020). In addition, one of the key factors in the development of Polish logistics is the increase in turnover and scale of e-commerce.

Every year, the Polish government is constantly developing and modernizing the domestic transport and logistics system. The combination of such positive factors as a convenient location, existing transport potential, established logistics system, material and resource base and the potential of domestic manufacturers determine the rapid development of the construction industry, which makes a significant contribution to

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the development of the national economy of Poland.

It should be noted that in the technology of construction activity the process of transportation is that connecting and basic link, which on the one hand provides the process of production of construction materials, on the other hand – their delivery, and on the third – provides the process of construction and installation work. Therefore, the importance of the transport component in the

construction logistics system is dominant (Hedborg Bengtsson, 2018). Close conjugation and interrelation of construction and transport industry are caused by many factors, the main of which is the availability of resource potential for development. The above-mentioned points to the topicality and importance of issues related to the optimization of progressive and innovative development of the Polish logistics system.

Material and Method

Scientific research in this field of activity should be based on a defined base of methods, which includes a set of both general scientific methods and specific ones. Besides, it is necessary to take into account that in the conditions of permanent complication of technical and technological landscape of functioning of the world market of logistic services the set of used methods of studying of logistic processes in construction has a tendency to constant increase as all this is connected with introduction and scaling of use of digital technologies (BIM-, GPS-technologies), cybernetics, modeling etc.

In the real process of scientific cognition all methods are interconnected, interact and complement each other. On the basis of all-round consideration of scientific approaches which are more often used by researchers in the decision of problems of management of development of building branch we have allocated set of the approaches forming a core of methodological model and set of auxiliary approaches for the decision of concrete problems of functioning of subjects of building business (fig. 1).

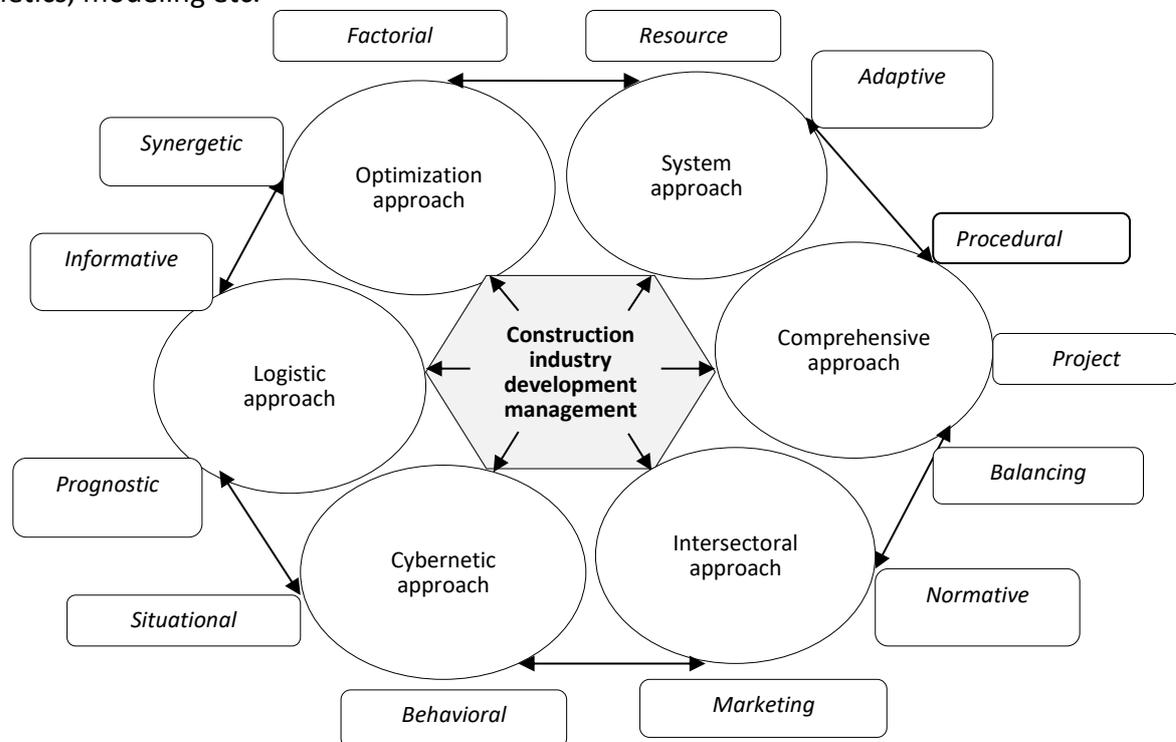


Fig. 1 – A set of approaches and scientific methods used to study the role of logistics in managing the development of the construction industry

Thus, we believe that the main methods or methodological “core” will be system, complex, optimization, logistics, intersectoral, cybernetic approaches. As additional – resource, adaptive, process, project, balance sheet, regulatory, marketing, behavioral, situational, synergetic, informational and factor methods of the scientific research.

It should be noted that the logistics approach is focused, first of all, on comprehensive

$$L(C) = \min (opt Cpr + opt Cprd + opt Csl + opt Ctr + opt Cstr) \quad (1)$$

where opt Cpr, Cprd, Csl, Ctr, Cstr are the optimum costs of procurement, production, sales, transport and storage (stocking) respectively.

Unflagging interest to logistics in the construction industry is also associated with the fact that the use of logistics approach significantly provides savings (by 30-50%) of all types of material resources, increases the speed of turnover of working capital, reduces the time (25-45%) movement of material resources from the primary point of delivery to the end user, reduces the overall cost level of construction activities and achieves a more complete customer satisfaction as a service and acquired objects (Chuev, 2014).

Many domestic and foreign scientists have devoted their works to the study of building activity logistics in modern economic conditions. So, Susanna Hedborg Bengtsson notes in its article how important the organization of effective supply chains is in the implementation of construction projects. The author's research is devoted to the issues of implementing coordinated models of construction logistics (Hedborg Bengtsson, 2018). Abdulmohsen Almohsen & Janaka Ruwanpura's research highlights logistics management and assessment of its impact on construction productivity. The authors propose the use of advanced information technology to optimize the timing and efficiency of construction processes

research and rejection of isolated cost analysis of logistics costs in construction, as well as the use of the criterion of minimum total amount of resources incurred based on the definition of the optimum of each type of resource component. The target function of logistics in construction – “procurement logistics – production logistics – sales logistics – transport logistics – warehousing logistics” is as follows:

(Almohsen, Ruwanpura, 2011). A group of scientists from Germany, Clausen U., Holloh K., Kadow M. presented their vision for the future in the development of a global transport and logistics system until 2030 and explored the impact of progressive innovation on socio-economic development (Clausen, Holloh, Kadow, 2014). The article by Elzbieta Gofembska analyses the main factors that determine the efficiency of international processes and operations, including the potential of logistics efficiency in supply chains. The author evaluated the efficiency of the Polish logistics system before and after accession to the European Union and presented a forecast of its development until 2020 (Gofembska, 2019). Persson G. analyses how to improve your competitiveness through logistics. The author focuses on the fact that through efficient logistics, the speed of response and flexibility to market requirements is significantly increased (Persson, 1991).

In our turn, based on the positive dynamics of improvement of the Logistics Performance Index (LPI) of Poland in the world ranking, we focus on the use of innovative logistics as a tool to increase national competitiveness (Table 1).

Table 1 – Logistics Performance Index (LPI) of Poland, 2007-2018

Year	2007	2010	2012	2014	2016	2018
Place in the ranking	40th place	30th place	30th place	31th place	33th place	28th place
Index	3,04	3,44	3,43	3,49	3,34	3,54

Source: <https://lpi.worldbank.org/international/aggregated-ranking>

As you know, LPI is the most famous rating developed for the logistics industry and measuring the performance of supply chains, the state of trade logistics at the national and international level. It is compiled every 2 years

(2007, 2010, 2012, 2014, 2016 and 2018) and allows to draw conclusions about shortcomings in the development of logistics and its individual components, which helps governments to identify the main areas of change in this area.

Results and discussion

At a time of intensifying crisis phenomena, at the same time stagnating regional development and intensifying competition in a globalized world, the issues of choosing effective instruments of state support for the development of the national transport and logistics system and the construction sector of the economy are becoming a priority, as they can generate a significant increase in gross domestic income to the state budget and become one of the main sources of growth in Poland's competitiveness.

Poland's branched out and infrastructure-developed logistics system predetermines the multi-variability of management and business solutions based on investments by financial institutions, influential developers, sharing the risks of the state and business in the form of public-private partnership projects, as well as implementation of large-scale infrastructure projects financed from EU funds.

The Centre for Transport Projects (CEUTP) was established in order to implement

infrastructure projects in the transport sector financed from European Union funds. The CEUTP has relative autonomy in the implementation of projects with low costs and coordinates with EU funds in the implementation of expensive financial initiatives for road transport development. It is important to note that the principles of CEUTP activity are fully constructed and harmonized with the rules of the Infrastructure and Environment Program as well as the transport policy of the Ministry of Infrastructure. The role of this Centre in the implementation of innovative projects in Poland is invaluable, thus increasing its strategic importance as a country with a high level of implementation of innovative technologies.

Thus, according to the data of the rating of countries of the world according to the index of innovations, the Republic of Poland shows the tendency to decrease the index indicator, which actualizes the problem of the necessity of support of innovation activity by the government (Table 2).

Table 2 – Innovation Index of the Republic of Poland, 2017-2019

Year	2017	2018	2019
Place in the ranking	38th place	39th place	39th place
Index	41,99	41,67	41,3

Source: https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2017.pdf,
https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2018.pdf,
<https://gtmarket.ru/ratings/global-innovation-index/info>

In the period from 2014 to the present, the Polish economy is planned to receive a financial injection of about 72.9 billion EUR from EU funds. These resources are allocated for the implementation of 6 national and 16 regional Cohesion Policy Programs. A significant share of this funding is aimed at increasing the overall level of business activity of economic entities (including

the construction and logistics sectors of the Polish economy) and intensifying investor activity.

In numerous publications, the authors emphasize that the process of development of the construction industry is complicated, multi-dimensional and poly-directional in nature, needs state regulation and stimulation because of its strategic importance.

Innovative logistics play a key role in improving the efficiency of the flow control system in the construction industry. It is one of the main components of logistics as a science and as a sphere of economic activity, which is focused on continuous search and optimization of forms, methods and results of material flow management by implementing logistic innovations in actual management systems.

On this basis, we can summarize the following. The main body of research into the problems of classical (basic) logistics is focused on finding solutions to ensure the actually achieved level of material flow management, depending on many geopolitical, socioeconomic and other factors, including the implementation of logistics innovations. In turn, innovative logistics is designed to improve the efficiency of the actual level of basic logistics through the introduction of the latest progressive organizational, technological, information, transport and other innovations (Terenina, 2018).

Statistical data confirm the fact that in the total cost structure of logistics in the supply chain in different countries are from 10% (USA, for example) to 20% of the country's GDP (in Russia and Singapore). The breakdown of these costs is as follows: transportation costs take 40-55%,

inventory maintenance and storage costs 30-40%, general administrative and management costs up to 15%. It becomes obvious that a particularly important task is to optimize the total amount of transportation costs, without reducing the quality of logistics service (Kostov, 2017).

Proceeding from it, we can assert, that logistics as means of the rational organization of material streams in building activity allows to operate profit by reduction of a cost part, instead of increase in income. As is known, the reduction of the total amount of costs (warehousing, transport and procurement, handling, etc.) by 1% on average gives the same effect as an increase in sales by 10% (Popovichenko, 2011). The aforesaid gives the grounds to believe that logistics in modern building management acquires instrumental quality of optimization not only of financial results of activity, but also at the expense of reduction of time expenses plays a role of the tool of increase of competitiveness of domestic building companies. Implementation of the above-mentioned set of problems is impossible without introduction of innovative logistics principles.

We offer visualization of key problems and ways of their solution by Polish logistics companies by means of innovative approach in logistics (fig. 2.).

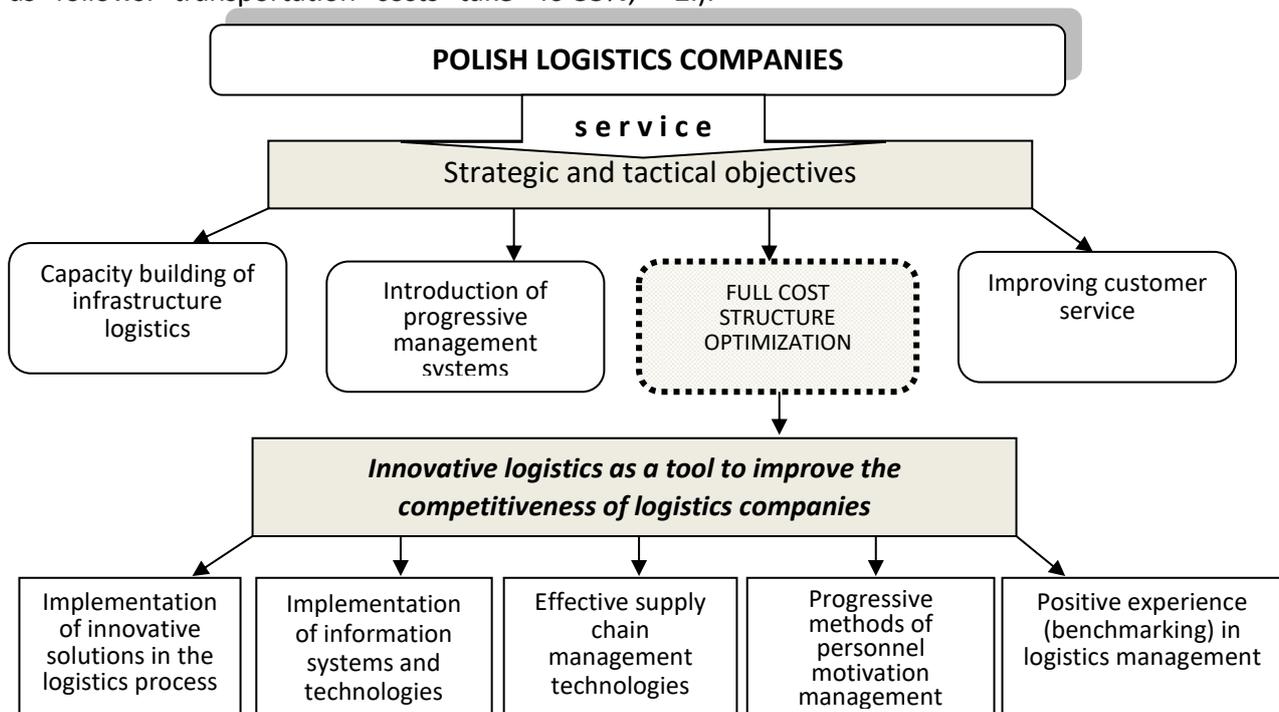


Fig. 2 – “Tree of problems” of Polish logistics companies and tools for their solution

Given the fact that at the moment a state strategy for the development of the national transport and logistics potential of Poland until 2020 (with the perspective until 2030), as well as the National Reform Strategy until 2020, we believe that in order to increase the level of competitiveness and innovation and investment activity in the transport and logistics sector it is necessary to form and implement a single strategy. Our proposed structure of goals and objectives of the Strategy for the Development

of the Transport and Logistics Capacity of Poland should cover the implementation of 4 key objectives: increase of the transport and logistics infrastructure; implementation of innovative technologies; organization of efficient supply chains; development of transit potential. Directly or indirectly, the implementation of the strategy's goals intersects with the development goals of the construction sector of the economy, as well as related sectors.

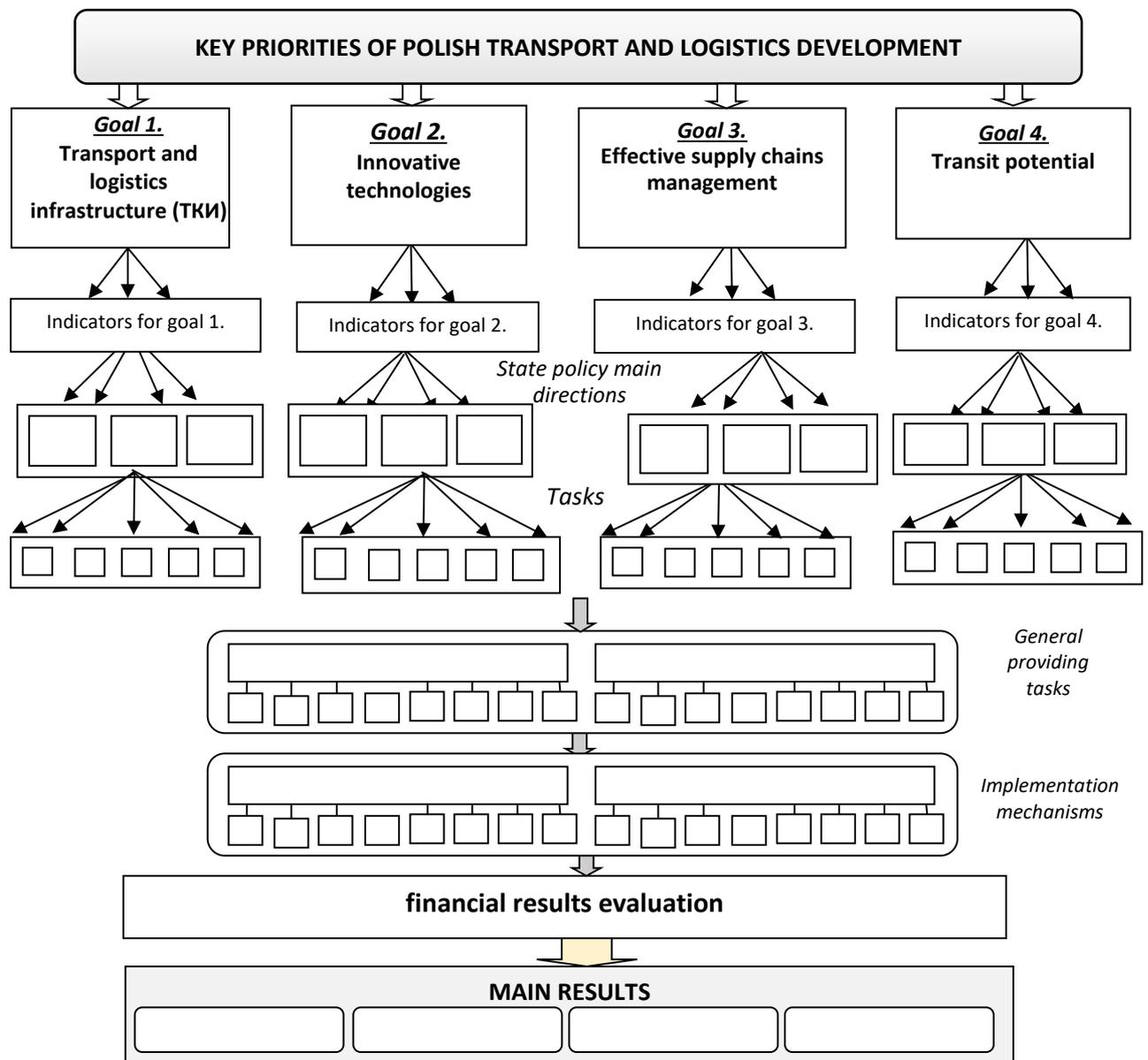


Fig. 3 – The structure of goals and objectives of the Strategy for the Development of Transport and Logistics Capacity of Poland

Conclusions

Thus, we can conclude that in the world and in Poland in particular, innovative technologies in logistics are gaining momentum. It is to be hoped that the trend of inflow of domestic and foreign investments into this sector of the economy will grow, which will lead to an increase in innovation and implementation activity, as well as the level of national competitiveness due to optimization of logistics costs and improvement in the quality of services

provided. The potential of the national logistics system is the key to the successful development of the leading sectors of the Polish economy, which predetermines the government's full support for the development of innovative logistics. But, it is necessary to form a unified national development strategy in order to achieve the strategic goals and strong positions of Poland as a competitive state.

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