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SIGNIFICANCE OF LOGISTIC CONTROLLING AS A BASE FOR FILLING GOALS OF BUSINESS STRATEGY

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Abstract: Logistics costs form one group of total business costs that fundamentally affect the performance of the firm, which is part of the business strategy orientated to minimize costs. Logistics controlling has to be part of the business management system for a reasonable evaluation of the performance of logistic processes and their influence to profit. The main goal of this paper to points to the significance of synergy of economic analysis, statistics, logistic controlling, dashboarding for filling the aims of business strategy. Effective logistic management the means of optimizing logistics costs, improvement of logistic processes, and achieving a business profit. We use economic, statistical analyses, controlling, dashboarding, and a questionary survey in this paper. An effective tool for improving the goals of business strategy in the logistic area is the implementation of logistics controlling presented by software EIS Dominant, results of analyses by a dashboarding, logistic performance by statistic, and economic analyses. Results of all analyses point to reducing logistic costs and improving the financial situation. This fact is an effective instrument for logistic improvement and innovation in logistic processes, implementation of logistics controlling. Logistics controlling is a system of rules which helps achieve business goals by minimizing costs.

1 Introduction

Today, firms operate in a complex competitive environment that requires fundamental changes in approaches, conceptions, methods, and instruments as is logistic controlling [1]. Business strategy is orientated on minimalization costs in the firms and logistic costs create one type of total business costs [2]. The main goal of this paper to points to the significance of synergy of economic analysis, statistics, logistic controlling, dashboarding for filling the aims of business strategy. Through economic and statistical analyses we show the significance of logistic controlling and its implementation in the firms. Management approaches these costs through the Balance ScoreCard approach, which allows to track logistics costs in terms of their financial perspective (Figure 1) [3]. BSC approach is orientated to logistic processes too. It is a tool for the efficient management of logistics processes.

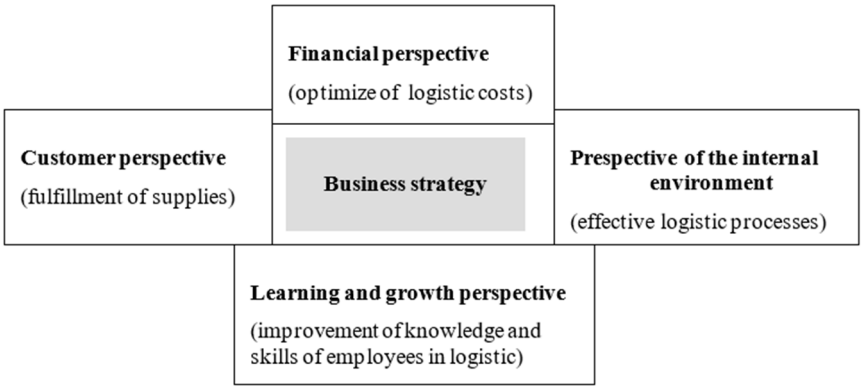

Figure 1 BSC approach for implementation logistics controlling
Source: own source

The basis of the BSC approach as a strategic instrument is to monitor logistic costs and their influence on the financial structure, sources and performance indicators [4,5]. Management of logistics costs requires a change of approach in terms of ensuring direct information flows on the occurrence of generic costs of logistics processes [6]. The base of business strategy is building of an information system based on accounting and reporting, connecting this

system with the company's management system so that information on logistic costs of logistics processes [7,8]. The reason for these changes is to optimize logistics costs and their reduction[9]. An effective tool for the implementation of these measures is the introduction of logistics controlling. Logistics is an important area in the IPO (input, process, output) chain in the firm. The chain of logistics activities ensures the smooth running of the production process and each logistics activity is associated with the occurrence of logistics costs [10]. These costs represent non-negligible items that greatly affect the firm's overall profit as well as profit generation. Monitoring of logistic costs in the concept of logistics processes is a base for identifying rationalization measures, innovations, improvements. Logistic controlling (Figure 2) creates part of the management information system in the firms. Logistics controlling means to fill business goals, to fill up business rules, to achieve profit, to keep law, norms, to guide business activities [11]. The management information system needs new innovations in the field of logistics from the perspective of Logistics 4.0 and therefore it is necessary to change the approach in companies and implement tools such as logistics controlling [12].

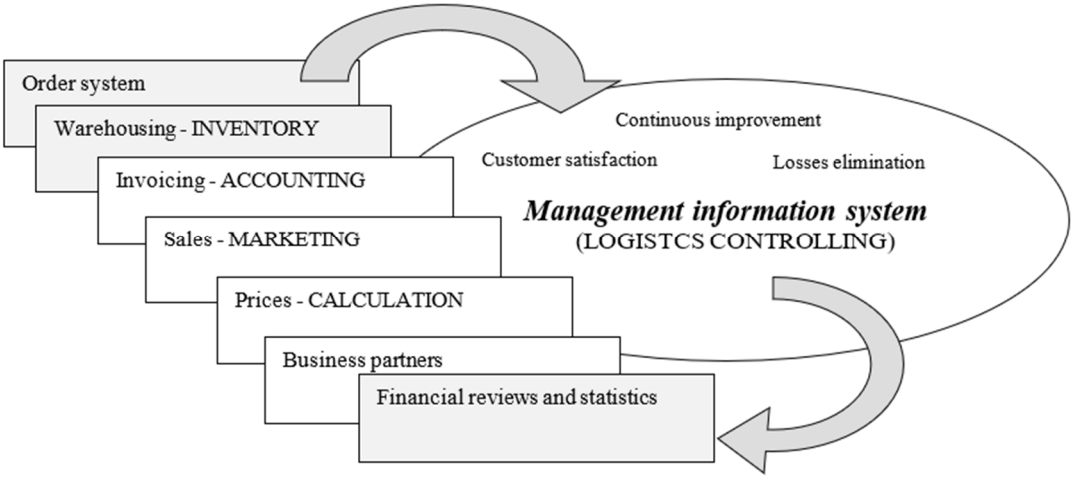

Figure 2 Business management information system with logistics controlling
Source: own source

Logistics costs (Figure 3) are cost that creating by logistic processes in the frame of the IPO chain in business. They are reported as logistics chain costs or costs for ordering, supply, material handling, storage, packaging, transport, and distribution. They are expressed in absolute terms or assigned to a unit of logistics performance, for the product, to order, etc. Logistics costs largely affect the number of total costs, as they are reflected mainly in the category of overhead costs, the share of which shows a growing trend in companies. Multiple- method analysis brings advantages for minimizing logistic costs and their checking, planning, leading [13,14].

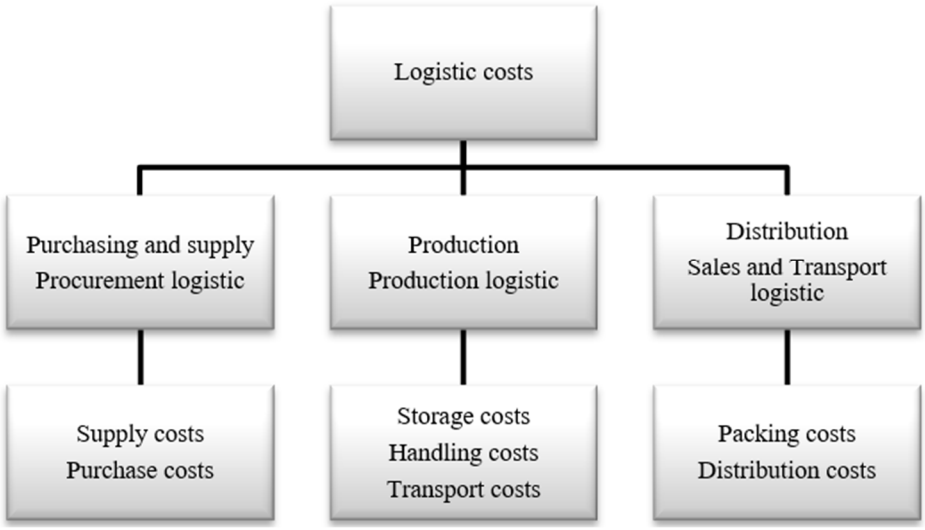

Figure 3 Type of logistic costs
Source: own source

Logistics costs become unproductive e.g. in the event of an unplanned method of procuring stocks, in the event of an excessive storage of stocks, in the event of an inappropriate choice of mode of transport, in the case of uncontrolled handling of goods what we can receive by accounting system in logistic [15]. These reasons also force managers, to look for solving, how to streamline the system of monitoring and control of costs within individual logistics processes. The theory of constraints is a supporting element of logistic controlling and that is important to integrate it in logistic controlling [16]. Logistic cost groups form an integral part of total costs and create customer value chain analysis [17]. Reducing total costs in companies is one of the business goals of the business strategy that must be orientated to human resources in logistic processes too and their motivation is a point to optimize costs in the firm [18]. Reducing total costs influences the profit and efficiency of the business. Logistic controlling is one instrument of how to check logistic costs. It is a concept that coordinates planning, organization, control, information flows, leading of people in logistic processes, analyze logistic risks, aims of green logistics, the benefits of reverse logistics [19,20]. Controlling mainly includes the following activities: finding out the current state (analysis), forecasting, setting goals, planning, and budgeting, checking for deviations from the plan, determining the causes of deviations, setting new goals in business strategy. The main controlling concept is based on comparative analyses for plan and actual logistic costs. Identifying deviations and causes of these deviations, monitoring the impact of deviations on the fulfillment of a predetermined goal, which is measurable by economic indicators. Controlling is based on defining the goals that the company wants to achieve in the logistic area. An important goal of business strategy is to reduce logistics costs.

2 Methodology

As part of the research, we followed a 5-step algorithm (Figure 4), which represented the following phases of solving the research problem: a collection of data from internal sources of the selected firm, implementation of a questionnaire survey on the use of management tools in companies, implementation of software support instrument EIS for doing logistic controlling, the realization of economic analyzed, evaluation of results of economic analyses and suggest innovative solutions. Through this algorithm, we tried to point out the importance and possibilities of using logistics controlling the firms as a tool for meeting the goals of corporate strategy that is orientated to minimize logistic costs.

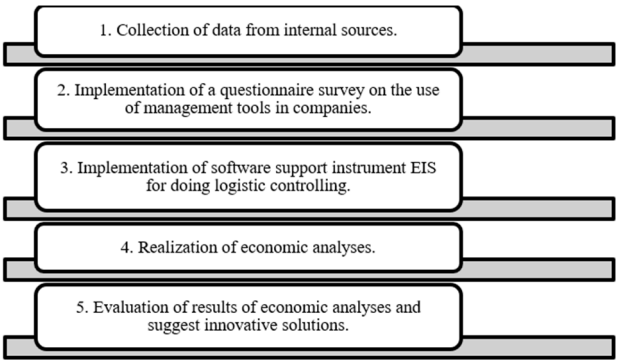

Figure 4 Algorithm of methodology
Source: own source

Collection of data from internal sources

In this phase, we collected data from management information system in the firm and from financial and accounting systems as Gradient and Omega that are used in this firm. Those information systems offered us all the required information for doing economic analyses. All information we prepared in the right form, in the same time period for the year 2019 and all 12 months.

Implementation of a questionnaire survey on the use of management tools in companies

A questionnaire survey on the use of management tools was realized by the VEGA project in the year 2019. The survey was prepared for industrial companies in Slovakia, in various areas of the industry, for 540 companies and the questionnaire had 10 questions. The companies were addressed by email, phone, personal meetings.

Implementation of software support instrument EIS for doing logistic controlling

For project realization, we obtained software support from firm Dominant Prešov named EIS Dominant. This software application is used in firms and it is very easy for education too. In the education process, we used this application. This application was used for solving project of logistic costs.

Realization of economic analyses

We used for economic analyses statistical, financial, economic indicators (formula 1-7).

Structure of stocks

They express the share of a part of the statistical file in the total file. Absolute values are converted to a relative percentage (%) that has a higher significance. We can use this indicator to determine the structure of production, inventories, costs, assets of the company. Xi – various indicator – stocks, costs, assets, production, revenues.

$$\frac{Xi}{\check{S}=\sum x_i} \quad (1)$$

Basic index

We compare by the ratio of the current period with a predetermined base period, the base period is constant throughout the time series. The basic period is denoted by the symbol (0), the current period is denoted by the symbol (1), (q) - costs.

$$\frac{q_1}{q_0}, \frac{q_2}{q_0}, \frac{q_3}{q_0}, \ldots, \frac{q_n}{q_0} \quad (2)$$

Chain index

We compare the ratio of two consecutive periods, the basis of comparison is not determined as a constant. The comparison is performed in chronological order in the monitored time series.

$$\frac{q_1}{q_0}, \frac{q_2}{q_1}, \frac{q_3}{q_2}, \ldots, \frac{q_n}{q_{n-1}} \quad (3)$$

Growth coefficient

It expresses how many times the value (Yt) in the period (t) has increased compared to the value (Yt-1) in period (t-1).

$$k_t = \frac{y_t}{y_{t-1}}, t = 2, \ldots, n \quad (4)$$

Increment coefficient

It expresses how many times the increment of the variable (Y) was greater or less than in the previous period.

$$k\Delta_t = \frac{\Delta y_t}{y_{t-1}} = \frac{y_t - y_{t-1}}{y_{t-1}} \quad (5)$$

Growth rate

It is the growth coefficient expressed as a percentage (%). It expresses the percentage by which the value (Yt) of the time series at the time (t) increased or decreased compared to the value (Yt-1) from the previous period.

$$T_t = \frac{y_t}{y_{t-1}} * 100\% \quad (6)$$

Increment rate

It is a relative increase expressed as a percentage (%) and expresses how much it increased, the value of the time series in time (t) decreased compared to the value from the previous period.

$$T\Delta_t = \frac{\Delta y_t}{y_{t-1}} = \frac{y_t - y_{t-1}}{y_{t-1}} * 100\% \quad (7)$$

Evaluation of results of economic analyses and suggest innovative solutions

Logistic costs were evaluated by selected indicators after economic analyses by using the EIS system for logistic controlling. In this phase, we obtained a view to fill the goals of business strategy orientated to minimize logistic costs.

3 Result and discussion

In the research of logistic costs, we followed a 5-step algorithm. Through this algorithm, we point out the importance and possibilities of using logistics controlling the firms as a tool for meeting the goals of corporate strategy that is orientated to minimize logistic costs. Economic indicators are important information for the creation of profit.

Collection of data from internal sources

In this phase, we collected data (Table 1) from management information system in the firm and from financial and accounting systems as Gradient and Omega. Those information systems offered us all the required information for doing economic analyses. We analyzed the year 2019 for 12 months. We obtained information on the type of stocks – material stocks, work in progress, finished products, the total cost in the firm, production, inventory turnover. That information is important for economic indicators.

Table 1 Information for economic analyses during 12 monts in year 2019

Month /Type of stocks	January	February	March	April	May	June	July	August	September	October	November	December
Finished products (€)	1 992 538	3 821 691	3 075 872	2 835 861	2 071 974	3 034 068	3 880 435	3 162 962	3 501 903	3 288 277	5 038 853	3 864 802
Work in progress (€)	1 012 232	1 299 237	1 692 581	1 760 328	1 860 075	1 807 219	1 552 845	1 628 198	2 307 643	1 710 181	1 295 030	1 150 214
Material stocks (€)	3 633 410	4 577 672	4 133 047	4 033 729	5 121 530	3 906 272	3 630 568	3 811 641	4 554 790	4 461 385	3 446 510	3 462 566
Total costs (€)	6 638 179	9 698 600	8 901 500	8 629 917	9 053 580	8 747 560	9 063 848	8 602 801	10 364 336	9 459 844	9 780 394	8 477 582
Production (€)	10 679 190	10 859 610	10 400 190	10 439 250	13 130 670	15 177 600	14 002 080	9 968 670	15 946 710	23 146 770	17 725 800	14 720 040
Inventory turnover (€)	10 985 280	9 970 560	12 016 320	11 050 560	12 925 440	14 504 640	15 478 080	9 165 120	16 778 880	21 651 840	19 983 360	17 613 120

Source: internal sources of the firm

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Implementation of a questionnaire survey on the use of management tools in companies

A questionnaire survey on the use of management tools (figure 5) was realized by the VEGA project in the year 2019. The results of a questionnaire survey show to using various approaches in business processes in the firms for filling goals of the business strategy. With these tools, companies can influence and optimize their business processes. We focused on the use of controlling in companies, which represents 24%. This result is not satisfactory due to the barriers that arise in the implementation of controlling in companies and at the same time the financial resources that are needed to start controlling. Significant findings were the application of the quality management system, which represents 65% representation in companies. This system also enables the control of logistics processes that have an impact on the fulfillment of business strategy goals. From the point of view of the logistical view of management tools, we can state that companies use process management 35%, JIT 29%, Kaizen 18%, ABC 16%. These tools offer opportunities to optimize logistics costs, which is beneficial for meeting the goals of the business strategy.

Figure 5 Using managerial instrumens in the firms in Slovakia
Source: own research

Implementation of software support instrument EIS for doing logistic controlling

For project realization, we obtained software Dominant (Figure 6) Prešov named EIS Dominant. This software contains database as Financial controlling, Value based management, Balanced Score Card, Cost controlling. The results of those parts are presented by dashboarding. Dashboarding is support instrument for decision and for filling the business goals.

Figure 6 Illustration : Dashboarding of EIS system
Source: EIS system

This Dominant software contains modules of various controlling. The modules are focused on financial, economic, marketing, knowledge areas. The important contains financial controlling - statements balance sheet, income statement, cash flow, financial analysis, economic analysis, bankruptcy models, working capital, financial plan, and TOP reporting. The second model is cost controlling, which includes budgets, calculations, cost analysis, consumption at the centers. The third module is the marketing controlling focuses on the company's strategy, BSC performance approach, company value, creditworthiness, value-based management. The fourth module is knowledge controlling, which contains a financial map, EVA analysis, financial indicators, and their impact on meeting the objectives of corporate strategy. It is reporting module where all important information of three modules financial, cost, marketing controlling.

Realization of economic analyses

We used for economic analyses statistical, financial, economic indicators (formulas 1-7). The first analysis was focused on the structure of inventories (Table 2) in the company during the year 2019. We found that material stocks account for 35-56%, work in progress 13-22%, finished products 22-52%. Based on research for a “healthy business”, material costs should be 30%, work in progress 40%, and finished products 30%. This company has a high stock of material in stock because in some months it exceeds 56% which should be 30%. This state of stocks creates problems for them in increasing the costs of storage, maintenance of stocks, insurance of stocks, there is a devaluation of stocks, stocks tie up funds that the company could use to minimize them. Work in progress stocks can be around 40%. In the company, these stocks are represented in the range of 13-22%. The company does not store unfinished products, but tries to end the production process and thus minimizes the costs associated with unfinished production. Finished production in the company is in the range of 22-52%, which is optimal for

the conditions of "healthy companies". The level of 52% could be reduced, which would enable the company to satisfy demand, financial resources for new production processes, expansion of product range. Overall, we can say that the inventory structure in the company is optimal, even though there are possible alternatives to the innovation of the inventory structure.

Table 2 Analyses of structure of stocks

Structure of stocks	2019	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Okt	Nov	Dec
material stocks	45.40%	54.74%	47.20%	46.43%	46.74%	56.57%	44.66%	40.06%	44.31%	43.95%	47.16%	35.24%	40.84%
work in progress stocks	17.76%	15.25%	13.40%	19.01%	20.40%	20.55%	20.66%	17.13%	18.93%	22.27%	18.08%	13.24%	13.57%
finished production	36.84%	30.02%	39.40%	34.55%	32.86%	22.89%	34.68%	42.81%	36.77%	33.79%	34.76%	51.52%	45.59%

Source: own processing

The second analysis (Table 3) focused on the base and chain index, which indicates the development of inventory in individual months. In January, it was not possible to determine the index due to the missing value of Inventory in the previous month and year. The basis for solving the basic index was the month of January in 2019 and the state of inventories in individual months was compared with January. The values of the basic index are above the coefficient (1), which means an increase in total stocks (material stocks, work in progress, finished products) in each month. This development represents a benefit for supply logistics because the optimal inventory turnover takes place, which reduces the company's costs and raises funds for a new production process. When addressing the chain index, both growth and decline in inventories were recorded when comparing previous months. In March, April, June, and August, October, December there was an overall decrease in inventories compared to the previous month. Inventories have risen in recent months. Overall, we can say that stocks were replenished according to market requirements, production process, customers.

Table 3 Index analyses

2019	Feb	Mar	Apr	May	June	July	Aug	Sept	Okt	Nov	Dec
Basic index	1.46	1.34	1.30	1.36	1.32	1.37	1.30	1.56	1.43	1.47	1.28
Chain index	1.46	0.92	0.97	1.05	0.97	1.04	0.95	1.20	0.91	1.03	0.87

Source: own processing

The analysis of time series (Table 4) points to the trend of development of stocks and their types in the company. Inventories recorded an increase and a decrease in individual months. This movement of stocks adapts to the production process and market requirements. The highest increase in inventories was recorded in February by 46%, the lowest increase was in November at 3%. Regarding the decrease in inventories, the lowest decrease was recorded in April and June by 3%, the highest decrease in inventories was in December at 13%.

Table 4 Time series analyses

2019	Feb	Mar	Apr	May	June	July	Aug	Sept	Okt	Nov	Dec
Growth coefficient	1.46	0.92	0.97	1.05	0.97	1.04	0.95	1.20	0.91	1.03	0.87
Increment coefficient	0.46	-0.08	-0.03	0.05	-0.03	0.04	-0.05	0.20	-0.09	0.03	-0.13
Growth rate	146%	92%	97%	105%	97%	104%	95%	120%	91%	103%	87%
Increment rate	46%	-8%	-3%	5%	-3%	4%	-5%	20%	-9%	3%	-13%

Source: own processing

Evaluation of results of economic analyses and suggest innovative solutions

Logistic costs were evaluated by selected indicators after economic analyses by using the EIS system for logistic controlling. In this phase, we obtained a view to fill the goals of business strategy orientated to minimize logistic costs. Reducing logistics costs in the company requires a change in approach in the management of

individual logistics activities or. processes, valuation of these processes by determining the relevant amount of logistics costs, and moving towards process optimization through the use of new approaches to streamline activities that will ultimately bring the company an economic effect. The solution to the issue of reducing costs is primarily the introduction of new approaches and methods in logistics, which are not focused only on the financial side, but on the organizational, technical, technological, environmental, etc. The structure of logistics costs (Figure 7) represents 45% of the material, 37% of final products, 18% of work in progress. In terms of efficiency, the amount of material costs is above the level of 20%, which represents the commitment of funds, depreciation of inventories, storage costs, insurance costs, operation of storage facilities, etc. In practice, the operational inventory management approach through the JIT approach is preferred in practice today. The development of stocks, monitored in the form of an index - basic and chain, points to fluctuating developments. This fact indicates a change in stocks in individual months, which may be linked to the need for the production process.

Logistics costs also affect the level of profit in the company. They are part of the total business costs. When calculating corporate profit, we use the difference between sales and costs (Table 5). Despite the fact that logistics costs make up 18-40% of the total costs, the company generates a profit, and logistics costs do not significantly affect the company's profit. However, monitoring the development of logistics costs is very important due to the implementation of innovations in logistics processes, which can affect the amount of logistics costs and thus increase the company's profit

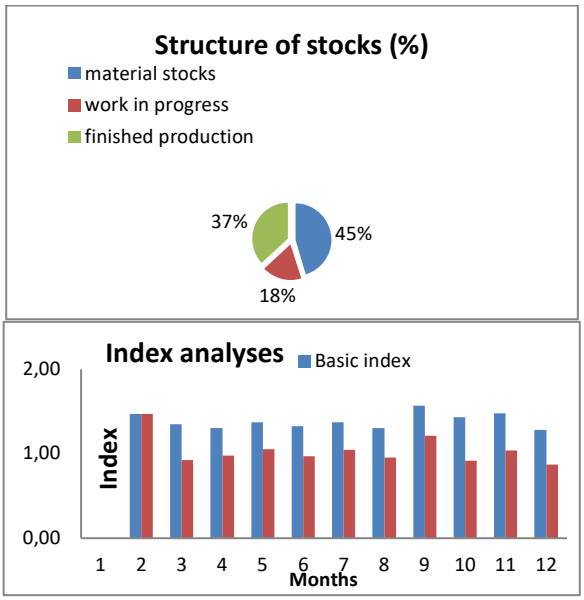

Figure 7 Dashboarding - Structure of stocks, Index analyses
Source: EIS system

Table 5 Profit formation

Month /Type of stocks	January	February	March	April	May	June	July	August	September	October	November	December
Total costs (€)	6 638 179	9 698 600	8 901 500	8 629 917	9 053 580	8 747 560	9 063 848	8 602 801	10 364 336	9 459 844	9 780 394	8 477 582
Inventory turnover (€)	10 985 280	9 970 560	12 016 320	11 050 560	12 925 440	14 504 640	15 478 080	9 165 120	16 778 880	21 651 840	19 983 360	17 613 120
Profit (€)	4 347 101	271 960	3 114 820	2 420 643	3 871 860	5 757 080	6 414 232	562 319	6 414 544	12 191 996	10 202 966	9 135 538

Source: internal sources of the firm

4 Conclusions

The chain of logistics processes is tied to logistics costs as an economic category, which is important to manage, monitor, evaluate and influence in terms of achieving economic efficiency of logistic processes. The best recommendation is to use managerial tools and approaches that will not only reduce logistics costs but will also contribute to changes in the organization of work in the company, innovation, environmental and social responsibility. In this paper, we showed one of the approaches how to check logistic costs and to view the trend of logistic inventories by logistic controlling. This approach has benefits for the company. It checks logistic costs, shows reserves in logistic processes, views waste, and others. The structure of stocks in the company is optimal, there is an effective turnover of stocks, which ensures a continuous production process. Within continuous improvement of logistic processes in the firm is important to use a system aimed at the systematic detection and elimination of failures in the production process. Continuous improvement in the logistic processes is realized through innovative steps in the form of changes of buying, supply chain, store building, the layout of store place, employees of the store. The use of logistics controlling in the decision process is possible to use in various companies while accepting the conditions of its implementation and using. The overall impact of using logistic controlling is reflected in the minimization of the production - logistic costs.

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simulation for streamlining production in the mining and building industry".

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