

Key factors for implementing the lean manufacturing system

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Abstract: The purpose of this paper is to provide a historical review for the role of management in implementation of lean thinking in a lean manufacturing environment. This paper begins with this subject who introduces the lean manufacturing as the combination of directions and a culture which managers could draw guidelines for achieving benefits through that. Two basic lines of lean manufacturing are "respect to the workforce" and "waste elimination" which is introduced in this paper and how these factors can cause an effective leadership during implementations. Then, it is described that how companies use the benefits of lean tools in their conception of lean implementations, and what factors involve managers with culture and leaderships issues. Also, this study implies that not only it is necessary to implement most of the technical tools but an organizations culture needs should change too. Furthermore, the alternatives which are needed could be implemented through an organizational value chain. Lean has a major strategic significance, though its implementation procedure. General approach to the supplier base viewing learns as a set of tactics rather than embracing it as a philosophy, because lean manufacturing has a strategic importance which the directions could be implemented through them. [Journal of American Science 2010;6(7):287-291]. (ISSN: 1545-1003).

Key words: Lean Management, Success and failure factors, Lean manufacturing

1. Introduction

While organizations try to remain profitable during periods of economic slowdown, many have accepted lean manufacturing as a tool to improve competitiveness. Some researchers utilize this culture as an important new management system that top managers of many manufacturing and service businesses now try to follow. Toyota's management system is variously referred to as "Toyota production System" (Ohno, 2008), "Toyota Management system" (Monden, 2008), "Lean Production" or "Lean Management"(Emiliani, 2003); It is also commonly referred to as "Lean manufacturing" due to its origins in production and operations management (Ohno, 2008). However, this description implies a narrow focus and is now recognized as incorrect because lean Principles and practices can be applied to any organization. Thus, the emergent preferred description for this management system for Toyota Motor Corporation is "Lean management" (Emiliani, 2006).

Lean implementation like many improvement tools have not succeeded universally in their application. Mora (2003), submits that "only some 10 per cent or less of companies succeed at implementing TPM and other lean manufacturing practices". Sohal and Eggleston (2004), advised "that only 10 per cent have the philosophy properly instituted". Repenning and Sterman (2001), advocated that companies use initiative almost as a passing style and submit that

whilst the: "number of tools, techniques and technologies available to improve operational performance is growing rapidly, on the other hand, despite dramatic successes in a few companies most efforts to use them fail to produce significant results".

There are many possible failures that can occur while trying to implement lean manufacturing, these barriers fall into the following categories (Mejabi, 2003):

- Executive issues
- Cultural issues
- Management issues
- Implementation issues
- Technical issues

Mejabi (2003) stated that "each one of these categories is important and if taken into consideration can cause possible obstacles in the path to lean manufacturing ". All these issues have correlated points with each other. For example, executive issues occur when the company executives are not totally dedicated themselves to making the conversion to lean manufacturing and a sufficient knowledge of lean manufacturing principles.

The conversion process is difficult and if upper management is not board, it becomes even more difficult; in the other hand management issues are closely related to executive issues because management needs to be dedicated to the conversion

to lean manufacturing and have sufficient knowledge of lean manufacturing to bring about the change.

2. Literature review

The roots of Toyota's management system dates back to the early 1890s, when self-taught inventor Sakichi Toyoda designed and patented a manually operated loom which automatically stop the machine when a thread broken in weaving cloth that greatly improved worker productivity and avoiding the production of defective cloth (Ford & Crowther, 2006). In part, as a result of these innovations, key objectives of Toyota's early management practice have been characterized as "production efficiency by consistently and thoroughly eliminating waste", and "the equally important respect for humanity" (Ohno, 2008).

Both Kiichiro Toyoda and Taiichi Ohno were greatly influenced by American industrialists and their Production and management practices (Ohno, 2008), but not by management theorists. By far the most influential person was Henry Ford, through his books *My Life and My Work* and *Today and Tomorrow* (Ford & Crowther, 2006). Another highly influential practice was the "Training Within Industry Service" (TWI), a structured four step program for training manufacturing workers – particularly supervisors (Huntzinger, 2003).

While the influence of western industrial management practice is clear, it is very important to recognize that it is also rather limited. Toyota managers have, over generations, purposefully made many important improvements to industrial management practice over time (Mejabi, 2003) consistent with the dual objectives of "production efficiency by consistently and thoroughly eliminating waste" and "the equally important respect for humanity" (Ohno, 2008). While these were the major drivers, Japanese business conditions and Japanese culture played recognizable but less significant roles (Ohno, 2008). In 2001, Toyota Motor Corporation published an internal document titled "The Toyota way 2001" (Taj & Berro, 2006), which presents these two objectives as top-level company principles: "continuous improvement" and "respect for people." The 13 page document provides a detailed description of these two principles and reveals explicit and implicit beliefs that have long guided management thinking. While this document is not publicly available, most of what appears in it can be found in a recent trade book (Liker, 2004). Publication of "The

Toyota Way 2001" document helped to raise awareness of this principle external to Toyota Motor Corporation and its affiliated suppliers. The correct practice of Toyota's management system – Lean management – would require, at a minimum, acknowledgement and practice by management of both principles: "continuous improvement," and respect for people. However, most managers practice only the first principle, "continuous improvement", which greatly limits amount of improvement that can be achieved (Emiliani, 2006). It is the second principle, "respect for people," that enables the first principle. Simultaneous application of both principles results in the elimination of waste, called "muda," in Japanese. Lean means "manufacturing without waste" (Taj & Berro, 2006). Waste is defined as: activities (Ohno, 2008) and behaviors that add cost but do not add value as perceived by end-use customers (Womack & Jones, 2006).

2.1 Waste Elimination Practice

Eight distinct types of waste are recognized in the Lean manufacturing system cause effective implementation of Lean management results in the establishment of intra and inter organizational capability building routines and improve time-based competitiveness depends on the use of this Lean principles, structured processes and supporting tools (Imai, 2007).

The waste concept includes all possible defective work/ activities, not only defective products (Taj & Berro, 2006) also, the factors underlying poor quality and elementary management problems can cause these wastes (Hines & Taylor, 2000). Waste can be classified in eight categories (Womack & Jones, 2003):

- (1) Motion: movement of people that does not add value.
- (2) Waiting: idle time created when material, information, people or equipment is not ready.
- (3) Correction: work that contains defects, errors, reworks mistakes or lacks something necessary.
- (4) Over – processing: effort that adds no value from the customer's viewpoint.
- (5) Over – production: Producing more than the customer needs right now.
- (6) Transportation: movement of product that does not add value.
- (7) Inventory: more materials, parts or products on hand than the customer needs.

(8) Knowledge: workforce is not confident about the best way to perform tasks.

2.1.1 Lean implementation leadership

In order to implement the concept of lean manufacturing successfully, many researchers emphasize on commitment by top management (Alavi, 2003) and the companies should utilize strong leadership capability to exhibit excellent project management styles. In essence, these qualities would facilitate the integration of all infrastructures within an organization through strong leadership and management vision and strategy.

Good leadership ultimately promotes effective skills and knowledge enhancement among its workforce and minimizes the non – value activities in order to eliminate the wastes. Managers should also work to create interest in the implementation and communicate the change to everyone within the organization (Boyer & Sovilla, 2003), specifically; the needed information related to worker in shop floor should be updated respectfully.

2.1.2 Lean implementation procedures

Bhasin and Burcher (2006) agree that there is general lean procedure consistent to any company, but each one should find their way through their conceptions from lean manufacturing. Bicheno (2007) and Liker (2004) are strong in suggesting that a key component of lean thinking is to identify all the value adding time and reduce the non – value added activities. Bicheno (2007), claims that in batch production about 98 percent of time activities is not value adding time; in the USA, Sheridan (Sheridan, 2000), indicates that less than 2 per cent of all manufacturing jobs are in companies that are truly lean; that they have completed at least 80 percent of the conversion process. Also, Womack and Jones (Hines & Taylor, 2000) in their survey of automotive manufacturers suggested that only 41 percent were assessed as having a high level of lean adoption. So, having a comprehensive knowledge of lean tools and being familiar with lean culture in adoption of right implementation and changes through incremental improvements and step projects by the reciprocal cooperation with workers until the completion of implementation is essential.

2.2 Cultural Requirements

All companies may have the specific procedure to do the implementations, but the lean culture is

needed to cause lean thinking in all actions the managers will take. The requirements in order to achieve the lean culture can be divided into two parts as bellow:

2.2.1 Intra – Organization improvements

(a) Develop a learning environment and training the employees, can provide an approximate efficiency and making the sense of more learning, encourage the organization's departments pursuing lean.

(b) Ensure that there is a strategy of change whereby the organization should understand and adapt their actions through the changes and communicates how the goals will be achieved. The managers through making effort to maximize stability in a changing environment should reduce schedule changes; program restructures; and procurement quantity changes.

(c) Assign responsibilities within the pilot program initially and ultimately within the whole organization whereby it is also clear who is supporting the program.

(d) Make decisions at the lowest level assessed by the number of organization level and promote lean leadership at all levels and evolution by the number of lean metrics.

(e) Control the conflicts and assess the fraction of an organization's employ operating under lean conditions.

2.2.2 Intra – Organization improvements

(a) Develop supplier relationships based on mutual trust and commitment; this could be assessed by the:

- Ø Number of years a relationship has existed with a supplier; and
- Ø Percentage of procurement purchased under long term supplier agreements.

(b) Systematically and continuously focus on the customer; one could receive a signal of this via the percentage of projects in which the customer was involved as intimated by Koenigsaecker (Koenigsaecker, 2000).

(c) Maintain the challenge of existing processes through, e. g. number of repeat problems and customer assistance to suppliers.

(d) Undeniably, as reiterated by Emiliani (2006) and liker (2004), lean requires a long – term commitment. A medium – sized company would need a minimum of three to five years to start pursuing the lean philosophy (According to the current British classifications) (Chase, 2004).

Lean philosophy also will be completed as the integration of various factors that the shortage of each factor causes some gaps in lean thinking.

2.3 Lean Thinking Issues

The managers within or outside the lean movement have rightly pointed to various gaps in lean thinking. This evolution is largely driven because of the shortcomings of lean that surfaced as organizations progressed on their learning curve, as well as the extension of lean thinking into new sectors, different settings and constraints (Hines, Holwe & Rich, 2004). Key aspects of this criticism are the lack of contingency and ability to cope with variability, the lack of consideration of human aspects, and the narrow operational focus on the shop-floor.

Ø Scope and lack of strategic perspective

Almost the complete lack of discussion of strategic level thinking in lean management as opposed to discussions of how to apply a series of different tools and techniques is one of the main shortages.

Ø Human aspects

It is further aspect that has high pressure on the shop floor workers.

Ø Lack of contingency

There is still a general misunderstanding of the contingent nature required to apply lean thinking.

Ø Coping with variability

Another most important part of the criticism was the ability of lean production systems and supply chains to cope with variability, a key aspect of the lean management.

3. Conclusion

This paper shows that one the major difficulties companies encounter in attempting to apply lean is not knowledge of particular tools and techniques, perhaps lack of comprehensive and suitable lean knowledge related to probable problems within the companies by the managers, direction, gap and a lack of recognition of lean culture in whole of the organization and planning cause the fails within the implementations. Additionally, some managers try to enhance the implementation by some of the lean tools and mostly try to only implement the "continuous improvement" and explicitly forget another basic lean principle, "respect for people".

The managers should know that lean thinking won't derive during a short time, and they should prepare the context of implementations before every decision making. Apply five or more of the technical

tools simultaneously; install a continuous improvement viewpoint; and make numerous cultural changes embracing empowerment and sponsor the lean principles through – out the value chain are the other principles that the managers should focus during the implementations.

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