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Research paper

Integrating the BSC and KPI Systems for Improving the Efficiency of Logistic Strategy Implementation in Construction Companies

Volodymyr Gryshko[1]*, Mykola Zos-Kior[2], Olena Zerniuk[3]

[1] *Poltava National Technical Yuri Kondratyuk University, Ukraine*
[2] *Poltava National Technical Yuri Kondratyuk University, Ukraine*
[3] *Poltava National Technical Yuri Kondratyuk University, Ukraine*
**Corresponding Author E-Mail: Zoskior@Gmail.Com*

Abstract

The article presents the theoretical and practical basis of BSC and KPI systems integration with a view to improve the efficiency of logistic strategy implementation at construction enterprises. It has been determined that an information logistic system of a construction company should be based on the system of complex performance indexes of logistic activity and it also should have a corresponding to them logistics information system that reflects the running state of logistic strategy implementation and enables to evaluate its efficiency. The exogenous variables, affecting the indicated efficiency, have also been presented in an entry. Based on the research findings, it has been concluded that the proposed guidepost indicators provide an opportunity to insure the process of logistic activity based on modern approaches and procedures in accordance with the chosen logistics strategy of the construction company.

Keywords: *balanced scorecard system, construction company management, information decision support, key performance indices, logistic strategy.*

1. Introduction

Even the most effective solution does not guaranty its effective execution. Logistics strategy of the enterprise, as well as any managerial decision, requires a qualitative performance evaluation, which is based on a set of performance indicators of the enterprise logistics system development. The subset of performance indicators is an integral part of information system effectiveness at the enterprise, which makes it possible to monitor the logistics strategy implementation. Unfortunately, in Ukraine, the underdevelopment of information systems in construction companies regarding logistical expenditure records and cost management is predominantly discernible. Alongside this, there is also no accurate and clear systematization of the indicators system for assessing the results of logistic activities, which in its turn does not allow either to effectively manage logistics costs, logistics system and logistics chains, or to implement effectively the logistics strategy of enterprises. For this reason, at present we consider to be of current interest the formation of an information logistics system of a construction company, which will be based on a system of logistic activity composite indicators, which will reflect the running state of logistics strategy implementation and will allow to evaluate its effectiveness.

2. Main Body

The information logistics system of a construction company should be based on the system of logistic activity composite indicators and ought to have a corresponding to them logistics information system that reflects the running state of logistic strategy implementation and allows to evaluate its efficiency.

2.1. Dynamics of Investments and Results of Activity of Construction Companies

For instance, over 2010-2015 years residential fixed investment in Ukraine per capita grew by 79.9%, which in percentage to the total capital investment combines to 16.7% (Table 1).

Table 1: Capital investment in residential construction[1]

	At current prices, mln. UAH	Percentage of total	At UAH per one person	Index of capital investment in % of	
				the previous year	2010
2010	25754	14,3	594,0	x	100,0
2011	26582	11,0	615,4	86,3	86,3
2012	34256	12,5	795,2	116,2	100,3
2013	36129	14,5	840,8	103,6	103,9
2014	33177	15,1	774,6	83,5	86,8
2015	45610	16,7	1068,8	108,5	94,2

At the same time, over 2010-2016 years the total quantity of built apartments per 1000 inhabitants of the resident population increased by 75%, which, with the inflation rate of 204.9% over the same period (Table 2), may indicate either an improvement of the efficiency in the industry through the introduction of innovative solutions, related to the resources management and cost management, or the deterioration of the quality of performed work and the housing itself or the reduction of the business profitability.

[1] Residential construction in Ukraine, 2010-2015. Statistical publication. Kyiv, 2016. – 89 p.

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Table 2: Total number of apartments built (units)[2]

	Total			per 1 000 resident population		
	of apartments built	including		of apartments built	including	
		in urban areas	in rural areas		in urban areas	in rural areas
2010	71292	52564	18728	1,6	1,8	1,4
2011	77330	61455	15875	1,8	2,1	1,2
2012	83355	63115	20240	1,9	2,1	1,5
2013	92612	67163	25449	2,2	2,3	1,9
2014	105241	76991	28250	2,5	2,6	2,1
2015	120307	89076	31231	2,8	3,0	2,4

Namely, we can trace an uncertainty about the working efficiency of a construction company, which is difficult to investigate.

2.2. Exogenous and Endogenous Variables Affecting the Effectiveness of Logistics Strategy Implementation at Construction Enterprises

Taking the above mentioned into consideration, it is possible to present exogenous variables that influence the indicated efficiency:
construction enterprises, while carrying out their primary activities, spend the funds of population on the housing construction;
technological development, improvement of construction technology, and therefore the improvement in the quality of newly-built housing, receive funding from investments in the industry;
timely project construction and suitable quality of executed works significantly depend on the material remuneration of workers-builders, that is, on labour payment expenses. For this reason, the annual payroll is important for all construction companies in a particular industry [7, 9, 11, 13, 14]. It affords an opportunity to take into account the specific character of construction production, which is associated with a considerable part of the works, which are still performed manually.
Consequently, due to the changes in the volume of investments in construction enterprises from all possible sources, changes in investments of the population in housing construction and changes in the payroll budget [2, 4, 8], there will be changes in such effective endogenous variables as:
the total floor area of housing accommodations, put into operation over the year;
general housing stock throughout the region;
the financial result of construction companies before tax.

2.3. Scheme for Implementing the BSC and KPI System

From theoretical and practical perspectives, a common system of such indicators – "the Balanced Scorecard (BSC)" – has been developed to assess the efficiency of work execution. This management system, developed in early 1990-s by Robert S. Kaplan and David P. Norton, the purpose of which is to provide more precise statement of strategic plans and their implementation, is wider in its intended purpose than the systems that measure only financial figures [3, 5]. In terms of logistics and logistics strategy implementation, BSC focuses on business processes and uses the set of quantifiable measures - Key Performance Indicators (KPI).
Hereat, in order to raise the efficiency of logistics strategy implementation in construction companies, it is advisable to introduce this balanced scorecard system.
BSC ensures the integration of financial and nonfinancial indicators, taking into account the cause-and-effect relations between the resulting indicators and the factors under the influence of which they are formed. This allows for detailed monitoring of the enterprise activities in strategic focus, provides an opportunity to increase the efficiency and effectiveness of managerial decisions, offers the possibility of controlling the most important financial and nonfinancial performance indicators (KPI) that are of special purpose for a construction company, and the degree of achievement of which is determined by its movement in accordance with the stated strategy. The KPI values reflect both the business performance as a whole and business processes that are considered separately, business units and personnel resources.
The Kaplan and Norton's system allows managers to represent business in four perspectives:
customer perspective;
internal process perspective;
learning and growth perspective;
financial perspective [1, 6, 10, 12, 15].
BSC significantly widens the choices of strategic management, making it more realistic. For this reason, the development of the formation and use of this conception in managerial systems of a construction company posesses great promising value.
BSC and KPI are modern tools for achieving strategic targets of both the company and its logistics system, as well as the effective implementation of the logistics strategy.
The following scheme of BSC and KPI system implementation for a construction company will allow to improve significantly the efficiency of both the development and the implementation of logistics strategy (Figure 1).

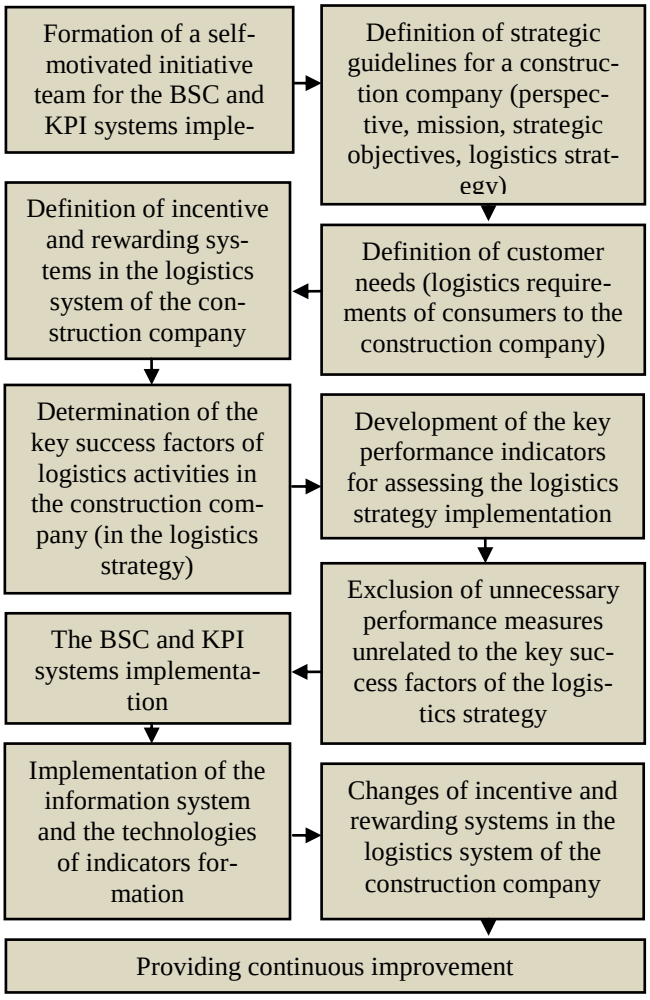


Fig. 1: The mechanism of the BSC and KPI systems implementation for the logistics system of a construction company

In fact, by implementing the system of indicators without significant costs (only expenses on improving the information system and developing the scorecard) under an effective management of change system, we will receive a qualitative tool for assessing the effectiveness of implementing not only the logistics strategy of the construction company, but also its other strategic goals and objectives. In order to develop the KPI in accordance with the goals and objectives, required for the logistics strategy implementation, the construction company should use the rules and principles: the rule "10/80/10" - the company ought to have about 10 key measures of

[2] Residential construction in Ukraine, 2010-2015. Statistical publication. Kyiv, 2016. – 89 p.

efficiency, up to 80 business performance indicators and 10 key performance indicators; the principle of manageability and the controllability concept; the principle of co-partnership; the principle of transferring the efforts to the privileged directions; the principle of process integration of performance evaluation, rendering of accounts assessment, productivization; the principle of coordinating between the indicators with the strategy.

After developing the key indicators system, focused on success factors, critical for a company, it is necessary to analyse the assessment system of logistics performance results and the rewards and incentives systems in order to bring them into line with the key indicators. If it is not done, then the motivation of managers will be carried out according to the old rules, which, in its turn, will have an impact on the quality of achieving strategic goals.

2.4. Components of a Construction Company Logistics Strategy

In order to estimate the implementation of logistics strategy in a construction company, we offer the following indicator sets:

the general set of KPI for estimating the implementation of the enterprise logistics strategy;

specific sets of KPI for estimating the logistics strategy implementation in certain areas of logistics:

the supply area KPI or logistic support KPI;

the manufacturing KPI;

the distribution area KPI;

the KPI of logistics infrastructure systems (transport, warehouse, stocks, provisions, information, service) – fig. 2.

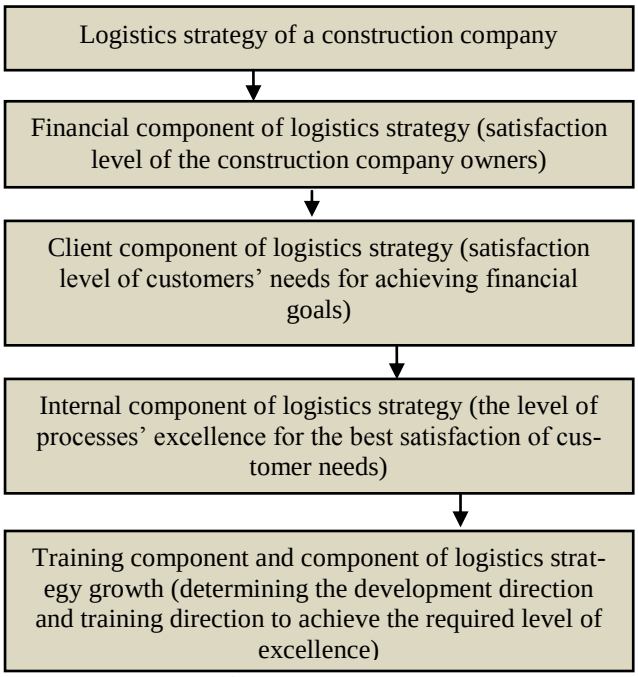


Fig. 2. Components of a construction company logistics strategy

Nonetheless, according to the Kaplan-Norton scorecard methodology, the establishment of the sales performance indicators system of logistics strategy should include four components that must be considered when establishing an indicators system. Among the general KPI for the enterprise it is expedient to use those that reflect logistics strategy direction: common logistics costs; the quality of logistics service; the duration of logistic cycles; productive efficiency; return on investment in logistics infrastructure.

The system of key performance indicators of the effectiveness of evaluating the logistics strategy includes the indicators sets, the composition of which, starting with the client level, significantly depends on the direction of logistics strategy. So, for example, for logistics strategy of the construction company, targeted at logistics costs, the key performance indicators should be the indicators, oriented to logistics costs of the company, focused on this very direction and ought to include the following components (Table 3).

Table 3: KPI for estimating the implementation of the cost-oriented logistics strategy in a construction company

Strategic Goal	Indicators
Financial component of logistics strategy	
The growth of the enterprise earning power	Return on assets, net operating income after taxes deduction
Increase in sales of products	Income of an enterprise, working or current assets
Optimization of logistics costs	Total logistics costs, specific logistical costs
Client component of logistics strategy	
Diminution in the final value of products, works, services	The quantity traded
Providing optimization of the range of products according to profit-earning capacity	Profitability of sales
Diminution in the value of intermediary services in prices of products, works and services	Share of the cost of intermediary services in the price of products, works, services
Service activities at the minimum required level	Maintenance costs in relation to sales volumes
Internal component of logistics strategy	
Optimization of the raw materials supply system	Outlay for purchase, the share of raw materials in the products value
Optimization of services according to the "profits-expenses" scheme	Revenue with reference to cost-to-service expenses
Expenditure management system implementation or development	Rate of consumption
Reduction of logistics operations duration	Operational and logistics cycles
the BSC and KPI implementation	The level of strategic goals achievement
Strategic logistics management implementation	The level of logistics strategic goals achievement
Mastering of new technologies and equipment	Return on investment in innovation
Formation of the distribution system, most appropriate in expenses	Distribution expenses in relation to the volume of sales
Training component and component of logistics strategy growth	
Implementation of incentive system for costs	The share of the cost savings amount in the total amount of expenses
Improvement of personnel running efficiency according to operations	Productive efficiency of the personnel
Creation of corporate culture aimed at changes	Actual realization time of changes in relation to the planned time
Staff incentives in order to facilitate innovation development	The number of innovations per one worker

The offered indicators should be included in the information system of a construction company. The process of their introduction has to be implemented stagewise – at first, the most important indicators are introduced, and in due course - all the rest ones (it allows to avoid the information system overloading).

3. Conclusion

The process of forming a logistics strategy is a rather complex process, especially for construction companies. The proposed guidepost indicators provide an opportunity to insure the process of logistic activity based on modern approaches and procedures in accordance with the chosen logistics strategy of the construction company.

Benefits of using a balanced scorecard system of indicators:

fundamental understanding of business in all interconnections of internal and external processes;

strategic business orientation of all business units and employees;

stepping up the rate of growth of strategic goals achievement;

purposeful focused allocation of all resources;

performance evaluation of managerial decisions within the framework of the construction company's strategy;

understanding by all the employees of the construction company's strategic goals and of their personal goals upon reaching them;

improvement of professional engagement and interaction between employees and business units;

obtaining key business information in an understandable, generalized, non-random manner;
personal responsibility of the managerial personnel and average executives for the performance of indicators, assigned to them;
increase in staff motivation due to clear personal goals and objectives.
Consequently, the key performance indicators system lays the necessary groundwork for assessing the logistics strategy of the construction company and increases the information support level of logistics solutions.

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