

# Application of Innovative Approaches in Enterprise Management Based on the Logistic Audit

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**Abstract**—Innovation management in logistics as a systematic controlled process for continuous increase in the quality of logistics involves tools resulting in a unique competitive advantage. Logistic audit in wood-working enterprise as a tool for the analysis of a company logistic system is described in the paper. The aim of the paper is to identify the critical factors of logistic activity optimization and to design optimal processes. Logistics in various areas, for example costs, inventory, control processes are evaluated using the logistic audit. Following the logistic audit, the enterprise will create a logistics strategy enabling it to solve problems defined by the audit. The goal is to optimize costs and achieve the business objectives.

**Keywords**—*innovation management, logistic audit, optimization, processes*

## I. INTRODUCTION

In Slovakia, there are many enterprises achieving the superior performance by applying innovative practices and management methods. In the business environment with the growing risk of uncertainty, new strategies are required to help exploit opportunities and eliminate vulnerability. In the paper, the focus is placed on the potential savings in logistics enterprises. The wood-working enterprise producing high quality cutouts for wooden floors is analyzed in the research.

The practice of wood-working industry points the need for improving cooperation between timber suppliers and manufacturers in the actual situation of raw wood material supply and level of technique and technology.

The economy of each enterprise is affected significantly by heavy machinery and technology available.

Technological advances, information revolution, groundbreaking innovation technology are factors of chaos, which are considered as a competitive advantage [7].

The right equipment is one of the determinants of production aimed at achieving a higher enterprise performance [9]. If we are preparing a change of subprocess by introducing new technology, we have to evaluate the impact of this change on downstream processes and overall outputs [11].

The current situation has led enterprises to become process-oriented. According to author [1], most of the problems and possibilities for improvement are in the area of enterprise processes. For an enterprise [10], the process is

defined as a sequence of follow up activities with clearly defined input and output. Input sources are transformed into output products during the process. In addition to the main processes, there are side processes in enterprises representing significant savings potential in an enterprise. They include logistic processes. Logistic audit is an analytical tool of a logistic process.

Well-defined strategy is the basis of success of an enterprise. Defining a strategic goal is important because it is stable over a long period. A form of a business strategy is an innovative strategy creating a new value for the customer. An innovative strategy can be a source of competitive advantage [1]. The logistics strategy derives from the core business strategy. It clearly defines strategy [8] as "defining the company basic long-term goals, ways of achieving them and allocating the resources necessary for their implementation". The process of creating a basic strategy in the company is characterized by authors [7] as a gradual logic-deductive process. It consists of exploring the environment, formulating a strategy, strategy implementation, and strategic control. If this model is applied in the logistics strategy process, the logistic audit can be used to analyze the environment in terms of logistics as the first step.

## II. METHODOLOGY AND THEORETICAL APPROACH

### A. Economic Aspects of Logistics

The efficiency in logistics reflects the relationship between the level of logistic services achieved and the total costs spent on the appropriate performance. The efficiency in logistics can be improved by following ways:

- Increasing revenues by improving the level of logistic services with the same logistic cost.
- By reducing overall logistic costs while maintaining the level of logistic services.
- The current increase in the level of logistic services and the overall logistics cost reduction [5].

### B. System Approach

The essence of the system approach is to understand the phenomena of the context, not to satisfy only the isolated interests of the individual processes.

Applying a system approach also means that we do not stand surface phenomena, but we are familiar with their causes. We examine "cause-effect" relations and we try to influence the causes. If we try to increase the level of logistic services or to reduce overall logistics costs, those processes can be applied to affect the outcome most [7]. Logistics requires integration, coordination and synchronization to achieve the necessary harmonization of the activities of individual articles and a positive effect from the synergy [13].

### C. Synchronization

Synchronization is a time alignment of downstream processes in the logistic network to limit the occurrence of waiting for processing and waiting for the service elements. Full synchronization is by the fact that the length of various follow-up operations is the same. Continuous and dynamic improvement of the efficiency of the logistics system processes is needed to ensure the company competitiveness. Therefore, logistic processes must be improved in terms of reinforcement in dynamic way [7].

### D. The Theory of Constraints

The Theory of constraints is a management philosophy aimed at uncovering system constraints, the weakest link in an enterprise limiting the system to achieve higher performance than the selected goal is. The Theory of constraints is based on a system approach similar to Just-in-time. All stakeholders work together to achieve the specific goal. Teams are interconnected and interdependent. However, their performance is not the same. The common goal depends on the functionality of all the components. The weakest article in the organization limits its performance. This function is associated with the chain. "A Chain is only as strong as its weakest link" [4].

### E. Bottleneck

The Bottleneck is associated with the flow of material. The Bottleneck is defined as a space in the chain limiting the total performance. Following issues must be declared:

- The bottleneck must be used to its maximum
- It contributes significantly to the level of service provided to customers.
- A certain stocks should be created before this place [3].

The Bottleneck in the enterprise may be seen in machines, processes, technology, employees, management and in enterprise strategy. The market is frequently a limited place. By locating bottleneck, the flow can be improved in the enterprise as well as the enterprise gains a competitive advantage. In order to improve the performance of the enterprise, it is necessary to focus on the limiting factor. Focus on removing the bottleneck gives the company significant benefits [14].

Two factors must be ensured in order to achieve continuous improvement - financial income and stability. Financial income will be achieved by the sale of products, stability through process improvement and trouble-free operation of all the enterprises. Both factors are

interdependent. Application of the theory of constraints, or improvement of the bottleneck result in an increase in revenue, performance, improved execution time, faster and smoother flow, and reduced inventory to enterprises. This fact is important for the supply chain, manufacture, management and sale complexly [4]. SWOT analysis can be an appropriate analysis tool for assessing the enterprises situation.

### F. Logistic Audit

Logistic audit is a method for complex and independent diagnosis of the logistic enterprises system. Statement by the authors [13] mention: „The logistic audit should provide information about opportunities how to improve the current situation in the enterprise logistics system and in processes that are implemented in the system. Recommendations and advices should define processes where optimization is possible. There is increasing the level of customer service quality in the enterprise and accelerating flow in the logistics unit system associated with reducing inventory“. Goals which would be achieved must be set before starting the audit. This may be the entire logistic chain or its specific part. According to the current situation of the enterprises, the audit can create potential level savings of 20 percent of the total logistic costs. Total expected profit of the enterprise can be affected by savings significantly. Reducing the costs and increasing the profits may result in a faster return on investment of an enterprise. Using the logistics audit, an enterprise can find a solution to optimize logistic performance [14].

## III. RESULTS

Information technology, advanced manufacturing, storage and transport technology can be considered technological advances. Costs of internal processes including corporate logistics must be reduced. The area of transport, storage and handling representing of 87 percent of the time when material is in the enterprise and of 15-70 percent of the total product cost. Audit of logistic activities and cost analysis of internal processes is the basis of any changes [7].

Wood-working company is analyzed. The company produces high quality cutouts of wood. There is current risk of degradation of input raw materials. We focused on the evaluation criterion so that the flow of basic material through the process is optimal and efficient, with respect to time and minimum operating costs. Real current risk of degradation of raw wood material is also seen in the process of storage and material manipulation.

A system approach was applied in this research. Main scientific methods, abstraction, modelling, causes and effect analysis and synthesis were used. All processes in product manufacturing were identified, their course was described and a process map was created. A catalog of research questions was created. The SWOT analysis was accelerated by the catalog and consistency the analysis was ensured. Subjective assessments of strengths and weaknesses of managers is the basis for the assessment. The result of the business analysis is their profile.

Firstly, issues essential to logistic audit were determined. Observation and communication with staff and management

by interview method were survey methods. Criteria for the overall logistic situation in the enterprise were evaluated in the individual parts of the internal analysis. Gradually were evaluated inventories, production, human resources, management, organization, and synergy potential. The importance to these criteria was assigned. The rating scale included scores ranging from 1 to 5, notice 1 was the value unfit, 2 acceptable, 3 good, 4 very good, 5 was the value "excellent".

In the first step, we found out relevant of data. On their basis, we created an objective image of the material, financial and information flow and their connection.

In the second step, we evaluated the current situation of the data gathered. During the evaluation, the quantitative and qualitative indicators were used. After evaluating the results, we identified limits.

In the third step, we propose solutions to remove them.

**A. Database of Questions for Logistic Audit Analysis:**

1. Are the core logistical data (which to manage, control and optimize logistics processes) complete, up-to-date, and correct?
2. Do you have a well-organized database of logistics information?
3. What cost units do you use in logistic chains?
4. Are the timing strategies such as synchronization or just-in-time used correctly?
5. Are downstream processing times in the chain synchronized?
6. Are costs of different parts of the logistics chain known and are they consistent?
7. Is the way to control logistics costs effective?
8. What are the logistic cost of an item or a storage unit, a customer order, a category or a supplier's order?
9. Where and how can you reduce logistics costs without reduction and performance?
10. Are inventory levels at the various parts of the network necessary and appropriate?
11. Is the safety supply adequate to ensure efficient use and continuation process?
12. How effective is communication and information exchange within the logistics chain?
13. Are available resources and capacities used efficiently?
14. What methods do you use to manage processes?
15. How effective are current logistics processes?
16. Are logistic processes complete and optimized for different material flows and finished products?
17. What are the criteria for implementing logistics processes?

**B. Evaluation**

The issues were evaluated using brainstorming in order to define the status quo and the current situation of the enterprise. In the evaluation process, the facts representing the potential for improvement we identified.

**C. Key Factors Affecting the Enterprise Outcome:**

- The competitive advantage of transporting the main input material through outsourcing.

- The length of the delivery cycle.
- Shift work due to the high utilization of machinery.

However, subjective assessment by management of the enterprise does not have a decisive impact on the overall performance of the enterprise. In our opinion, there are other important factors.

**D. Key Factors Affecting Audit Outcome were:**

- Location from which the main input material is delivered during the reference period was often far away and therefore transport costs increased. Subsequently, the prices of inputs increased.
- The firmly determined length of a delivery cycle is limited by the variability of a stock keeping interval what increases the buffer stock and decreases the quality of main input material.
- Shift work supplement can be adjust according to the height of the main input material. This will increase savings on overheads.

**E. Deficiencies in the Current State**

The result of our findings is identification of the following deficiencies in the field of logistic input, processes and management in the analyzed enterprise:

Incorrect storage of raw wood material causes reduced quality. The accumulation of inventories at individual technology node causes disturbances in the flow of the base material. Disturbances are due to the moral wear of the machine. The solution is to invest in the renewal or purchase new machine.

In the case of managerial decisions, errors caused by subjective estimates increasing operating costs were identified. The solution is to replace intuitive estimates with qualified conversions.

**F. Enterprise Profil**

Following the knowledge from the question analysis, the overall strength and weaknesses profile of the enterprise can be determined as shown in Table 1.

TABLE I. PROFILE OF THE STRENGTHS AND WEAKNESSES OF THE ENTERPRISE

Criterion	*Score				
	1	2	3	4	5
The total condition			x		
Input		x			
Logistics		x			
Processes		x			
Heavy machinery		x			
Technology				x	
Human resource				x	
Synergy potential					x

\*Notice 1 – value "unfit"; 3 – value "good"; 5 – value "excellent"  
Source: Authors

The results are basis for the logistic strategy. The logistic strategy can be a source of competitive advantage. The basis of success is optimization internal processes including corporate logistics. The economy of the enterprise is affected significantly by heavy machinery and technology available.

#### IV. CONCLUSION

In order to strengthen the market position, market players look for alternative sources of competitive advantage. Digital technology, advanced manufacturing, warehousing and transport technology are examples of Innovative management in logistics. Time and quality strategy is a competitive advantage in logistics. Innovation and technological advancement across the product flow are applied in the modern business environment. The area of transport, storage and handling representing of 87 percent of the time when material is in the enterprise and of 15-70 percent of the total product cost. Audit of logistics activities and analysis costs of internal processes is the basis of any changes Following the results of logistic audit, the enterprise can create the strategy. The company can achieve economics efficiency by optimization internal processes including corporate logistics. The implemented changes have a positive effect on the business performance of the enterprise.

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