



PROCESS BARRIERS IN THE LOGISTICS MANAGEMENT OF THE FAST-GROWING INDUSTRIAL COMPANY

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Abstract

Logistics management has become more and more in the forefront of management interest in industrial companies, which are aware of its key importance, especially in the conditions of a dynamic environment and rapid growth, which in addition to opportunities and revenue growth brings with it risks and new challenges. The aim of this article is to identify and present barriers to logistics management of a fast-growing enterprise and concepts of approaches leading to the removal of priority barriers based on the framework of process maturity models and case study from the automotive industry company. The outputs of this study will help management of fast-growing businesses recognize or anticipate barriers causing the decrease of logistics services performance and provide support for effective decision-making to overcome these barriers during the dynamic growth of the business.

Keywords: Logistics management barriers, logistics maturity model, process analysis, fast growing company

1. INTRODUCTION

General goal of entrepreneurial efforts not only of industrial enterprises should not be seen only in the context of turnover and profitability growth but also in the improvement of quality, reliability of production, efficiency of all processes implemented and, in particular, the improvement of logistics processes performance. Maintaining the required pace of growth is a challenging task, particularly for fast growing businesses, during which the company faces a number of challenges and is accompanied by increased logistical costs and a reduction in the level of logistics services. Some of the problems are well visible, and their solution is to a large extent natural, others may not be so obvious, and the management's attention may miss them due to their nature and the current state of the processes.

It can be assumed that there are problems that, despite the strong commitment of the company's management to process improvements, make it impossible for a fast-growing business to operate efficiently and reduce logistics performance. These problems, which often arise from the inadequacy of existing processes or, for example, IT infrastructure, are becoming procedural barriers to logistics management. The aim of the article is to identify and present barriers to logistics management of a fast-growing enterprise based on the framework of process maturity models and case study from the automotive industry company and concepts of solutions leading to the removal of priority barriers.

2. LITERATURE REVIEW

Literature review briefly introduces the general principles of logistic management and concept of process maturity models used to determine the level of maturity of the processes which was used in the case study as methodological bases and inspiration, especially in terms of the decomposition of the main surveyed process.

2.1. Logistics management and subprocesses

Logistics management typically includes internal and external transport, storage and handling of materials, semi-products and products, inventory management, supply / demand planning and management, order

execution, or, for example, 3PL providers, fleet management or logistics network design. Logistics management is an important part of company management that permeates across organizational units and business processes, which is reflected in the complexity of coordinating, planning and executing logistics activities in the context of other company activities, in particular production, sales, finance, information and other technologies [1]. Although concepts of logistics management and defined subprocesses differ among various authors, according to Lambert [2] logistics management can be understood in the context of the 8 core logistics processes included in the Global Supply Chain Forum framework:

- Customer Relationship Management
- Customer Service Management
- Demand Management
- Order Fulfillment
- Manufacturing Flow Management
- Supplier Relationship Management
- Product Development and Commercialization
- Returns Management

2.2. Process maturity assessment

For effective management of realized processes is desirable to assess current level of processes being carried out. For this purpose, process maturity models (MM) have been invented. Till this day, considerable amount of scientific literature has been presented, such as a strong review by Tarhan et al. [3] who presents that the notion of maturity in terms of processes was first proposed by Crosby [4] and is understood as "the state of being complete, perfect or ready" [5].

Among other major MM reviews, maturity of maturity models research by Wendler [6] analyzing more than 230 scientific articles with focus on their categorization can be mentioned. The origin of the maturity models can be found in the software engineering industry in the 1990s and the original Capability Maturity Model [7] which has inspired the development of such models in other fields. In addition, several logistical and mathematical models in supply chain management have been presented and provided researchers with a framework for the assessment of logistics processes. [8]

Concept of process maturity models of processes, and the decomposition of processes to partial subprocesses and the activities that are their essence respectively, is further used in a case study where the supply chain management processes, production processes and purchasing processes are evaluated through the subprocesses on which they are decomposed.

3. METHODOLOGY

In order to identify the barriers to logistics management of a fast-growing industrial enterprise, a case study in the automotive industry has been carried out. Selected company has seen a turnover increase of almost 100 % over the last 5 years and is therefore a suitable representative of a dynamically developing and fast-growing enterprise. The inspiration for identifying growth barriers with a particular target of increasing the level of logistics management as a whole was found in a literature review of current literature on logistics management and process maturity models with a focus on logistics.

The data for the study was obtained in the form of structured interviews with company employees across organizational units and all management levels. The realized interviews focused on a comprehensive description of the logistics processes functioning in the company according to the individual areas and realized subprocesses. In the context of the company's organizational structure, employees of Purchasing, Production and SCM departments as well as top management representatives of the company were involved in interviews.

Based on the data obtained during the structured interviews with the company representatives, a model of logistic processes was compiled according to business process modeling notation (BPMN 2) methodology and the realized processes were described, assessed and evaluated. Weaknesses of the realized processes and the root causes of identified and described problems considered barriers in the study have been identified. The findings of the study were further generalized into a set of barriers to logistics management of a fast-growing industrial enterprise that lead to a decrease in logistics performance and reducing the level of logistics services and increasing logistics costs respectively.

4. AUTOMOTIVE INDUSTRY CASE STUDY

The case study was carried out at the company KES - kabelové a elektrické systémy, spol. s r.o. founded in 1992 and based in the town of Vratimov (Czech Republic). The company produces more than 1,400 types of electric systems for the automotive and electrotechnical industry on a production area of more than 10,000 m² and the products of the company are part of products of many successful automotive brands such as Audi, Bentley, Ford, Man, Rolls-Royce, Skoda and many others.

The tasks of the case study conducted in the company were:

- Analyze the current state of the key logistics process of fulfilling a customer order from receiving the actual order by SCM Department, planning and scheduling the production, securing material for purchasing, and actual order execution.
- Evaluation of the analyzed processes and identification of problem areas, barriers to logistics management respectively.
- Prioritization of identified barriers, and their elimination respectively.

In the case study processes have been dealt with in terms of series production and operational management, not tactical and strategic levels of processes. The main researched Customer Order Fulfilling Process was divided and further investigated for the needs of the study in three sub-units corresponding to the structure of the organizational units: SCM department, Production and Planning department and Purchasing department. For individual departments, the basic characteristics of the subprocesses (main activities, employees' competences, basic inputs and outputs) were first defined and the respective activities were analyzed. The study did not deal with subprocesses related pre-projects phases and project start-ups, product development, prototyping and product standardization, or a KPI measurement and setup of the system. Identified barriers, respectively their removal, were prioritized during the workshop with representatives of the company. For the barriers assessed with a high priority of removal, concepts of solutions have been designed to address them, considering the current level of process maturity. Proposed concepts of solutions may not always be an ideal target from a theoretical point of view but a viable solution considering current state of the processes.

5. RESULTS

The following chapter presents the results of the case study, which are generalized in the discussion and conclusion. Firstly, the decomposition of the process of realization of the customer order to individually evaluated sub-processes is presented, and the 6 main identified barriers of logistic management are presented. For key barriers according to prioritization of their removal, the impact on the whole process under consideration is proposed the concept of the solution, or the elimination of the barrier respectively.

For the purposes of the analysis and the assessment, the process of realizing customer orders was divided into following subprocesses:

- Processing of customer orders and forecasts.
- Planning and management of expedition and transport.
- Managing production orders.



- Planning, scheduling and realization of production.
- Negotiating conditions with suppliers and managing supply contracts.
- Material ordering.
- Securing and controlling the supply of material.

For above mentioned main process and sub-processes a process analysis, a description of the implementation of the individual subprocesses and the activities carried out was performed. In the analysis the activities were described and evaluated. Based on the process analysis, main process barriers were identified, for which the concepts of solutions were designed to eliminate them, leading to an increase in the efficiency of the implemented processes and the provided level of logistics services. Identified barriers are listed below, including a description of the weaknesses of the current state and the impacts on the processes being implemented:

- 1) Poor quality of customer forecasts - The process of acquiring and using customer forecasts for sales predictions is not standardized, with impacts on purchasing processes and production planning. Obtained forecasts often prove to be unreliable, and there is often a growing customer demand compared to the original forecast. Due to missing or unreliable forecasts, an information resource is missing for the efficient purchasing of material items with long delivery times.
- 2) Failure of the order fixed period - There is in fact no period during which the quantity ordered would have been fixed and there was no change in customer demand. This leads to an increase in the entitlement to production planning and prioritizing.
- 3) Non-standardized internal order creation - The process of creating internal orders from customer orders does not have firm rules, making it impossible to efficiently plan and prioritize production.
- 4) Non-Systemic planning and production management - Current planning and control tools fail due to increased complexity and production volume. Information systems for the continuous collection and maintenance of current production data and advanced planning and scheduling systems are not implemented. This state of process adversely affects the efficiency of production planning and management.
- 5) Ordering of purchased items not functioning - The main problems of ordering purchased items are poor or missing forecasts, non-standardized and undifferentiated approach to all items and manual administration, resulting in inefficient inventory management and degradation of the production and shipping plan.
- 6) Undifferentiated approach to suppliers - The main problem is the lack of a system of work with various groups of suppliers according to the reliability and importance of the delivered parts. Negative consequences are manifested primarily in ensuring and controlling the supply of materials and negotiating conditions with suppliers.

Identified barriers were discussed with business representatives during the workshop and analyzed. For barriers, prioritization was determined based on the number and significance of affected subprocesses, see the list below:

- High priority:
 - Poor quality of customer forecasts.
 - Failure of the order fixed period.
 - Undifferentiated approach to suppliers.
- Medium priority:
 - Non-Systemic planning and production management.
 - Ordering of purchased items not functioning.
- Low priority:
 - Non-standardized internal order creation.

For high-priority barriers, a concept of solution to their removal was subsequently proposed. The top priority has been assigned to the barrier of Poor quality of customer forecasts that have a major impact on all subsequent processes. It was recommended to start building up own internal forecasts based on available data and negotiation and systematic work with customers to improve the quality of forwarded forecasts and long-term orders. The second highest priority was assigned to the barrier of Failure of the order fixed period, for which it was proposed to create a differentiated approach to fixation periods of orders according to various groups of customers and contract anchoring of rules with selected customers. The third highest priority was assigned to the barrier of Undifferentiated approach to suppliers, which should be eliminated through systematic work with suppliers and setting of a system based on differentiation of suppliers' according to their reliability and criticality of the delivered parts.

6. DISCUSSION AND CONCLUSION

Based on the case study, some general knowledge and principles of identification, prioritization and removal of barriers to logistics management of a fast-growing industrial enterprise could be presented:

- Non-existent or insufficient systems of suppliers and customers relations management (SRM and CRM).
- Insufficient or missing IT infrastructure, respectively the functionality of existing information systems that are not fully utilized or suitably adapted and made available to all users is no longer sufficient.
- Missing advanced management tools and systems.
- Non-existent differentiated approach systems for customers, suppliers, and product portfolio.
- Non-standardized processes and missing uniform rules for performing work activities.

When assessing the priorities of the identified barriers, several criteria have to be considered. The most important criteria include the demandingness of the required solution, the cost of the barrier removed, the need for cooperation with external partners (suppliers or customers) and, above all, the impact of removing the barrier on the process as a whole. The highest priority of removal requires barriers whose removal will have a positive impact on the most implemented processes. With the second highest priority, barriers should be removed from the sales and customer processes, followed by internal barriers related to suppliers and purchasing processes, and then barriers to production.

ACKNOWLEDGEMENTS

The work was supported by the specific university research of the Ministry of Education, Youth and Sports of the Czech Republic, no. SP2018/107 and SP2018/109.

REFERENCES

- [1] LAMBERT, Douglas M. An evaluation of process-oriented supply chain management frameworks. *Journal of Business Logistics*. 2005. vol. 26, no. 1, pp. 25-31.
- [2] LAMBERT, Douglas M. The eight essential supply chain management processes. *Supply Chain Management Review*. 2004. vol. 8, no. 6, pp. 18-26.
- [3] TARHAN, Ayca, TURETKEN, Oktay and REIJERS, Hajo A. Business proces maturity models: A systematic literature review. *Information and Software Technology*. 2016. vol. 75, pp. 122-134.
- [4] CROSBY, Philip B. *Quality is free: The art of making quality certain*. New York: McGraw-Hill, 1979. p. 309.
- [5] Oxford English Dictionary - The definitive record of the English language. Oxford: Oxford University Publisher. 2004.
- [6] WENDLER, Roy. The maturity of maturity model research: A systematic mapping study. *Information and software technology*. 2012. vol. 54, pp. 1317-1339.
- [7] CMU/SEI. Capability Maturity Model Integration for Development. Version 1.3. CMU/SEI/-2010-TR-033. CMU/SEI, 2010.
- [8] BATTISTA, Claudia, SCHIRALDI, Massimiliano M. The logistics maturity model: Application to a fashion company. *International Journal of Engineering Business Management*. 2013. vol. 5, no. 29, 11 p.