Competing Through Lean -- Towards sustainable resource-oriented implementation framework

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ABSTRACT
This paper addresses the needs of SMEs manufacturing companies which due to their limited resources are often unable to introduce radical changes in their strategies. The main focus is on analyzing the principles of lean manufacturing and management regarding their potential contribution to building a company’s competitive advantage. The paper analyses lean from a strategic management viewpoint while combining its implementation with achieving a competitive advantage. The ultimate result is a framework for lean implementation aimed at building a competitive advantage for companies. The proposed framework focuses on the idea of a closed loop with embedded sustainability.

Keywords: lean manufacturing, SMEs, resource-based view

1.0 Introduction

Lean as manufacturing technology and overall philosophy of companies has been growing in popularity over the years after Toyota’s successful way of operating was made available for broad audience. The vast amount of empirical and theoretical research proved that this specific approach to manufacturing popularized by Toyota has the potential of increasing operational effectiveness by the wiser utilization of available resources combined with eliminating any non-value adding activities- waste (Liker, 1994).

The issue of lean manufacturing has been gaining researchers’ attention since the advent of Toyota Production System (TPS). The Japanese automotive giant created their own path of growth that is currently being described as lean. Although Toyota eagerly shares its knowledge and experience with other companies that are intending to follow its path. Nevertheless, the idea of direct transfer of Toyota’s ideas does not seem reasonable since every company has to adjust lean improvements to their own characteristics. This does not imply that no guidelines of lean implementation can be proposed. In fact, SMEs share a set of general, common features just as the bigger companies do.

Lean as a concept refers to nearly all areas of organizational operations and many researchers appraise its universality. Nevertheless, the research concerning lean implementation in small and medium enterprises (SMEs) is being somewhat underdeveloped. Scientific resources often quote the success stories of major players, within the automotive industry in particular, while lacking the more complex perception that includes SMEs.

This paper addresses the mail concerns of SMEs in terms of their limited resources as compared to large companies. The empirical research presented in this paper revealed that SMEs are often unable to allocate enough sustainable resources into lean implementation and are often discouraged by the amount of workload needed for implementing lean. The aim of this paper is to match the process of lean implementation with the available resources in order to achieve success in lean implementation as well as avoid the fuzziness of the initial stages of lean which might lead to abandoning lean improvements.
2.0 Literature Review

Lean is a broad concept that can be applied to a wide array of operations. It is argued that lean improvements are equally beneficial for both manufacturing and service companies since at the core of lean lies the solid commitment to achieving goals with optimal utilization of available resources. Shannon et al. (2010) claim that the aim of the lean philosophy is the careful examination of the whole system in order to identify and eliminate the non-value added activities.

Motwani (2003) defines lean manufacturing as an improvement of mass production so therefore a logical evolution of the concept. Focusing on manufacturing the right product the first time, undertaking the efforts in terms of continuous improvement, quality embedded in products and processes, flexible production and minimizing waste whenever and wherever possible. Sugimori et al. (1977) support that thinking by claiming that the origins of lean can be explained by the recognition of Japan’s distinguishing features. The authors emphasize the lack of natural and sustainable resources and the high costs of raw material when compared to Europe or America. Therefore, Japan was force to overcome this advantage by focusing on manufacturing of better quality products with higher value for customers and lower cost. Sugimori et al. (1977) also mention the Japanese concept of work which differs in consciousness and attitude. The authors state that the Japanese way of working can be reflects in the way enterprises base their operations upon values such as lifetime employment, the importance of labor unions, avoiding discrimination between shop workers and white collar staff.

The basic understanding of lean concept should be centered on seeing lean as a philosophy not as a selection of tools that a company utilizes when needed but rather a philosophy that shapes the organizational culture and guides a company. According to Hines et al. (2004) companies often fall into a trap of misunderstanding the lean concept. By implementing single or multiple tools organizations tend to assume that they have become lean while in fact they are falling into a trap of ad hoc activities that cannot be sustained.

Nevertheless, the understanding lean is still somewhat problematic. Since the operational system of a lean giant- Toyota is apparently impossible to replicate, companies are crafting their own understanding of lean. The core element of the philosophy is therefore often lost, since long-term orientation as well as preventative measures are not addressed frequently. Toyota’s operations are strongly influenced by the culture of long-term orientation, commitment and strong leadership. Therefore, it is not uncommon for the company to resign from immediate financial benefits for the sake of more long-term benefits (Liker, 1994). Moreover, Toyota is also characterized by its “crisis mentality” which means that the company anticipates challenges before they actually appear. This applies in particular to a process the development of a Toyota Prius concept- the first hybrid car in Toyota’s offer. The motivation for development stemmed from within the company as opposed to being triggered by competitor’s advancement.

Garnett et al. (1998) claim that lean is not simply a method that can be applied in any industry and bring the benefits that can be compared to the success of Toyota. Moreover, the authors also address the common pitfall of manufacturing companies concerning the perception of lean through the lens of manufacturing solely. The common mistake that organizations make is focusing solely on their own operations while being unable to have a broader perspective and ability to position themselves in the whole value chain. The authors also mention the issue of individual engagement into the lean change and taking the ownership of the organizational change process if companies are opting for success.

This article aims at combining lean thinking and the sustainable resource-based view of strategic management. According to Peteraf (1993) the basic notion of strategic management is that the firms are fundamentally heterogeneous in terms of their sustainable resources and internal capabilities. Therefore, heterogeneity implies that firms with varying capabilities are able to compete in the marketplace and the
author claims that it is one of the cornerstones of competitive advantage. The author also refers to ex post and ex ante limits to competition as well as the imperfect mobility as the remaining building blocks of the resource-based model. Barney (2001) emphasizes the evolutionary character of the resource-based view of strategic management. The author refers to the routines that every company develops over time. The evolution of the routines based on the mechanism of selection will lead to the elimination of those inefficient and ineffective, extracting those practices that generate competitive advantage for the firms. Nevertheless, the evolutionary perspective does not address the issue of sustainability. Barney (2001) concludes that there are many resource-based theories within the field of strategic management and the common ground for the research has not yet been identified. Nevertheless, the author outlines the general assumptions that those theories share. Namely, the notion that resources and capabilities can be heterogeneously distributed across competing firms, the differences can be long-lasting and they might provide explanation why certain firms perform better than others.

Since this paper combines the two seemingly dissimilar disciplines, the aim is to identify the elements that could be considerate similar and mutually supportive. The results of empirical research and managerial implications that stem from the identified need to perceive lean thinking as a part of strategy will be discussed further in chapter four.

3.0 Methodology

The case study approach was utilized to conduct the research. Data collection was completed through semi-structured interviews, shop-floor visits and data available from the official websites of the case companies. Among the interviewees were: company owner and chief executive officer, production manager, sales manager, and a manager responsible for lean implementation. During the data collection a focus was put on addressing lean from different viewpoints—lean practitioner and non-implementer actively seeking for improvement opportunities. The study presented in this paper aims at gaining a broad perspective in terms of locating lean in company’s strategy. Therefore, the analysis was conducted in two companies one of which (company A) is currently not implementing lean, but is actively seeking for improvement opportunities, and seriously considering stepping on a path towards lean. The other (company B) is a lean practitioner.

The research conducted in the two case companies had a slightly different focus. In the case of company A the aim was to identify the main challenges of day-to-day operations and the areas that would need improvement in the first place. The company is also considering introducing the new manufacturing method that is expected to decrease lead-times and is less labor-intensive. The company perceives the introduction of the new manufacturing method as an excellent opportunity to introduce the far-reaching changes such as lean improvements.

Company B has long observed the opportunities for improvement and the economic downturn has worked as an additional stimulus to rethink its operations. Currently, the company has introduced a set of lean improvements in the shop-floor and experienced the benefits in terms of costs and lead-times reduction, as well as increased quality of products. The aim of the research was to analyze the lean conversions in terms of their impact upon company performance. Moreover, challenges of the lean implementation were identified.

3.1 Description of cases

Two case companies were chosen for the study and both of them qualify as SMEs. The case companies are focusing on manufacturing but the industries they are operating in are different. The first analyzed
company (company A) is a motor boat manufacturer located in the Ostrobothnia region and selling its products through dealer network. The company is operating based on a manufacturing to order basis and its main challenge is shortening the lead times. Company A is currently not implementing lean improvements but the challenge of growing manufacturing costs and competition from low cost countries urges the organization to rethink its operations. Therefore, it might be stated that the stimulus for implementing lean stems from the outside rather than from within.

Company B is a manufacturer and a supplier of magnet generators and full power converters for wind power. The company aims to become the industry leader in the field of new energy sources by being a frequently chosen partner for multi-megawatt power generation. The mode of operations is engineering to order (ETO). The company has been long aware of the benefits that the introduction of lean manufacturing might bring. Therefore, it has stepped on a path towards lean and introduced a set of improvements in the shop floor. In other words, the studied company is a lean practitioner with considerable experience in the area and the initial stimulus for lean implementation came from within.

The chosen case organizations differ in their organizational structure especially in terms of a global presence. While case A operates in Finland, case B has its units abroad. Moreover, the companies differ also in terms of strategic perspective. While company A focuses on the short-term planning and reacting when the outside environment is imposing requirements for change, company B is actively seeking for improvement opportunities. In company B the implementation of lean was initiated as a result of careful observations of factory operations and identification of areas for improvement. The introduction of lean started with improving the shop-floor operations and the company has noticed benefits in terms of costs, quality and lead-times shortening. Nevertheless, the company is showing no initiative towards

4.0 Findings

The main outcome of the empirical research conducted in company A is the identification of several discrepancies between a small organization and a lean giant- Toyota. The most important discrepancies identified refer to the following areas:

- Time perspective
- Leadership structure
- Human resource management
- Supplier relations
- Organizational culture and learning
- Decision-making process

Evaluation of the operations and management principles revealed the domination of short-term orientation and lack of planning in a longer perspective. Company A is a manufacturer of high quality motor boats for recreational purposes. Even though the customers for this kind of product value quality and are brand conscious the growing competition from low labor cost countries started threatening the company. The introduction of the new manufacturing technology supported by lean toolbox is considered as a new development path.

Company B is a lean practitioner and the introduced lean tools comprise of the following:

- Cell manufacturing
- 5s (with an added element of safety
- Kanban system
- Standardized and simplified assembly procedures
- Visual control- andon lights
Cross-functional teams
Unified coding system for internal documentation

The company operates on an engineering-to-order (ETO) mode which also determines the perception of lean especially in terms of collaboration with suppliers. Even though the company was able to implement certain lean tools successfully the sustaining of lean improvements is not addressed at all.

The main challenge identified during the empirical research is the inability of the companies to place the lean improvements in the broader perspective of company’s development. Company A sees lean as a set of ad hoc activities that will be introduced on the shop-floor and nowhere else. Company B has a considerable experience of lean implementation but has not been able to widen the scope of improvement beyond the shop-floor. In other words the companies do not perceive lean as a philosophy that requires changes on the level of organizational culture. This is particularly threatening in the case of the company B which might encounter challenges in the process of sustaining the lean improvements. Based on the empirical research conducted in the case companies it might be stated that those two organizations are lacking a deeper understanding of the lean concept.

This paper argues that for the successful and sustained implementation lean should be seen as an overall philosophy of a company. Moreover, a company should be able to place its own operations in a broader context of the complete chain of value creation for the end customer. This implies addressing the whole supply chain. It is not the aim of this paper to analyze the construct of the supply chains and therefore, the importance of “seeing the big picture” is just signaled.

4.1 Managerial implications

Based on the challenges identified during the empirical research conducted the framework for lean implementation was proposed. The underlying idea was to address the main challenges identified- the lack seeing lean implementation as a part of the strategy and the inability to match the current resources with the desired future state. Moreover, the issue of sustaining lean improvements was addressed. The framework proposed comprises of the five simple steps- identify, evaluate, match, implement and sustain. Figure 1 summarizes the idea behind the framework. The framework should work as a closed loop where elements are mutually reinforcing.

![Figure 1: Elements of the sustainable resource-based lean implementation framework](image-url)
4.1.1 Identify
This step refers to the precise identification of available resources and core competencies available within the company. Before the actual introduction of lean improvements, which would go beyond the shop floor, a company should conduct a thorough analysis of the current state in terms of available resources. This step also refers to gaining a thorough understanding of the lean concept. This paper opts for a more holistic and almost philosophical approach. This implies that lean should be seen as an organizational change rather than a set of tools. Without a deep understanding companies should not step on the path towards becoming lean.

4.1.2 Evaluate
The process of evaluation can be done as soon as a company has gained a thorough understanding of its own resources and core competencies as well as the idea of lean. At this point a company should decide what kind of improvements will be undertaken and in which sequence. This is a crucial part of stepping onto the path towards lean as it addresses the fact that each company will follow its own sequence of steps tailored to its unique experiences and expectations.

4.1.3 Match
The step of matching is characterized by the matching of available resources and lean improvements. This step facilitates the sequencing of lean implementation process by focusing on those activities that would be supported by currently available resources.

4.1.4 Implement
The decision of implementation should be executed rapidly but still preceded by thorough preparation (previous steps) according to the principle of lean—make decisions slowly, by consensus, thoroughly considering all options, and implement them rapidly (Liker, 1994).

4.1.5 Sustain
Sustaining lean improvements is a challenge. According to Mann (2010) lean culture cannot be created without sustainable lean improvements. The author also suggests the parallel implementation of lean production and lean management that should work as a closed loop that produces focus and process improvement. Such thinking also supports the idea of seeing lean as a philosophy and a thorough organizational change.

5.0 Conclusions and Further Research
The need for addressing the available resources while planning and executing lean conversions was identified and refined during the empirical research presented in this paper. The aim of the research was to find connections between those two areas and build a deeper understanding of lean as a broad concept but also as a concept that should not be followed without a moment of thorough consideration.

The proposed framework should be treated as a stimulus for rethinking the understanding of lean and it is expected to be beneficial for organization in every stage of lean. The expected outcome is to moderate the initial fuzziness of the introduction of lean in terms of not understanding the concept and not seeing the overall direction of development. Implementation of the approach proposed in this paper is expected to help companies build and strengthen their competitive advantage. This could be interpreted referring to the creation of the unique lean approach based on the proposed framework as well as in terms of “doing it right the first time”. Having a clear understanding of the concept of lean combined with the awareness of resources at hand is expected to enable the companies to benefit from lean faster by shortening the time needed for the introduction of the lean conversions. Suggestions regarding a thorough examination own
company’s resources, core competences and capabilities can even lead companies to a conclusion that lean implementation is not an optimal solution and the framework does not exclude such situation. Nevertheless, the main expected contribution that the proposed framework should bring is the facilitation of the actual implementation of lean.

The further development of the research would be done in terms of the refinement of steps by providing more tangible instructions on their completion. Suggestions regarding drawing the limits in between the consecutive steps would be needed to be developed further. Moreover, the issue of sustaining the undertaken improvements requires closer attention as the mutual reinforcement and connections between the steps should be considered crucial.

References


Author’s Background

Anna Rymaszewska is a graduate of a Master’s Program in Industrial Management at the University of Vaasa. She is currently pursuing her Ph.D. studies as well as being involved in project research activities at the same university. Her research interest focuses on lean manufacturing and its implementation in SMEs in particular. Her scientific activity also consists of participation in research projects concerning networked collaboration and the improvement of manufacturing processes throughout the implementation of lean. Anna Rymaszewska is also supporting the teaching activities in the area of Supply Chain Management at the University of Vaasa.