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The Strategic Approach to Exploration Review on TQM and Lean Production

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Abstract: The aim of this paper is to explore similarities and differences between TQM and Lean Production with an emphasis on Lean strategy approach. This paper investigates the related literature of various studies, analyzes, and finally reviews them systematically.

This study finds that, although Lean and TQM both aim to improve quality, TQM reaches a certain point or stage at which no more improvements can be made. Lean, however, focuses on taking quality improvement to the next level. It is clear that Lean journey is deeper and more extensive in comparative to TQM Journey. Lean production evolution is Lean thinking; Lean was reconsidered to this renown.

And, the result of this research discloses that TQM and Lean Production have many concepts in common. However, based on Lean strategies; TQM, similar to many improvement approaches, can be a tool to support and create synergy for making a more competitive factors market place amid firms.

JEL Classifications: L15, M11, O14, O33
Keywords: Lean Production, Lean strategy, Total quality management

1. Introduction

Different management theories have been presented over the years. Total quality management (TQM) and Lean Production (LP) are two management approaches to optimization, but there are not unique ideas and views of them.

TQM is a management manufacturing strategy. The purpose of TQM is to increase awareness of quality in all parts of the organization's processes. TQM is an integrated management philosophy and a set of practices that promotes an organization-wide focus on quality starting with top management, but involving workers at all levels of the organization. The major objective of TQM is the development of a business strategy that harnesses all of the company's resources to achieve world-class quality at reasonable costs (Small, et al., 2011).

Lean strategies have arisen from the Toyota Production System. The evolving variants are originally founded in the Japanese Automotive industry; and its evolution has mostly carried out in the West. Needless to mention that TQM likes the management of initiatives and procedures has also been introduced and developed in Japan. However there are not common perspective of authors and researchers in this issue.

LP which is often known simply as 'Lean' is a production practice that considers the expenditure of resources for any goal other than the creation of value for the end customer to be

wasteful, and thus a target for elimination; basically, more value with less work (Ohno, 1988). LP is the production of goods using less of everything. TQM has Kaizen as a tool for continuous work; this is visualized by the Deming's wheel. Further, there are many concepts of TPS found in TQM, such as Kaizen and Process Mapping (Shah and Ward's, 2007). As a result, LP is a manufacturing philosophy that shortens the time between the customer order and the product build/shipment by eliminating sources of waste (Anvari, et al., 2011a).

In fact, two of the differences are particularly noteworthy. First, Lean focuses on improving entire value streams, whereas most of the other improvement methods tend to focus on individual processes. The second important difference is that most process improvement methods tend to focus on improving the productivity or efficiency of major value-adding processes, whereas Lean emphasizes reducing or eliminating non-value-adding activities (waste) and adding value.

Lean production has become a popular trend among companies and especially among manufacturing companies. TQM is also a great tool mainly used in manufacturing, and service industries. In addition, TQM improves and sustains the quality of the products and processes in order to meet or value-added to customer expectations. Within Lean settings, TQM has been enriched by peculiar Lean practices geared at reducing manufacturing process variance (Furlen, et al., 2011).

Consequently, according to our review of the literature, there is not common point of Lean and TQM clearly. Because, based on the new Lean approach, Lean is not just a box of tools; it is a system, philosophy and thinking. Anyhow, TQM is one of various tools and techniques to implement Lean principles to an industry (Shah and Ward 2007; Vinodh and Joy, 2011).

This article is arranged as follow: in sections 2 and 3, concepts of TQM and LP is presented. Then in section 4 a comparison between TQM and LP is given. Finally discussion and conclusion are drawn and conducted from the study in section 5.

2. Total Quality Management

TQM is an integrated management philosophy and a set of practices that emphasize continuous improvement, meeting customer requirements, reducing rework, long-range thinking, increased employee involvement and teamwork, process redesign, competitive benchmarking, team-based problem solving, constant measurement of results, and closer relationships with suppliers (Ross, 1993). Using TQM in manufacturing will result in a number of improvements, including increased profits, more satisfied customers, and better business practices in general.TQM is broken down into the following shortening:

T - Total = involvement from everyone at the company

Q - Quality = the standard in which you define product perfection

M - Management = the system of managing the different steps of the business management strategy

In fact, TQM is a philosophy or an approach to management that can be characterized by its principles, practices and techniques. Its three principles are customer focus, continuous improvement, and teamwork (Dean et al., 1994). TQM is an approach to improving the quality of goods and services through continuous improvement of all processes, customer driven quality, and production without defects(Matiasa and Coelho, 2011), focus on improvement of processes rather than criticism of people and data-driven decision making (Flynn, et al., 1994).So, TQM is the most pervasive approach to managing quality so that with meaningful effort by an organization to change its whole approach to corporate to make quality a directorial factor is everything the organization does (Mazumder, et al., 2011).

Therefore, Quality management can be described:

As a management revolution, a revolutionary philosophy of management, a new way of thinking about the management of organizations, a paradigm shift, a comprehensive way to improve total organizational performance, an alternative to management by control or as a framework for competitive management (Foley, 2004).

As a business process that allows companies to drastically improve their bottom line by designing and monitoring everyday business activities in ways that minimize waste and resources while increasing customer satisfaction by some of its proponents (Magnusson et al., 2003).TQM is an extensive method and requires specialist or consultant help that can in implementation (Kedar, et al., 2008)and emphasized on performance aspects of cultural and customer satisfaction (Baird, et al., 2011; Morrow, et al., 2011; Small, et al., 2011).

In the end, an interesting part of the TQM concept is that quality awards are offered by different foundations such as Deming Price, European Foundation of Quality Management (EFQM), Malcom Baldridge and so on. The concept of TQM can give competence, so benchmarking could be used to accomplish this with critical success factors: Top management commitment, Suppliers quality management, Human resources management, Process management, Customer focus, Role of quality department , Product design, Quality information system and use of IT, Training, Quality citizenship (Khanna, et al., 2011).

3. Lean Production

3.1 Concept of Lean Production

LP is an integrated socio-technical system whose main objective is to eliminate waste by concurrently reducing or minimizing supplier, customer, and internal variability (Shah and Wards, 2007). The key issues of Lean can be considered as (Ohno, 1988): Value, Value Stream, Flow, Pull, and Perfection.

The main concern of LP design is to eliminate waste. The main desire is to reduce the production cycle and this would be accomplished by the elimination of waste. Lean also has a focus on retaining tasks that add value, and eliminating non-value adding tasks. Other concepts having to do with time and waste are important to LP. LP is normally driven by customer demand. This brings up the point about what the driver of a business process should be. NIST (2000) defines Lean: "as a systematic approach to identifying and eliminating waste through continuous improvement, following the product at the pull of the customer in pursuit of perfection".

Among the several quality management concepts that have been developed, the Lean concept, as in LP, and so on. Moreover, Lean principles are basically customer value driven that makes them suitable for many manufacturing and sharingconditions. Five basic principles of LP are generally known(McCurry and McIvor, 2001; Wangaand Chenb, 2011):

- Customer value. Only what the customers'remark as value is important.
- Value stream analysis. Having understood the value for the customers
- Flow. Focus on organizing a continuous flow through the production
- Pull. Demand chain management prevents producing commodities to stock
- Perfection. A process of continuous improvement to eliminate of non-value-adding elements

3.2 Lean Strategy

Lean is a production strategy whose fundamental principles drive the industry towards a more effective production of goods and services. Moreover, LP has proved itself a worthwhile production strategy in many distinct industries across all regions of the planet by achieving higher levels of production efficiency (Moreira, et al., 2010).

According to Hines, et al. (2004), it became evident that LP exists at both strategic and operational levels. At the strategic level, the concept helps one to understand customer value and identify the value stream. At the operational level, it is a bundle of practices and tools that lead to the elimination of waste and force continuous improvement (Hines, et al., 2004).

According to Smiths and Hawkins (2004), Lean is a comprehensive package that includes reducing inventory, standardizing work routines, improving processes, empowering workers to make decisions about quality, soliciting worker ideas, proofing for mistakes, applying just-in-time delivery and using a Lean supply chain. Lean thinking (LT) is elemental to a Lean transformation. Askinand Goldberg (2002) defines Lean as a strategy based on

1. Kanban based pull production.
2. Elimination of waste as guiding philosophy.
3. Faith in the value and importance of quality.
4. *Kaizen* (explained later in this chapter) or continuous improvement as a day to day operating strategy.
5. Belief in the value and utilization of human resources.
6. Emphasis on reducing setup times for machines.
7. Integration of suppliers and material acquisition into the corporate planning process.
8. Efficient, cellular layouts with balanced material flow.

Furthermore, Competitive pressures force manufacturers to continuously improve the provision of products. Manufacturers shave adopted Lean practices such as JIT and TQM to reduce costs and improve quality (Inmana, et al., 2010). Also, in more recent work (e.g. Shah and Ward, 2007) identify four "bundles" of LP: JIT, TQM, Total Preventive Maintenance (TPM) and Human Resource Management. It is not a series of techniques that can be applied without the LT philosophy (Figure 1 on the next page).

Lean is a concept, a process and a set of tools, techniques and methodologies that leave behind them a trail of successes in bringing about effective resource allocation. Lean can be a major strategic initiative focused on major cost efficiencies managed from the top of the business. Lean can be the major philosophy that literally unites the organization in a relentless drive for improvement. Moreover, success in having Lean accepted and applied throughout any business depends on how it is sold and the potential benefits it (Atkinson, 2004).

In today's operating environment, a competitive strategy is defined by the way in which a business wins orders from customers over its competition. So, defining a Lean strategy means analyzing and understanding the fundamental areas of improvement that will allow your company to reach its goals:

- How does your organization make customer satisfaction?
- Where in the companies are the profits, revenues and margins coming from?
- Where is the improvement focus?

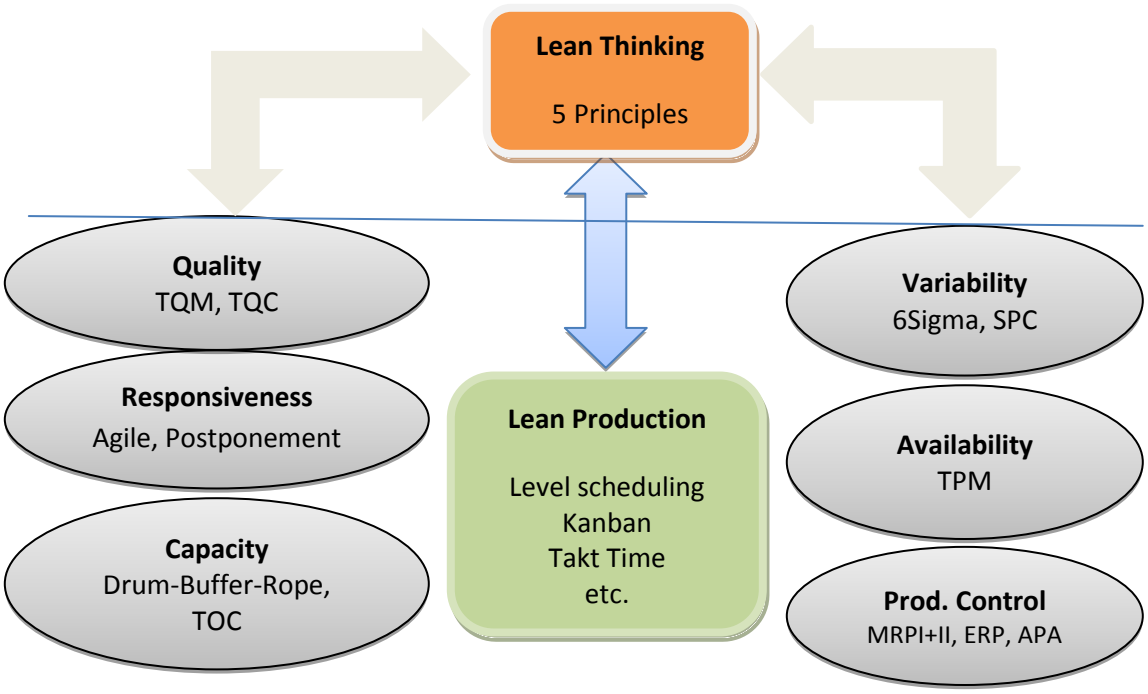

Figure 1 Lean–framework (Adapted from Hines, et al. 2004)

Then, to be successful you must link your Lean strategic priorities to daily improvement activities. This requires:

- defining the organization's current state (business case for change)
- defining and prioritizing strategic objectives
- translating the organization's strategic objectives into tactical improvement initiatives and projects
- defining appropriate measurements and targets to improve
- identifying the financial and social impacts
- establishing and executing a deployment process

Therefore regarding to Lean strategy to Leanness (Anvari, et al., 2011c), there have been three critical factors namely: 3S (strategy, structure, strengths), which should be considered as shown in Figure 2. The items that these critical factors rise are listed on the next page.

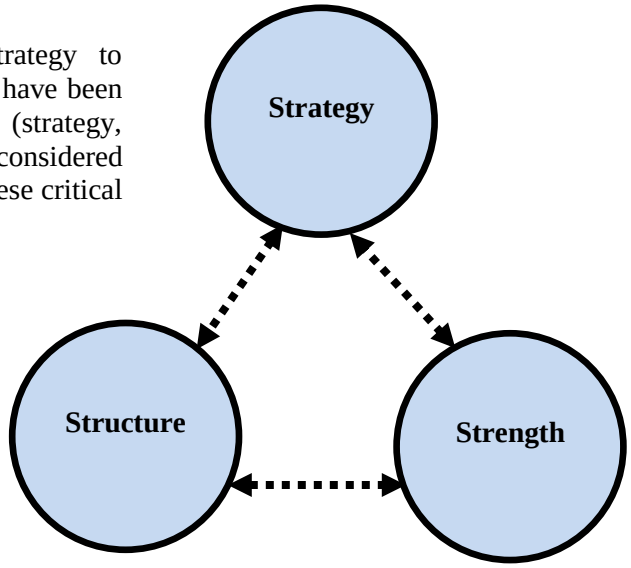

Figure 2 Three Critical Factors (3S) to Leanness

- Strategy rises to strategic determined – the kind of corporate your company aims to be.
- Structure rises to how the business internal and external relations are organized.
- Strength rises to organizational abilities and capabilities.

3.3 A Framework for Lean Strategy

According to Hines, et al. (2004) any concept that provides customer value can be in line with a Lean strategy, even if LP tools on the shop-floor, such as kanban, level scheduling, or take time, are not used. These concepts are not part of the LP methodology, but can be used in support of a wider Lean strategy (Anand and Kodali, 2010).

Finally, they concluded that the distinction of LT at the strategic level and LP at the operational level is crucial to understanding Lean as a whole in order to apply the right tools and strategies to provide customer value. So, LP strategy can be included (Anand and Kodali, 2010):

- Lean customer relationships
- Lean product development
- Lean order fulfillment
- Lean supply chain

4. Comparisons Between LP and TQM

In this section, some similarities and differences between TQM and Lean are analyzed. The overall analysis is done with three different aspects: basic assumptions, change principles and interventions (Table 1).

Table 1 A comparison between LP and TQM in three different aspects

Aspects	Categories	Resources
Basic Assumptions	• Quality • Employees and the quality of their work • Organizations as systems	Shingo, 1984; Deming, 1986; Ohno, 1988; Krafcik, 1988; Berggren, 1992, 1993; Hackman &Wageman, 1995; Sörqvist, 1998; Rother & Shook, 1998; Ezzamel, et al., 2001; Dennis, 2002; Jones & Womack, 2002; Womack & Jones, 2003; Bicheno, 2004; Anderson, et al., 2006; Kedar, et al., 2008
Change Principles	• Focus on processes • Management by fact • Learning and continuous improvement	Hackman &Wageman, 1995; Thompson & Wallace, 1996; Riley, 1998; Niepce &Molleman, 1998; Liker, 2004; Dennis, 2002; Womack & Jones, 2003; Anderson, et al., 2006; Kedar, et al., 2008
Interventions	• Analysis of customer requirements • Supplier partnerships • Improvement teams • Scientific methods for performance • Process management techniques	Ohno, 1988; Rother & Shook, 1998; Flinchbaugh, 1998; Dennis, 2002; George, et al., 2004; Bicheno, 2004; Anderson, et al., 2006; Kedar, et al., 2008

Source: Adapted from Anvari, et al., 2011a.

4.1 Basic Assumptions

(1)Quality The main focus in the Lean literature is on JIT production and continuous improvement (Shingo, 1984; Ohno, 1988; Krafcik, 1988). A common opinion is that the purpose of Lean is waste elimination; and it is a strategy for reducing cost (Ohno, 1988, Hackman and Wageman, 1995). Reducing waste is also a significant part of TQM, but under the banner of poor-quality-costs (Hackman and Wageman, 1995; Sörqvist, 1998). A major difference between TQM and Lean in this aspect is the precision in defining waste. In the majority of the Lean literature, waste or muda is based on the seven forms defined by Ohno(1988), whereas TQM has a very general definition of poor-quality-costs, including everything that could be eliminated through improvement (Sörqvist, 1998).

(2)Employees and the quality of their work The proponents of LP usually have a strong instrumental and managerial perspective, and discuss employees in terms of components in the production system (Berggren, 1992; Berggren, 1993; Jones and Womack, 2002).

(3)Organizations as systems One thing that Lean and TQM have in common are seeing the organization as a system (Womack and Jones, 2003; Bicheno, 2004), but there is a slight difference in perspective between the two concepts. Whereas TQM has a strong focus on the internal structure and integration of departments within the organization, Lean stresses a supply chain perspective, and sees the internal production operations as a part of a value stream from the sub-suppliers to the end customer (Rother and Shook, 1998; Womack and Jones, 2003;Talib, et al., 2011).

4.2 Change Principles

(1)Focus on processes Within the Lean concept the term 'value stream' is usually preferred (Womack and Jones, 2003). The term "process" is usually used at a lower level of abstraction that TQM theorists would call sub-processes or activities (Riley, 1998). TQM and Lean also share the conception that management should analyze and improve the processes and train the employees.

(2)Management by facts The literature on Lean does not really stress management by facts explicitly. However, this is implicit in the description of Lean practices, many of which are analytical tools designed to help achieve JIT production. Although this is a shared perspective between Lean and TQM, there is a difference. Within TQM the analysis of variability through the use of statistical tools is a central concept (Hackman and Wageman, 1995); in the Lean tradition, this is not seen as equally important. In fact, some authors argue against the use of statistical tools for analyzing production performance, and they recommend alternative tools such as increased inspection and visualization of problems (Liker, 2004; Dennis, 2002). Anyway, Lean operations practice (human resources and supply chains) and the production system design have significant positive impacts on the performance factors (flow, flexibility, and quality)(Taj and Morosan, 2011).

(3)Learning and continuous improvement TQM is focused on stimulating creativity and individual efforts for improvement (Hackman and Wageman, 1995), whereas Lean places strong emphasis on the standardization of work and collective learning (Thompson and Wallace, 1996; Niepce and Molleman, 1998).

4.3 Interventions

(1)Analysis of customer requirements Customer focus is one of the hallmarks of TQM. The Lean concept emphasizes customer interests. Some authors argue that the very purpose of Lean is to please the customer (Dennis, 2002). Moreover, Lean is a discipline that focuses on process speed and efficiency, or the flow, in order to increase the customer value (George et al., 2004).

(2)Supplier partnerships The suppliers are seen as important in both Lean and TQM (Petersen, 2009).

(3)Improvement teams Quality circles have a central role in much of the TQM literature. In the Lean literature, Improvement teams are explicitly discussed by just about half of the reviewed authors (Petersen, 2009).

(4)Scientific methods for performance measurement and improvement Both TQM and Lean employ various scientific methods for analysis and evaluation of performance. In TQM measurements are done in order to identify problems and to document improvement, whereas Lean theorists argue that measurements should be made for planning and synchronization purposes, for example for setting production rate (Ohno, 1988; Bicheno, 2004).

(5)Process management techniques In the Lean literature, different techniques are presented for both overall process level and individual activities. At an organizational level VSM can be used for highlighting several kinds of problems in the processes (Rotherand Shook, 1998). In-control processes are more commonly associated between Lean and TQM programs (Flinchbaugh, 1998).

As a result, many organizations start to implement LP without having understood the cultural and structural preconditions for implementing LP and TQM; Vise versa, many organizations have previously tried to implement TQM without great success and had the same experience with LP (Dahlgaard and Dahlgaard-Park, 2006). It normally requires, as with TQM, a cultural change where the soft or intangible factors of management (the systemic factors) like leadership, people management and partnerships are changed, so that a new organizational culture is developed to support and improve the core processes (Dahlgaarda and Dahlgaard-Park, 2011).

In a summary, although Lean and TQM both aim to improve quality, TQM reaches a certain point or stage at which no more improvements can be made. LP, however, focuses on taking quality improvement to the next level. Another major difference between the two is the approach they take. TQM views quality as a conformance to internal requirements, whereas LP focuses on reducing the number of defects. LP helps organizations reduce operational costs, cycle time, and cost savings. It tries to eliminate costs that are of no value to the customers such as costs incurred due to waste. TQM focuses more on improving individual operations within unrelated business processes, whereas LP tries to improve operations within a single business process. In more general terms, LP requires the skills of trained professionals and TQM may not. TQM may only be a 'part time' thing, and can be done with anyone; dedicated or not.

5. Discussions and Conclusion

LP has become a popular trend among companies and especially among manufacturing companies. TQM is also a great tool mainly used in government, manufacturing, education, and service industries. However, LP is not a singular concept, and it cannot be equated solely to waste elimination or continuous improvements, which constitute its guiding principles (Shah and Wards, 2007). LP has recently become pervasive as the primary strategy for manufacturing performance enhancement. Many companies now realize that business success in the short, medium and long term is predicated upon outstanding performance in the quality of products and efficiency of manufacturing operations. These companies recognize that consistent and disciplined application of LP strategies, with the emphasis on waste elimination and process streamlining, can offer a steady path towards business excellence (Mejabi, 2003).

Furthermore, Trehan and Kapoor (2011) in a study entitled: "TQM journey of an Indian milk-producing cooperative", described on TQM journey. It's notable that TQM journey can be compared with Lean journey, (Anvari, et al., 2010) and proposed a dynamic Lean roadmap (Anvari, et al., 2011b). It is clear that Lean journey is deeper and more widespread in comparative to TQM Journey.

In addition, TQM improves and sustains the quality of the products and processes in order to meet or exceed customer expectations. Within Lean settings, TQM has been enriched by peculiar Lean practices geared at reducing manufacturing process variance (Furlen, et al., 2011). Anyhow, TQM is one of various tools and techniques to implement Lean principles to an industry (Braglia, et al. 2006; Salem et al. 2006, Shah and Ward 2007; Vinodh and Joy, 2011; Furlan, et al., 2011).

Consequently, according to our review of the literature, there is not common point of Lean and TQM clearly. Since LP evolution is LT. The idea of a LP system is reviewed in *LT* (Womack and Jones, 1996). Furthermore, since LP reconsidered to LT, according to Hines et al. (2004) TQM similar to others can be tools and techniques of Lean (see Figure 2). Because, based on the new Lean approach, Lean is not just a box of tools; it is a system, philosophy and thinking! Therefore, LT is better and will be created a synergic power for implementation of LP, as if TQM and other tools/improvement approaches as a tool support that.

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