

Evaluation and Execution of Lean Manufacturing System - Some Issues in Indian Industries

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Abstract:

Lean manufacturing and lean principal is used by Industries to eliminate wastages and increased the productivity from continuous improvement in routine works. Because transformation is inevitable and an industry functions based on the needs of its customers, management practises and philosophies are always complex and ambiguous. This study discusses the evolution and execution of lean manufacturing in Indian businesses, as well as the challenges of implementing the lean mindset. Literature survey on lean manufacturing identifies different lean tools like TQM, JIT, KIZAN, 5S, KANBAN, SIX SIGMA etc. it has been aimed to investigate how a small organization could implement LMS in own organization for getting benefits from lean philosophy. Also, reduce the bottlenecks which affect the performance of industry and what are the obstacles to implement LM.

Keywords: ... Lean Manufacturing, Lean leadership, SMEs, barriers, lean philosophy.

1. INTRODUCTION:

Lean Manufacturing, also known as Lean Concepts, is a method for identifying and eliminating waste or non-value-added activities in manufacturing and service operations. Lean Manufacturing is a production philosophy and technique that aims to reduce all sorts of waste from the manufacturing process on a continuous basis. "Anything that does not enhance any worth to end products" is defined as waste. The primary goal of LM implementation is to reduce manufacturing costs, increase productivity, and cut production lead times. Waste can be divided into the following categories:

- Waste that can be seen or calculated, such as machine breakdown; waste that cannot be seen or calculated, such as poor machine and material movement. Papers in management machines are examples of minor wastes, and In every industry, LM is used to detect and eradicate these wastes. The following are the seven categories of trash that are addressed in this category: sector. The seven types of wastes addressed in this category are as follows:

- **Overproduction:** It is considered a waste to produce more things than are actually required by the client at the time of demand. **Rejection:** The product that does not meet the specifications is considered scrap and garbage.
- **Transportation:** Unnecessary part movement during production that adds no value to the final product is considered waste.
- **Motion:** Unnecessary worker movement on the shop floor is regarded as a waste. Only around 5% of the motion is useful for processing on the work piece, according to research.

Work in Progress (WIP) is a result of excessive production and waiting time. Over processing is another term for it, and it is a sort of waste.

Waiting Time: It is considered a waste when a worker waits too long to begin the following step, or when a product waits to be processed on the next work station.

Inventory can be defined as the stocks of parts that are waiting to be finished or items that are ready to ship. Any form of inventory is referred to as a waste.

Lean Manufacturing Tools and Techniques

The continual identification and removal of all types of wastes, as described above, is the foundation of lean manufacturing. All of the LM tools are aimed at identifying dissimilar types of waste and their sources, and then devising a mechanism to continuously remove them from the s The core of lean manufacturing is the continuous identification and removal of all sorts of wastes, as stated above. All of the LM tools are targeted at recognizing various sorts of waste and their origins, as well as designing a process to remove them from the system on a constant basis system. The following tools and strategies are used to identify the problem's root causes and methods for resolving it.

Table: 1 Lean Tool

5S	Overall Equipment Effectiveness
Value Stream Mapping (VSM)	
Bottleneck Analysis	Poka-Yoke
Continuous Flow	Root Cause Analysis
Gemba (The Real Place) SMED	
Heijunka (Level Scheduling)	Six Big Losses
HoshinKanri (Policy Deployment)	SMART Goals
Jidoka (Automation)	Standardized Work
Just-In-Time (JIT)	Takt Time
Kaizen (Continuous Improvement)	TPM
Kanban (Pull System)	Muda (Waste)
Toyota Production System (TPS)	

Principles behind the lean thinking:

1. Customer focus: make sure that all the activities of the organization are driven by the customer needs and expectations
2. Eliminate waste with the goal of creating value: elimination of waste throughout the value chain. I.e. those activities which does not add somewhat value to goods or services in the eye of customers or any for which the customer is not willing to pay.
3. Pursue knowledge driven enterprise transformation: utilize the ideas and skills of everyone in the organization to implement systematic changes

Research methodology

The study's main purpose is to find out where industries stand in terms of lean awareness and implementation. A questionnaire-based study was conducted in 25 industries to achieve the predetermined target. The survey instrument was created based on the information provided. literature. The present level of lean implementation within the organisation included questions about staff involvement, awareness, and attitude toward lean principles, as well as management involvement and commitment to lean implementation. A five-point Likert scale with a minimum rating of 1 and a maximum rating of 5 with an equal interval was used to convey the respondent's opinion. The survey instrument was sent to the selected industry personnel in person or via e-mail. Representatives from the awardees' respective industries contacted some of the beneficiaries. Figure 1 shows the greatest and lowest ratings received by different industrial sectors in important areas, as well as the performance of diverse industrial sectors in nine primary categories. Table No. 2 The data suggest that the majority of industrial sectors perform well in terms of maintenance, but struggle in terms of process and process technology. A three-point scale was proposed by Shah and Ward (2003). There are three options for evaluating LM practises: (1) no implementation; (2) modest implementation; and (3) considerable implementation. High level of implementation, intermediate level of lean implementation, and low level of enactment of LM methods in industries are defined in the current study as high level of implementation, intermediate level of lean implementation, and low level of implementation of LM methods in industries, respectively.

Table No: 2 Key Areas

Key Areas	Mean of responses (five-point Likert scale)
Inventory	3.83
Teams and corporate culture	3.51
Process and process technologies	3.41
Maintenance	4.19
Plant layout and material handling	3.60
Suppliers	3.85
Setups	3.55
Quality	3.27
Scheduling and production control	3.97

Figure No: 1

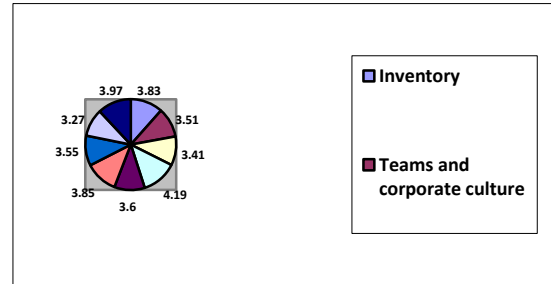


Table No: 3 Time frame for the lean leap

Phase	Specific steps	Time frame
Get started	1. Find a change agent, 2. Get lean knowledge, 3. Find a lever, 4. Map value streams, 5. Begin kaikaku, 6. Expand your scope	First six months
Create a new organization	1. Reorganize by product family, 2. Create a lean function, 3. Devise a policy for excess people, 4. Devise a growth strategy, 5. Remove anchor draggers, 6. Unstill a "perfection" mind-set	Six months through year two
Install business systems	1. Introduce lean accounting, 2. Relate pay to firm performance, 3. Implement transparency, 4. Initiate policy deployment, 5. Introduce lean learning, 6. Find right-sized tools	Years three and four
Complete the transformation	1. Apply these steps to your suppliers/customers, 2. Develop global strategy, 3. Transition from top-down to bottom-up improvement	By the end of year five

Barriers of Lean Manufacturing

1. Personal training: Lack of training is one barrier that prevents a company from being agile. Training security professionals on different security spheres is helpful to their personal development as well as that of the overall security team. Enterprises must allow for the examination of staff capabilities and initiatives to train them in their areas of responsibility, as well as the development of the lean mindset as a whole. As a result, top management's assumption that there is a significant investment in employee training but little production from employees at that time is incompatible with the lean idea. [1]

2. High Cost of Advance Technology: Small manufacturing firms (SMEs) suffer a challenge in that their production is not atomized; as a result, they rely heavily on traditional production machining facilities in terms of manufacturing technologies and procedures. This aligns with the company's

objectives, which include a focus on customization rather than bulk production.

Because SMEs' product quantities are typically small, they may not see the value in investing in huge gear. Similarly, SMEs' production planning technology may rely on outdated planning tools or lack completely integrated solutions. These are some of the most significant roadblocks in the lean process. A few companies that had been investing in mid-size ERPs or other customised IT systems have benefited from Lean.

3. Reduced manufacturing lead time: To stay competitive, manufacturers must create a sufficient volume of things at a lower cost, with higher quality, and shorter lead times..

4. Social factors: This factor includes environmental pressures, workforce/workplace expectations, and legal pressures [2]

5. Resistance to Change: In any organisation, some employees will be resistant to change. They will fight improvements no matter how beneficial they are, thus these personnel must be especially targeted because their opposition can be a major roadblock. [3]

6. Copying with Variability: Another source of dispute was lean production systems' and supply networks' inability to deal with variability, which is a key aspect of lean management. Lean managers try to find ways to limit variability and create capacity by using assets more efficiently than traditional systems in order to give value to clients. Other lean methods, such as mixed model and level scheduling, had been devised to do this. Due to the fact that the first lean pioneers originated from industries with comparatively stable demand environments, these approaches have tried to regulate demand in the face of demand uncertainty. For this type of high-volume, repeatable demand, Kanban pull scheduling is suitable.[4]

7. Technological advancements: To meet the needs of today's customers and markets, businesses are focusing on introducing more efficient, faster, and cost-effective manufacturing facilities, as well as new soft technologies and the integration of information technology into new hard technologies. [5]

8. Integration and pro-activity: In order to achieve their expectations, manufacturers must connect with customers to understand their issues and requirements. Aside from that, they must acquire capabilities that are slightly ahead of what is now necessary. In this sense, proactivity can help with strategic advancements in the face of global market uncertainty. [6]

Table No: 3 Barriers to implement lean

Barriers to Implement Lean	Small Organizations	Medium sized Organizations	Large sized Organizations	Sources
Cost of the investment	√		√	(1)
Insufficient internal funding	√	√		(1)
Insufficient supervisory skills to implement lean	√	√	√	(1)
Insufficient management time	√	√	√	(1), (2)
Employee attitudes/resistance to change	√	√	√	(1),(2),(3)
Insufficient external funding	√			(1)
Insufficient senior management skills to implement lean	√	√	√	(1)

(Adopted from Bhasin (2012)) Sources: (1) Bhasin (2012), (2) Panizzolo (2013), (3) Pingyu (2010), (4) Emiliani (1998), (5) Hunter (2004), (6) Shah et al. (2007).

Conclusion:

Based on literature definitions, this study gives a review of lean philosophy and its concept. The main goal of lean manufacturing is to eliminate waste by doing things better with half the resources required by mass production, resulting in higher quality at a cheaper cost. Successful lean adoption necessitates a thorough grasp of lean concepts and practises, as lean approaches implemented without a thorough understanding of lean principles may yield short-term results but fail as a long-term strategy. The goal of the study was to present the best lean implementation approach available in the literature, as well as a discussion of how lean is successfully applied in diverse industries. Based on a literature analysis, this report assesses the hurdles of lean implementation. To avoid failures and maintain the lean leap, managers must first understand the barriers The primary barriers or challenges that may be encountered while adopting Lean Manufacturing are a lack of preparation, a lack of top management commitment, a lack of technique, a lack of readiness to learn and see, and human issues. Furthermore, few managers attempt to improve the use of lean technologies, focusing mostly on "continuous improvement" and explicitly ignoring another core lean value, "respect for people." Managers should be mindful that lean thinking takes time to develop, and they should understand the context of implementations before making any judgments. According to the research, lean was popular in India; yet, when it comes to success, it was not.

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