LEAN SUPPLY CHAINS IN ENGINEERING, METALLURGY AND KEY PRINCIPLES OF THEIR MANAGEMENT

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Abstract

Companies' effort to work effectively, associated with the implementation of lean philosophy principles, has changed significantly all companies processes within last decade. Since the day when principles of lean manufacturing were introduced by Toyota there have been a huge progress not only in the number of companies' departments where these principles may be implemented, but also in the number of companies adopting them in any of them. In the very beginning, lean processes were associated to automotive mainly, but today we can see an acceptance of these principles also in other industries. Main focus of the article is on comparison of differences in management of company's supplies and procurement in two companies. Data about supplies' management and processes in automotive company will be compared to the data from company operating in engineering, metallurgy. This comparison should confirm the statement, that not only production, but also all companies' processes are lean nowadays, and that the principle of being lean within whole supply chain management has been accepted also by companies in other industries, including suppliers of metal products. Article describes key elements of lean supply chains and identifies how far are the companies from other industries, more concrete from engineering, metallurgy, with their implementation.

Keywords: lean, supply chain, procurement, efficiency, metallurgy

INTRODUCTION

We can see a significant change in companies' approach to efficiency within last decades. Dynamic and competitive environment on all markets worldwide brings new requirements on managers and forms new organizational structures.

Many years have passed since the idea of lean management was introduced by Toyota, and in spite of the fact that the main principles and ideas remain to be unchanged, there is a new view on the whole concept. In the very beginning, lean management was associated with automotive industry where companies tried to decrease costs and increase efficiency of production processes. A lot of methods and tools have been developed and thanks to them, companies have succeeded in the practical implementation of the theory. Lean management in practice saves companies' money by reduction of wasting of time, resources and energy. As a side effect, companies are becoming more stable as the whole organization of the business is being constantly improved. All related benefits have apparently motivated companies to conceive and develop the theory in a broader sense. The new approach is focused not only on lean production, but it emphasizes the need to be lean in all company's processes and the need to utilize the whole concept also in other industries.

LEAN SUPPLY CHAINS

Focus on efficiency in the process antecedent to production has been linked to procurement and the logistic system as a whole. Authors oriented on this topic suggest different principles to be implemented in order to increase efficiency and reduce logistic and purchasing costs. All principles can be divided into three

categories – new company's perception of logistic and procurement, suppliers management and alternative sourcing.

Perception of purchasing

First category may be described as a move of managerial activities to a different executive level. Purchasing processes are newly considered as a strategic and in accordance with that, management is focused on particular areas more deeply. Not only all defined targets and strategies must be based on the whole company's plans, but also the approach of employees and managers has to be changed. Activities should be centralized in one place enabling better coordination and direct focus, related mainly to inventories and employees management. Orientation on total cost of inventories ownership, benchmarking and regular evaluation of best market practice, risk management and employees training are considered as ones of the most important areas. It is clear that first of all however managers have to understand the most important rule: each system is built and formed by people – without the acceptance, participation and support of everyone involved the probability of successful implementation rapidly decreases.

Suppliers management

Second area is related to supplier management. The acknowledgement of importance of purchasing has opened the discussion among the experts about the optimal supplier base. The main idea is to find balance between the immediate availability of goods and the cost associated with their ownership. Company can influence both of the factors to a certain level – availability of goods is related to the level of inventories, which may decrease securely thanks to the mutual trust with particular suppliers. However as well as it is not financial effective to keep high level of inventory it is not possible to develop closer relationship with all suppliers or to apply only one general strategy for all supplies. Companies' approach can be influenced by two indicators - importance of goods supplied and the number of its suppliers available on the market. With this knowledge it is easier to choose a partner for close collaboration in order to build a strong and stable relationship. Based on the studies from several authors, current trend is to rationalize supplier base: 1. standardize components and lower complexity of supplies, 2. consolidate purchases and size of supplies

Optimizing of supplier base enables stronger focus on particular supplier and partnership development. Suppliers may be motivated either by size of individual supplies or by the length of cooperation accompanied by variety of incentives leading to deeper supplier's integration into the company's processes.

End customers are more sophisticated nowadays and expect more in the terms of quality and flexibility. Flexibility means the ability to react quickly on market changes and innovate product based on different customers' needs and wants. Companies therefore offer wide range of product customization by the optional scale of shapes, colors, materials, features and functionality. In the same time, they are trying to shorten delivery time, improve customer care and sell goods for reasonable price. This concept can't be implemented without the change in supply chains management and supplier involvement. To ensure real time information exchange and effective communication, shared information systems or physical presence of supplier's employee in customer's premises are quite common nowadays. Suppliers can either directly manage all supplies based on the real consumption or cooperate on product development, which enables further adjustments and enhancements in the whole production process of goods supplied.

Alternative sourcing

Third area may be described as alternative sourcing as traditional sourcing is being modified in the last decades. As mentioned above, it is quite common that suppliers by themselves manage either whole sourcing process or its particular parts. Companies are moving to the big industrial parks to enable suppliers to deliver goods directly to the production lines. As companies tend to minimize stock, all current supplies are more or less managed on just-in-time principle. In addition, companies tend to pull the point where the

ownership and responsibility for the goods is transferred as close as possible to the manufacturing process. It might be at supplier's premises, on the way or directly next to the production line. There are hybrid alternatives such as consignation, where goods still owned and managed by suppliers are stored in the companies' warehouses. In the same time companies tend to get rid of stock management, they are supporting supplier's activities and they are trying to improve efficiency and quality of the whole supply chain by sharing of know-how or physical resources or by direct financial incentives. Higher efficiency, reduction of costs and wasting in all processes finally lead to formation of lean supply chains.

LEAN SUPPLY CHAINS IN METALLURGY

Since the theory of lean production and complex lean supply chains was firstly introduced by Toyota, the most significant progress in this area might be expected mainly in the companies operating within automotive industry. Being proved by the evaluation and comparison of purchasing processes of companies operating in automotive and metallurgy, not only automotive companies tend to be lean nowadays. Two medium automotive businesses and one metallurgy business were interviewed to demonstrate this fact.

Table 1 Lean supply chains - selected criteria

Criteria	Company 1	Company 2	Company 3
Industry	automotive	automotive	metallurgy
Type of production	batch	batch	batch
Number of employees	500 – 1000	1000 – 1500	500 – 1000
Operational purchase	local	local	local
Strategic purchase	centralized	centralized	local
Central coordination	yes	yes	yes
Purchasing strategy	sole sourcing	sole sourcing	not defined
Standardization	yes	yes	yes
Consolidation	yes	yes	yes
Supplier development	yes	yes	yes
Information exchange	advanced	advanced	limited
Information system	SAP	SAP	MRP system
EDI	yes	yes	no
Consignation	yes	yes (40% of stocks)	no

Reference: Novotna, P., based on the data provided by companies

The first above-mentioned area is related to general thinking about the company procurement. All interviewed companies have already realized the importance of strategic approach however companies operating in automotive industry seem to be more advanced in terms of centralization than the ones operating in metallurgy. All strategic activities are centralized in mother company, which enables bigger efficiency in particular purchasing processes – sharing of suppliers and data about them, consolidate purchases, etc. There is even a mechanism on global level in one of the companies that monitors whether the immediate stock in branches doesn't exceed predefined level. If so, specific actions have to be done to prevent penalization by mother company. Automotive companies seem to be also one step ahead in terms of purchasing portfolio analysis as they handle each supplier in a special way based on results of advanced analysis. In metallurgy company there is more simple portfolio analysis done as it is based on the monetary value of purchased material only.

The big difference might be seen in the number of suppliers and in relationships with them. Companies in automotive are focused on sole sourcing strategy being proved also by the value of current stock. In spite of the fact that the scope of business is almost the same, the value of company's stock in metallurgy is two times bigger compared to the companies in automotive. Nowadays there is a perceivable tendency to reduce supplier base also in metallurgy since the company has already started to work on standardization, consolidation and suppliers sharing within the several company's branches. Automotive companies are also more advanced in terms of the real time information sharing with the suppliers compared to the metallurgy one. Both companies are using SAP as a main information system. In spite of the fact, that they don't share the information system within their supply chain at all, they use EDI as a standard protocol for communication with suppliers. They also have online system for data sharing enabling quick and effective exchange of information. Company operating in metallurgy uses just simple MRP system and the amount of information shared with suppliers is not lower at each moment. However there is a tendency to change and to develop online system enabling effective and quick information exchange in the future.

There is also a difference in supply chain management of interviewed companies. Automotive companies are more oriented on JIT supplies; they are using consignation and they are trying to develop relationships with carefully preselected amount of suppliers. Company operating in metallurgy tends to change their stock management system toward the lean production too - they have already implemented Kanban, one of the JIT methods, which helped them to decrease stock level of 15 % in a year. Company is also working on suppliers' performance improvement in terms of production efficiency. Despite the fact that company is taking steps to higher production efficiency, the results of improvements of suppliers' performance are strongly influenced by irrational and not transparent focus on suboptimally selected suppliers. Company is focused only on suppliers evaluated as the worst from the perspective of quality of supplied goods and on suppliers chosen by the Procurement Manager mainly according to subjective criteria.

CONCLUSION

Based on analysis it is clear, that although the implementation of lead concept seems to be more advanced in automotive industry, there is a significant change and progress in approach to lean management in metallurgy too. Focus on efficiency in procurement process therefore seems to be one of the first logic steps for companies identifying ways of reducing costs and being lean not only in automotive industry.

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