Optimization of the mechanism of financial incentives for the development of logistics activities in the Polish construction industry

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Abstract

The article explores the role of various financial incentive instruments in optimizing the financial mechanism of logistics development in the construction sector of the economy. The author focuses on the necessary to use a synergistic approach in the study of efficiency issues of two related industries - logistic and construction sectors of the national economy. Positive factors such as convenient location, available transport potential, established logistics system, material and resource base and the potential of domestic producers determine the rapid development of the construction industry, which brings its significant contribution to the development of the national economy of Poland. At the same time, the main factor contributing to the development of construction business is domestic production of construction materials. In this context, it should be noted that the country has developed the potential of its own production of building materials, there is a sufficient fleet of construction machinery and construction equipment, innovative technologies are being introduced, highly qualified personnel, etc. Comprehensive assessment of financial-investment and transport-logistic potentials in the context of the regions, as well as differentiated approach allowed to offer a matrix of financial stimulation tools for the development of logistics in construction in a horizontal and vertical strategy. At a time of intensifying crisis phenomena, simultaneous stagnation of regional development and increasing competition in the globalized world, the issues of selecting effective instruments of financial support for the development of national transport and logistics system and construction sector of economy gain priority importance, as they can generate a significant increase in the gross domestic income of the state budget and become one of the main sources of ensuring Polish competitiveness.

Keywords: financial incentive mechanism, logistics in the construction business, financial incentive tools, financial and investment potential, transport and logistics potential.

Introduction

As you know, logistics is a key unifying link, as well as one of the main factors in the development of practically all sectors of the national economy. Its development almost synchronously reflects changes in other areas of the economic system, for which it is an integral part of operations and business model (Yinping Gao, Daifang Chang, Ting Fang, Tian Luo, 2018). The events of recent years related to the elimination of crisis phenomena during the pandemic motivate us to search for optimization of the logistics system, as well as effective financial incentive tools (Riccardo Aldrighetti, Daria Battini, Dmitry Ivanov, Ilenia Zennaro, 2021).

It should be noted that for any country in the world, including Poland, construction has always been an indicator and priority of socio-economic
development. Being one of the most powerful levers of growth, the systematic and effective functioning of the construction sector determines the comprehensive development of both the economy of the regions and the country as a whole (Giang Dang & Pheng Low, 2011).

The process of development of the construction industry has a complex, composite and multidirectional character, which also needs state regulation and stimulation due to its strategic importance. As the basic conditions that determine the effectiveness of the construction business, we consider it necessary to recognize the transport, logistics and financial and investment potentials (Jessop David, 1994).

Thus, the study of the current state and conditions of development of the domestic transport and logistics system, as well as the existing financial and investment regional opportunities create prerequisites for the development of methodological and practical recommendations of directions, mechanisms and tools for financial support of construction activities.

**Material and methods**

One of the main methodological principles of the logistics concept is a systematic approach. Logistics systems are included in the generally accepted concept of systems, since they consist of system-forming elements that are closely interrelated and interdependent with each other, which have ordered connections, and form a certain structure with predetermined features. These systems are distinguished by a high degree of consistency of incoming productive forces in order to control through material flows (Natalia Antczak, 2017).

The following research method we used an adaptive approach. A logistics system is an adaptive feedback system that performs certain logistical functions, consists of subsystems, and has developed intra-system connections and connections with the external environment. The logistics system constantly interacts with the external environment, thereby being an indicator of stability in various sectors of the economy, including in construction. In the context of our research, adaptability is the ability of a logistics system to change its structure and choose behaviors in accordance with new goals and under the influence of the environment.

Because of the numerous specific threats to safe development and their impact on the logistics processes in construction in general and on the implementation of a particular object in particular, the methodological model should include a situational approach. The situational approach explores which methods and tools of financial incentives and in which operating conditions are considered effective in a specific period of time and in a specific situation.

It should be noted that the situational approach is considered one of the main ones in management, it complements the system approach and in the literature it is also often called a functional approach.

The fundamental approach in this study is the synergetic approach. A number of the author's publications describe the attributive properties of the logistics system as an artificial, complex, open, ergatic, technical-technological, ecological-socio-economic, spatial-temporal system of optimization modeling of the delivery of the right goods at the right time to a specific consumer. The formation of logistics systems and supply chains in construction unites all subjects into a single coordinated mechanism of relationships, allows you to organize coordinated management of technical and technological, economic and financial, material, information flows and processes, and also ensures their efficiency, synchronicity and high efficiency. Hence follows the correlative dependence of the efficiency of the construction business described by many authors on a successfully functioning transport and logistics system (Lavine Marc, 2018).

According to the synergetic approach, the complex structure of interdependent and mutually complementary systems (construction,
as well as transport and logistics) accelerates the pace of development of the socio-economic system as a whole, that is, the established rate of development of the whole is higher than the rate of development that was the fastest developing structure that entered the whole (Hall Bronwyn & Howard Kirsten, 2008). In this context, we are talking about increasing the level of socio-economic development of the territorial entity - the country and its constituent regions.

The importance of the synergetic approach in the development of the logistics system in the construction of Poland and its constituent regions is shown in Fig. 1.

Results and discussion

To determine the content of the mechanism of financial stimulation of logistics activities in any of the sectors of the economic system, consider the concept of the financial mechanism itself.

In the financial and credit encyclopedic dictionary, the financial mechanism is interpreted as a set of types and forms of organization of financial relations, instruments and levers of influence of public authorities on

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**Fig. 1. Synergetic effect of logistics interaction in the construction business of Poland**

**SYNERGISTIC EFFECT:**
- growth of competitiveness;
- growth of investment attractiveness;
- development of various forms of doing business;
- development of interaction between government and business

- Improvement of financial and statistical indicators of the regions
- Optimization of operational expenses of activities
- Increase in entrepreneurial activity
- Growth of tax revenues to budgets of all levels

- Modernization of construction and related industries
- Strengthening transport security, minimizing transport costs in construction
- The growth of innovation activity, as well as the attraction of domestic and foreign technologies

- Increasing the level of employment,
- welfare and quality of life of the population
- Increasing the level of provision of infrastructure facilities, as well as residential and commercial real estate
- Increase in the level of business activity of the population

- Increasing the level of information availability and awareness of all participants in logistics and construction activities
- Expanding the boundaries of government communication with business entities
- Unified information, regulatory and consulting platform

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the economic and social development of society with the help of public finance (Gryaznova A. G., 2004).

A panoramic review of the literature on this subject indicates that the focus of the research of the first group of scientists is focused on the importance of the structure of the financial mechanism, the second – on a system of measures aimed at using objectively existing financial relations, the third – on a set of methods by which economic laws or a set of forms, methods and levers used in financial relations are put into effect (Tarakanov V.V., Kalashnikov A.A., 2016).

It should also be noted that the structure of the financial mechanism itself is complex due to the fact that financial relations are diverse and depend on a large number of multi-vector factors: regulatory, socio-economic, managerial and other nature (Aleksandra Łuczak, Agnieszka Kozera, 2021). The most common opinion of scientists in the economic literature is that the structure of the financial mechanism covers five interrelated elements: regulatory, legal, information support, financial methods and financial levers.

All structural elements of the financial mechanism are interdependent and interrelated, integrated into a single ensemble, and the combination of specific types, forms and methods of organizing financial relations forms the "architecture of the financial mechanism". The subjects of the financial mechanism develop the most favorable instruments that meet the specifics of the activities of the main participants in the economic process, including prices and taxes, lending rates, duties and benefits, fines and sanctions, grants and grants, subventions and subsidies, interest and tariffs. These tools are used adequately to the methods of financing selected processes, their significance, level and scale of implementation. Due to the wealth of equipment with tools and methods, the financial mechanism acts as the most dynamic part of the financial policy formed by the country's leadership.

Based on the general understanding of the financial mechanism, it is possible to clarify the content of the mechanism of financial incentives for logistics activities in construction, taking into account its specifics.

The mechanism of financial stimulation of logistics activities in the construction business, according to the author, expresses the diverse connections between the subjects of transport and logistics activities on the issue of creating favorable conditions for construction on a specific territory and stimulating its development through the use of special tools.

The elements of this financial mechanism include: directly the subjects of financial incentives for logistics activities in construction, the goals of enhancing the development of logistics in the construction business, a set of financial methods to achieve the goals and the appropriate tools for their implementation, sources of means to achieve the goals, regulatory and information support for the processes of financial incentives for the development of logistics activities (see Fig. 2).

The subject of the author's in-depth research is the study of the separation of effective tools for financial incentives for the development of the logistics system in construction from the whole variety of tools that exist today (Bohdan Cherniavskyi, Radostin Vazov, 2020). The analytical research is based on the materials of the analysis of financial, investment, transport and logistics potential in the context of the regions of Poland.

The overall assessment of the effectiveness of the tools of financial incentives for the development of logistics in the construction business can be calculated using an integral index. According to the formula (1), which is calculated by the author as the product of the geometric averages of the model.

$$I = \sqrt[n]{P_1 \times P_2 \times P_3 \times P_4 \times \ldots \times P_n}$$

Where - I is an integral index for evaluating the effectiveness of financial incentives for the development of logistics in construction; \( P_n \) - individual indices of individual development potentials.
FINANCIAL INCENTIVE MECHANISM FOR LOGISTICS IN THE CONSTRUCTION BUSINESS

FORMS OF INCENTIVES:
- direct;  - indirect

Sources:
- governmental;  - non-governmental;  - mixed

DEVELOPMENT TOOLS:
- EU Budget Cohesion Funds;
- Polish National Road Construction Program for 2014-2023;
- State program investments in the Polish railway industry 2023;
- Financing of the EU ERTMS implementation program [European Railway Transportation Management System];
- Support of the Polish Information and Foreign Investment Agency (PIFIA);

SUBJECTS:
- the state represented by the authorized authorities;
- public and private domestic and foreign investors;
- financial and credit institutions;
- customers and contractors;
- subjects of economic activity;

Purpose:
- modernization of construction and related industries;
- increase in entrepreneurial activity;
- improvement of the investment climate;
- growth of tax revenues to budgets of all levels;
- improving the quality of life and increasing the welfare of the population;
- improving the level of national competitiveness

Result:
- innovative development;
- social effects;
- commercial effects

FINANCIAL METHODS:
- financing (budget, venture, mixed);
- co-financing;
- benefitment;
- lending;
- taxation;
- donation;
- subsidizing;
- investing;
- grant provision

FINANCIAL INSTRUMENTS:
- subsidies, subventions, budget allocations, loans and borrowings, investment tax credit, tax benefits and tax holidays, tax rates, special investment regime; special taxation regime, government contracts, financial assistance, grants, public-private partnership instruments

Regulatory and legal support:
- regulatory and legislative acts of the EU and Poland; National Development Strategy of Poland; state development programs; budgets of the country and its regions

Information support:
- information base on market conditions, investment climate; regulations and legislative acts, tenders, grants, FEZ (free economic zone) functioning

Fig. 2. Semantic content and structure of the mechanism of financial stimulation of logistics activities in construction

Analytical evaluation of the investment potential of logistics development in the context of provinces were carried out on the basis of generalization of statistical information from 2009 to 2019. The general trend line for all regions of Poland is shown in Fig. 3. The dynamics by regions in the context of the reporting periods (sample years) is shown in Fig. 4.

The assessment of transport and logistics potential is shown in Fig. 5 and 6, respectively. It should be noted that the generalized characteristic of transport and logistics potential contains both quantitative and qualitative indicators. In particular, Figure 6 shows the cartographic characteristics of the logistics potential in the context of the regions of Poland by the number of unloading and loading terminals and logistics centers.

Fig. 3. The trend of growth of the financial and investment potential of logistics development in the construction of Poland in 2009-2019

Fig. 5. Characteristics of Poland’s transport potential for 2010-2019
Diagram 7 clearly shows the comparison of financial-investment and transportation-logistics potential.

Financial instruments that can be used to stimulate business activity in the construction sector are grouped depending on the nature of their impact on the construction business. In this study, the total set of all instruments was divided into: group I (instruments of direct financial incentives), group II (package of mixed instruments – combinations of direct and indirect financial incentives), group III (instruments of indirect financial support).

As a result of the analysis of each financial incentive tool that is applicable to the logistics of the construction industry, it was possible to form a matrix of the use of financial instruments in the context of a vertical and horizontal strategy, which is presented below in table 1.

Table 1. - Matrix of the financial stimulation tools for horizontal and vertical logistics development strategy of the construction industry

<table>
<thead>
<tr>
<th>Incentives</th>
<th>Horizontal strategy</th>
<th>Vertical strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjustment tax rate</td>
<td>The solution to the problem of effective development transport and logistics enterprise is possible with regulation of the tax rate, seems to be effective with a horizontal strategy (+++)</td>
<td>Performance reduction because of the possibility of application of aggressive tax systems planning (+)</td>
</tr>
<tr>
<td>Incentives</td>
<td>Horizontal strategy</td>
<td>Vertical strategy</td>
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<tr>
<td>Tax holidays</td>
<td>Application as an effective tool to stimulate business in the context of negative dynamics of the macroeconomic indicators. Providing market equilibrium (+++).</td>
<td>High risks of dumping in regarding functioning subjects are reduced efficiency of using this tool (++).</td>
</tr>
<tr>
<td>Beneficial loans</td>
<td>Implementation as an effective tool for crisis management and business stimulation in regional development stagnation. Market equilibrium and anti-crisis regional development policy (+++).</td>
<td>With a vertical strategy the opportunity to boost the volume of domestic investment increases in a short-term perspective (++).</td>
</tr>
<tr>
<td>Benefits under investment agreements</td>
<td>Reducing efficiency of benefits, provided within the framework of investment agreements under the horizontal strategy are associated with possible budget losses (++).</td>
<td>Application of benefits in the framework of investment agreements in the vertical strategy is caused by opportunities to attract capital (++).</td>
</tr>
<tr>
<td>Investment subsidies</td>
<td>Low level of usage associated with insufficient the effectiveness of this incentive in a horizontal strategy because of the overly strict (+).</td>
<td>More effective with a vertical strategy, and encouraging targeted investment (++).</td>
</tr>
<tr>
<td>Export-oriented incentives</td>
<td>The lack of popularity of this tool is due to the existence of more effective tools of incentives</td>
<td>Within a vertical strategy, it is possible to intensify foreign economic activity and stimulate the growth of foreign direct investment (FDI) (+++).</td>
</tr>
<tr>
<td>Export processing zones</td>
<td>Effective in creating free economic zones (FEZ), industrial parks and clusters (+++).</td>
<td>More effective in combined with horizontal strategy (++).</td>
</tr>
</tbody>
</table>

References
1 + - rarely used;
2 ++ - are used often, but inefficient use is possible;
3 +++ – active priority application.

In table 1, financial incentive instruments are divided into three groups, depending on the level of demand for stimulating the development of logistics in the construction sector of the economy:
- weak usage;
- active use;
- priority use.

The selection of financial incentive instruments was carried out on the basis of the published results of the study "CONFIDENCE INDEX 2018/2019. Logistics and Supply Chain Optimism Index for Poland" and "Five factors influencing the development of the transport and logistics industry. Overview of trends in the development of transport and logistics in 2019".
The effectiveness of the above tools in the vertical strategy of financial incentives is explained, first of all, by the possibility of achieving a variety of goals when applying specific financial incentives for development. The main reason for using such preferences is mainly to stimulate investment activity, improve the investment climate and, especially, to attract foreign direct investment (FDI). The multiplicative effect of the inflow of FDI is not only to increase the level of employment of the population, as well as the increase in the number of high-paying jobs in the country, the introduction of advanced technologies, but also can have a positive impact on the growth of competition and increase the efficiency of domestic markets, thereby making a significant contribution to the overall economic development of the country.

The innovative-investment vector of development of the national economy as a whole and of the transport and logistics system in particular should become a national development priority. These processes are closely interlinked with issues of financial provision, which is the subject of scientific interest of many scientists. Blockchain technology (Britchenko I., Cherniavska T., 2019), automation and robotisation of processes (Lehmacher Wolfgang, 2021), optimization modeling and crowdsourcing are all becoming current realities (Lóránt A.Tavasszy, 2020).

At the same time, it should be taken into account that financial decentralization, being a vertical incentive, has a positive effect on tax revenues at the regional level, the activation of the activities of executive authorities in the context of maximizing the use of existing positive factors in order to increase business activity (Гореев Р.А., 2018).

The analysis of the advantages of using financial instruments as vectors of the policy of promoting the development of logistics in the construction industry of the Polish economy, first of all, allowed us to conclude about the possibilities of using various types of financial incentives and instruments, divided into three main groups depending on their priority in a particular region. Thus, it is of practical importance to select effective tools for improving financial incentives for industrial production, consisting of a matrix of using tools to stimulate the development of logistics activities with horizontal and vertical strategies (Qaiser F.H., Ahmed K., Sykora M. et al., 2017).

Conclusions

Therefore, we can conclude that in the world, and in Poland in particular, the stimulation of logistics development through the use of effective financial instruments in all sectors of the economy, including construction, is a strategic decision. In the conditions of financial resources shortage and limited budget funds, it is recommended to use indirect and mixed instruments of financial stimulation. Identification of strengths and weaknesses, parametric evaluation of actual financial-investment and transport-logistic potentials allow to form an ensemble of effective instruments of financial stimulation of construction logistics development in the context of Polish regions, thereby optimizing the financial mechanism. In order to strengthen the position of Poland as a competitive state, a broad configuration of financial tools as incentives for the progressive development of the system of transport and cargo logistics is proposed.

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