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## **Integrated logistics solutions in the enterprise’s development strategy**

### **Zintegrowane rozwiązania logistyczne w strategii rozwoju przedsiębiorstwa**

**Abstract.** The article discusses the concept of integrated logistics, which is an interconnected set of operations of the enterprise management system, providing for the balanced movement of material, information and financial flows of the company. Guided by the basic principles of integrated logistics is proposed the basic platform of the hierarchical structure of the enterprise logistics system in the form of logistics network configuration. This will allow real enterprises to build their own integrated logistics system, define their logistics mission and strategy, and identify business processes for managing resource flows. For the acceptance of the integrated logistic decisions within the limits of concrete strategic problems the simulation model of formation of economic streams of the building enterprise taking into account functioning of a set of the interconnected and interconnected streams corresponding to certain business processes is offered. The stages of logistic flows are defined, creating the basis for the formation of an integrated logistic system. A mechanism has been developed for the functioning of a construction company within the logistics system at the strategic and tactical levels of management, which makes it possible to coordinate the activities of units related to logistics activities.

**Key words:** business process, logistics system, logistic process, building industry

**Synopsis.** W artykule omówiono koncepcję zintegrowanej logistyki, która jest połączonym zestawem operacji systemu zarządzania przedsiębiorstwem, zapewniającym zrównoważony przepływ materiałów, informacji i przepływów finansowych firmy. Kierując się podstawowymi zasadami zintegrowanej logistyki, zaproponowano podstawową platformę hierarchicznej struktury systemu logistycznego przedsiębiorstwa w postaci konfiguracji sieci logistycznej. Pozwoli to prawdziwym przedsiębiorstwom zbudować własny zintegrowany system logistyczny, zdefiniować misję i strategię logistyczną oraz zidentyfikować procesy biznesowe do zarządzania przepływami zasobów. Do akceptacji zintegrowanych decyzji logistycznych w granicach konkretnych

problemów strategicznych oferowany jest model symulacyjny tworzenia strumieni ekonomicznych przedsiębiorstwa budowlanego, uwzględniający funkcjonowanie zestawu połączonych i połączonych strumieni odpowiadających niektórym procesom biznesowym. Zdefiniowano etapy przepływów logistycznych, tworząc podstawę do utworzenia zintegrowanego systemu logistycznego. Opracowano mechanizm funkcjonowania firmy budowlanej w systemie logistycznym na strategicznym i taktycznym poziomie zarządzania, który umożliwia koordynację działań jednostek związanych z działaniami logistycznymi.

**Słowa kluczowe:** proces biznesowy, system logistyczny, proces logistyczny, branża budowlana

## **Introduction**

In modern conditions of market economy companies have to solve problems connected with effective material resources management. That's why the effectiveness of companies' functioning considerably depends on the integration of present management systems of delivery, manufacturing, transportation and sales processes. The concept demands new approaches to the management of the companies' business processes taking into account integration processes on the market. Integrated processes are accompanied by the development of logistics that is based on the system approach to organization and management.

Lately, many Ukrainian companies, use a system approach to business processes organization and pay considerable attention to the implementation of integrated logistics management of input and output material flow. It is mainly explained with the establishment of commodity market structure and strengthening of competition [Amitan et al., 2003]. However, not all characteristics of integration processes development are fully researched what demands the necessity of their analysis.

## **The purpose and the research methods**

The main objective of the study is to develop the ideal image of the business process management system of a construction enterprise in the context of the implementation of the integrated logistics concept.

The example of a company from the construction industry was used and based on its system, the place of logistics in the process of achieving strategic goals was identified. Literature in the field of logistics was used, primarily authors from Ukraine and Russia, because the considerations undertaken in the study were embedded in the realities of the post-Soviet economy. The conclusions constructed at the end of the study are global, referring to all the phenomena occurring in the environment of modern enterprises, whose success is also determined by logistic excellence.

## **Logistics as a part of the enterprise system**

The modern practice of management is characterized by an intensive transformation from the management of separate logistic functions or operations to management of the business processes that demand implementation of integrated logistics concept. Logistics

business process is an interconnected complex of operations and functions that change over resources of the company into the result according to the logistics strategy of the company [Bowersox and Closs 2008].

In the time of the Soviet Union, the companies were interdependent in the border of the unitary environment. Breakdown of the USSR led to the severance of effective inter economic ties among the companies. The modern period of the Ukrainian economy development is characterized by a high level of production separation, and lack of elements necessary for the provision of the non-stop working cycle.

Logistics business processes of the company are concentrated on the planning and coordination of material flow, purchase, production and delivery of products to consumers [Frolova 2004, Uoters 2003]. Effective management of the business processes allows to shorten stocks, provides the control over the volume of incomplete production, decreases risks, fastens material flow and capital turnover, provides coordination of material-technical resources delivery, production and technological packing with work that leads to high effectiveness of the whole production cycle [Krykavskiy and Chornopyska 2012].

It is important to work out mechanisms of informational interaction of participants in the delivery chain. Application of the mechanisms allows achieving maximum coordination of logistics operation fulfilment, providing coordination of actions of all the participants in the delivery process of the company. Such an approach can be realized on the base of integration as a union of participants in the logistics chain with the purpose of organization of balanced movement of material, informational and financial flow.

Integral logistic approach oriented on all the participants of the process consists of:

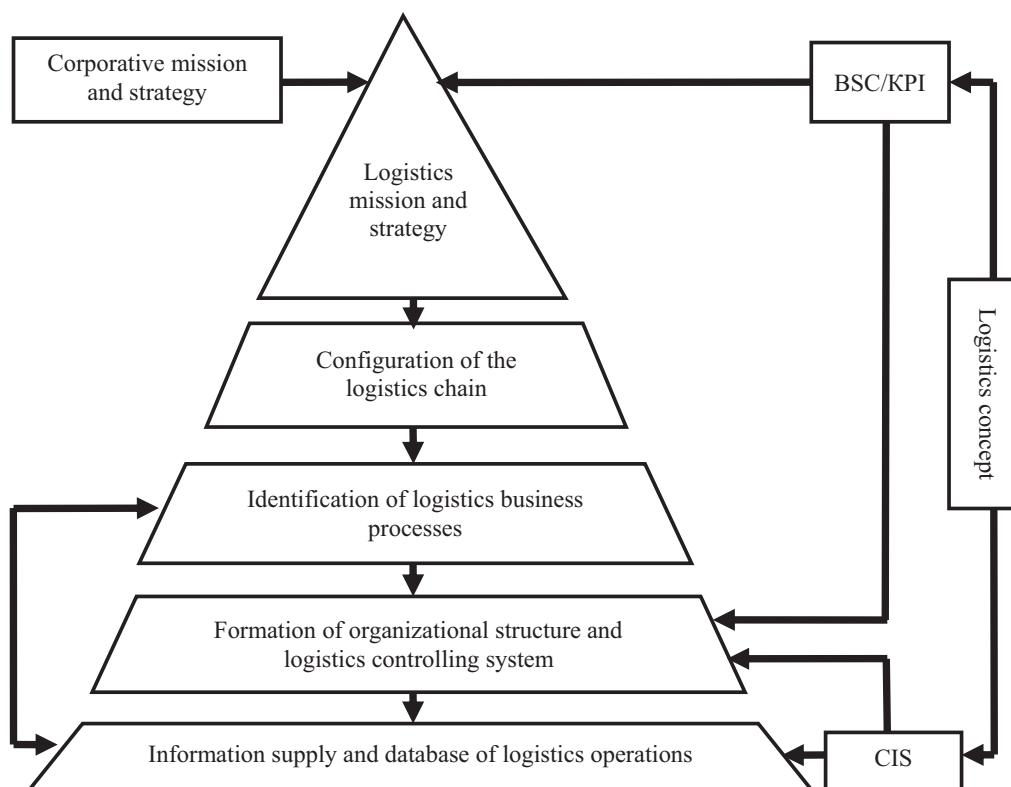
- technological processes within one department of the company,
- logistic processes among the departments within the company,
- logistic connections among the companies in the logistic chain,
- suppliers,
- consumers.

The main reasons that cause the necessity of logistic approach implementation for the strategic management of the companies are:

- integral features of logistics that unite all the participants of the regional complex: factories-suppliers of materials and products, buying, delivery, packing, transporting and other organizations,
- logistics creates the conditions for effective cooperation among all the participants of the process because it is based on the satisfaction of common economic interests of all the participants of logistics chains and systems,
- the logistical approach leads to the economical use of resources because logistics is based on the system approach to the organization of material, labour, financial and informational flows in the process [Tkachova and Zahorna 2012].

Formation of the enterprise's logistics is described by a certain sequence (Fig. 1).

On the first stage, a corporative strategy is formulated, on its base configuration of the network is made. It determines the main business processes that initiate organizational structure of management. After that informational support, the system of indicators' control and record for the estimation of logistics effectiveness (controlling) are determined [Cherchata 2016]. The base of the hierarchic structure of the logistics system makes logistics functions and operations individual for each building company.



**CIS – Corporation Information System; BSC – Balanced Scorecard; KPI – Key Performance Indicators**

Figure 1. Logistics in the system of a created enterprise

Rysunek 1. Logistyka w systemie tworzonego przedsiębiorstwa

Source: own elaboration.

Process control of any object must be based on a system approach. It is necessary to consider an object or a subject matter, a methodology and method for the management process as a system.

An object of logistic management is logistic flow as a complex of material, information and financial flows. A subject is an effective organization of logistic flows based on synchronization of their interaction and synergy using [Holweg and Rich 2004]. Therefore the result of logistics usage is creating an effective logistics system where the coordinated motion of flows providing rational business-processes operating during the whole life cycle of the project is fulfilled.

The logistic system is determined as an adopted system with feedback that performs certain logistic functions, consists of several subsystems and has a connection with the external environment [Vasylevskyi et al. 2008].

Let us consider the process of forming a logistics system on the example of a construction company in the building industry. With the increasing of economic flows intensification necessity in logistics usage for the building industry is up.

Effective using of logistical approach in the construction industry is provided by the following factors:

- technological for ensuring non-stop duration of the building process, constant and full loading of manufacturing capacity.

- economical, their basis is an interdependence of financial and economic results of the activity of all the participants of the building process and their influence on the final economical results of the building process. The most important organizational and technical precondition for the formation of stable macro logistical systems in the building industry is providing effective technology of building material and products manufacturing. It means one must provide the correspondence between characteristics of material, products, constructions and their technology manufacturing, transportation and installation. The total technological flow of material resources is the sum of technology manufacturing, transport technology, installation technology, and operation technology [Popovychenko and Cherchata 2017].

The management of engineering and construction processes includes differentiation of material and connected flows on all the stages of the project life cycle within the logistic system (Fig. 2). On that figure conformity between the flows and certain business processes within the project is shown.

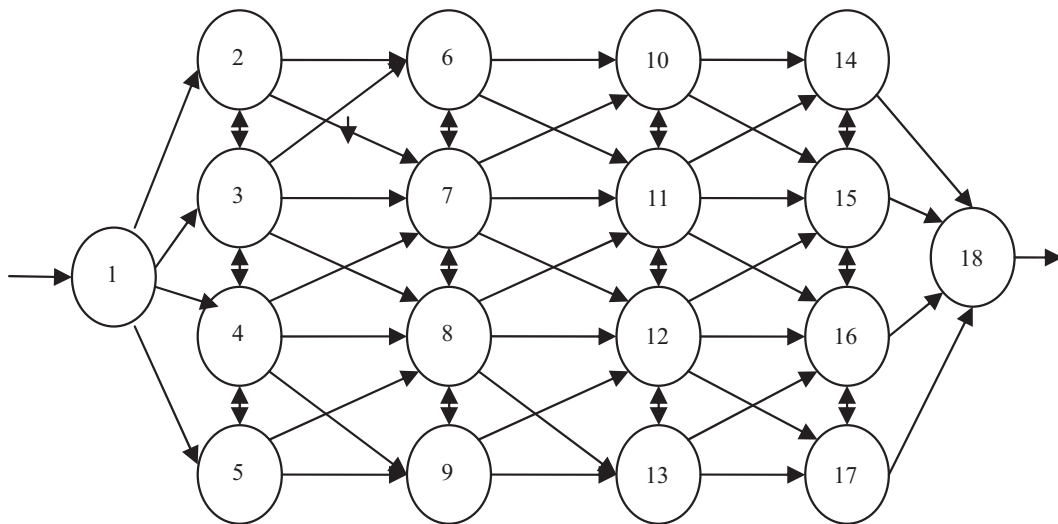


Figure 2. Formation of construction enterprise's flows in the logistic system

Rysunek 2. Formowanie przepływów przedsiębiorstwa budowlanego w systemie logistycznym

Source: own study.

The identified symbols mean:

1. Input flow (resourcing of construction process).
2. The flow of the material resources (resourcing of construction process).
3. The flow of financial resources (financial resources management).
4. Information flow (penetrates all the business processes of a construction company).
5. The flow of labor resources (provision of human resources).
6. Purchase of material and technical resources (resourcing of the building process; equipment and material procurement for production).
7. Payment of material and labor resources as well as information (financial flows management).
8. Designing estimates (design and prospecting operations and engineering).
9. Recruitment and training of the workforce (human resources management).

10. Transportation, storage and industrial consumption of material resources (transportation of material resources, storage of stocks, constructions, products; production business processes, electricity, water, gas supply).
11. Payment of construction, installation and subcontract work (financial flows management).
12. Current calendar planning of the construction process.
13. Labour process organization (human resources management).
14. Sale of the building products (marketing activity management).
15. Payment for finished building products (financial flows management).
16. Advertisement and other informational and commercial communications marketing activity management).
17. Intracompany migration of labor resources and motivation (human resources management).
18. Output economical flows (construction operations, capitalized repairs, repair and construction work, mounting of engineering systems).

The model simplifies real economical flows of the building company and enables to observe its types and interconnections. In the model the material flow is shown as a complex of operations: 1-2-6-10-14-18, financial flow: 1-3-7-11-15-18, informational: 1-4-8-12-16-18; labour: 1-5-9-13-17-18.

The strategy of logistic implementation must be formed on the level of high management of the building company and includes the following tasks:

- economic justification of the implementation of the logistics,
- formation and support of the long-term programs of material and technical supply and building products manufacturing,
- formation and management of logistics chains of the building production,
- financial flows of the logistics system management,
- formation of the long-term strategic directions for the organization of production and technological supply of the construction projects,
- control over informal internal business information and its harmonization the logistics procedures,
- organization of the management accounting for the building process.

In general planning of the building process using a logistic system as well as the interconnection of strategic and operative subsystems is shown on Figure 3.

On the first step of the business project, tasks are checked on the correspondence of mission and corporative purposes.

On the second step marketing researches of the real estate market are held for market situation estimation and making a forecast of the demand parameters. Preplanning of sales, estimation of material needs and its assets backing is worked out. Taking into account predicted orders the construction program and calendar plan of projects realization is formed including determination demands in production facilities.

On the third step demands in construction facilities are detailed over the types of building equipment according to the requirements of the construction project. According to the calendar plan of the construction demand in materials for the project is estimated. Calendar plan of the project is differentiated to the purchase plan and service plan. Provision of each plan with facilities is estimated.

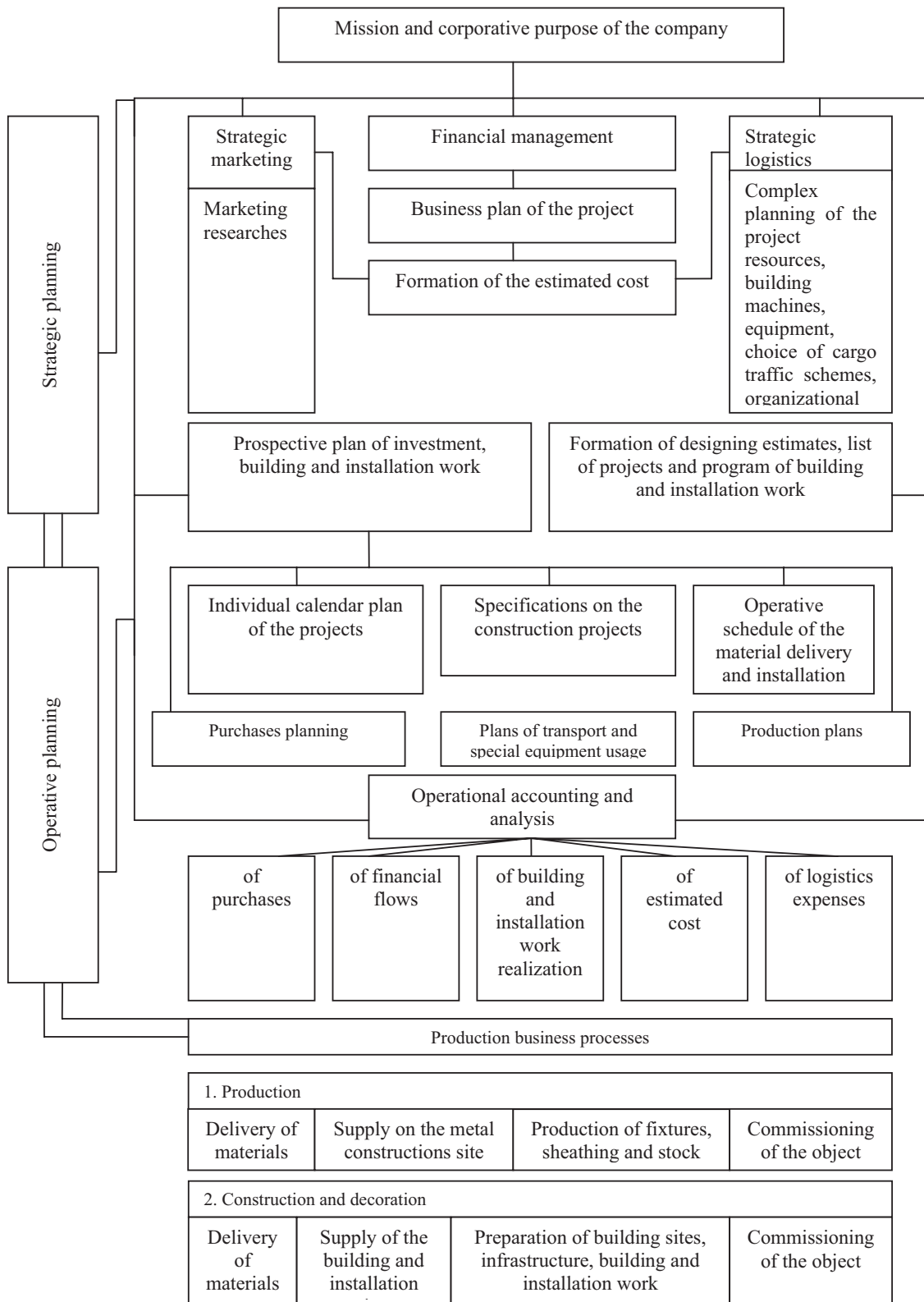


Figure 3. Construction company logistics management

Rysunek 3. Zarządzanie logistyką przedsiębiorstwa budowlanego

Source: own study.

On the fourth step operative management of subsequent and parallel business processes, accounting, controlling and analytical functions are realized. They provide plans realization and analysis and final construction cost and expenses of the building company estimation.

In general, the whole planning cycle includes solving the following tasks:

- specification of the construction projects taking into account their changes and additions,
- preparation of long-term installation schedule taking into account manufacturing resources,
- preparation of the month's operative installation schedule,
- supply schedule preparation of the construction projects with ferroconcrete structures and items based on the installation schedule data and/or operative installation schedule, labour and material resources,
- preparation of material procurement plan according to the balance of stock and operative installation schedule (or prospective schedule while forming long-term plans),
- preparation of applications to the material and technical supply department,
- control of the realization of the plans.

## **Conclusions**

Fierce competition in the construction services market has led to significant changes in the basic foundations of logistics, which has turned from an auxiliary tool to support individual business processes into a powerful tool to increase the competitive advantages of organizing and conducting business. Enterprises of the construction industry demanded a transition from a marketing logistics concept to the concept of integrated logistics, based on a synthesis of models for managing the flow of material, information and financial resources.

The approach presented in the study to create the ideal image of the business process management system of a construction enterprise in the context of implementing the integrated logistics concept allows making effective logistics decisions in the conditions of unstable development of the business environment.

The scientific results obtained on the development of the platform of the hierarchical structure of the enterprise's logistics system should guide the practical implementation of the construction industry enterprises in the economic activity. This will optimize real economic flows and identify the directions of their structuring in the process of creating a construction product.

The proposed model for the formation of an integrated logistics system allows us to solve the problems of analytical support for making logistics decisions on material and technical, transport and storage support for construction production in modern conditions.



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