

Lean Manufacturing over the Firms of Various Platforms: A Literature Review

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Abstract:

Lean manufacturing is a technique which eliminates the wastes produces within the firms of various sectors. It contains seven different types of wastes like transportation, inventory, motion, waiting, overproduction, over processing and defects. This paper reveals the overview of lean manufacturing and its implementation over the firms of various sectors. Furthermore, it reveals the lean manufacturing tools, barriers and performance measures occur while implementation.

Keywords —Lean manufacturing tools, Barriers, performance metrics, benefits, summary overview

I. INTRODUCTION

Lean manufacturing is a management philosophy. It is an efficient way to reduce unwanted wastes in the firms by using an appropriate lean tools and techniques. The main aim of the paper is to summarize the literature review of the lean manufacturing implementation in the manufacturing and distribution firms, and it also explains some intangible barriers while lean implementation especially in changing the employees according to the lean environment. It also referred some case studies regarding lean implementation by that it clearly tells us the obstacles/barriers occurs in small and medium scale manufacturing and distribution firms. It also summarizes why many firms refuse to implement lean concepts in their firms. Furthermore, it also suggests some ways to overcome such problems. By that it makes the business professional and the industry management to try the lean concepts in their organization/ industry.

II. LITERATURE REVIEW

lean manufacturing can be described by an aggregate arrangement of key factors or key regions. These key variables are accepted to be vital for its execution. In this changing plant to lean creation from large scale manufacturing was viewed as extremely troublesome. Laborers didn't assume liability for the nature of the item. They reacted just when they realized that administration really esteemed their abilities. The statement 'do it right the first run through', urges laborers to feel responsible for the items [1]. Moreover, their investigation found that Indian organizations were utilizing employees just truly however not mentally. There had been no recommendation framework in the associations [2]. An overview in the Indian automobile, machine tools and production firms. They made five gatherings as a boundary of assessment. These gatherings were called authoritative, provider, client, market focus and top administration. They found that, for organizations to execute lean, they need to zero in on

administration and market issues [3]. Its addition it also found that supplier issues are essential for the fruitful usage of lean. Numerous large organizations have effectively actualized lean manufacturing standards. Some small and medium scale enterprises have improved their process by the execution of lean manufacturing concepts. More organizations cut down their expenses by utilizing lean manufacturing ideas in their organization [4].

It is also expressed that lean organizations are those which use less material to make their work, less human Endeavour's to play out the work, less an ideal opportunity to plan and grow less energy and space. Lean organizations concentrate around client demand and consequently delivering great products and services in most the compelling and conservative way [5]. A review investigation utilizing an example of 20 production lines is performed to investigate the situation with lean usage in these associations. The outcomes show the presence of a few obstructions and difficulties that prevents the Lebanese plastic manufacturing firms to execute lean practices [6]. It investigates the connections between lean manufacturing rehearses, environmental administration (environmental administration rehearses and environmental execution) and business execution results (market and monetary execution). The conjectured connections of this model are tried with information gathered from 309 worldwide manufacturing firms. The discoveries recommend that earlier lean assembling encounters are decidedly identified with natural administration rehearses [7].

III. LEAN MANUFACTURING TOOLS

Lean manufacturing consists of different tools and techniques which will be appropriately used as per the type of industry. Here, some generalized lean tools used commonly in firms of various sectors were discussed [8]

- a) Value Stream Mapping (VSM) - It is characterized as all the worth added and non-esteem added activities required to

bring a particular item, administration, or blend of items and administrations, to a client.

- a) Heijunka (Level Scheduling) - A type of creation planning that intentionally fabricates in a lot more modest clusters by sequencing (blending) item variation inside a similar cycle.
- b) Jidoka (Automation) - Design hardware to halfway robotize the assembling cycle and to consequently stop when deformities are identified.
- c) SMED (Single Minute Exchange of Die) – Reduce arrangement change over the long haul.
- d) Standardized work – Documented strategies for assembling that catch best works on (counting the chance to complete each undertaking). Should be "living" documentation that is not difficult to change.
- e) TPM (Total Productive Maintenance) – A comprehensive way to deal with support that centers around proactive and deterrent maintenance.
- f) Visual Management - Visual administration frameworks empower assembly line laborers to be very much educated about creation procedures status and other significant data for them to take care of their responsibilities as successfully as could be expected.
- g) Just– In-Time (JIT) - Pull parts through creation dependent on client interest as opposed to pushing parts through production dependent on projected interest.

- h) Kaizen (Continuous Improvement) - A methodology where representatives cooperate proactively to accomplish normal, incremental upgrades in the assembling cycle.
- i) Kanban (Pull System) - A strategy for directing the progression of products both inside the processing plant and with outside providers and clients. In light of programmed recharging through sign cards that show when more products are required.
- j) Gemba (A real workplace) - A way of thinking that helps us to get out to remember our workplaces and invest energy on the plant floor where genuine activity occurs. It promotes a profound and exhaustive comprehension of certifiable assembling issues by direct perception and by conversing with plant floor representatives.
- k) Hoshin kanri (policy deployment) - Adjust the objectives of the organization (Strategy), with the plans of middle administration (Tactics) and the work performed on the plant floor (Action). It ensures that progress towards key objectives is predictable and careful – disposing of the waste that comes from poor communication and conflicting way.
- stream in work cycles and building up a ceaseless improvement culture. By rehearsing every one of the 5 standards, an association can stay serious, increment the worth conveyed to the clients, decline the expense of working together, and increment their productivity [9].
- Value – To all the more likely comprehend the primary rule of characterizing client esteem, it is essential to comprehend what esteem is. Worth is the thing that the client will pay for. It is vital to find the genuine or inactive requirements of the client. Here and their clients may not understand what they need or can't expressive it. There are numerous methods like meetings, reviews, segment data, and web examination that can assist you with interpreting and find what clients discover important.
 - Value stream - This is a distinguishing and planning the value stream. In this progression, the objective is to utilize the client's incentive as a source of perspective point and recognize all the exercises that add to these qualities. The waste can be broken into two classifications: non-esteemed added however important and non-esteem and pointless. The latter is unadulterated waste and ought to be wiped out while the previous ought to be decreased however much as could reasonably be expected
 - Flow - After eliminating the losses from the worth stream, the accompanying activity is to guarantee that the progression of the excess advances run easily without interferences or postponements. A few methodologies for guaranteeing that esteem adding exercises stream easily include: separating steps, reconfiguring the creation steps, leveling out the responsibility, making cross-utilitarian divisions, and preparing workers to be multi-talented and versatile.

IV. LEAN MANUFACTURING PRINCIPLES

The lean principles are the basic fundamental structures while its implementation process. These lean principles are classified as five different types such as value, value stream, flow, pull and perfection. The five Lean principles give a structure to making a proficient and successful association. Lean permits supervisors to find shortcomings in their association and convey better an incentive to clients. The standards empower making better

➤ Pull - Stock is viewed as probably the greatest waste in any creation framework. The objective of a draw-based framework is to restrict stock and work in process (WIP) things while guaranteeing that the essential materials and data are accessible for a smooth progression of work. All in all, a force-based framework considers Just-in-time conveyance and assembling where items are made at the time that they are required and, in the amounts, required. Pull-based frameworks are constantly made from the necessities of the end clients. By following the worth stream and working in reverse through the creation framework, you can guarantee that the items delivered will actually want to fulfill the requirements of clients.

➤ Perfection - Squanders are forestalled through the accomplishment of the initial four stages such as value, value stream, making flow, and pull (receiving a draw framework). Be that as it may, the fifth step of seeking after flawlessness is the most significant among them all. It makes Lean reasoning and nonstop interaction improvement a piece of the hierarchical culture. Each representative ought to endeavor towards flawlessness while conveying items dependent on the client needs. The organization ought to be a learning association and consistently discover approaches to improve every single day.

V. BARIERS FOR LEAN MANUFACTURING IMPLEMENTATION

Lean implementation process is not an easier one because there will be different types of obstacles according to the firms. So, here some common lean manufacturing implementation barriers were segregated under seven different categories [10]. They are,

1. Management
2. Resource
3. Knowledge
4. Conflicts
5. Employee
6. Financial
7. Past experience

➤ **Management**

- Lack of the management involvement
- Lack of urgency
- Lack of the board uphold
- Lack of long-term vision

➤ **Resource**

- Lack of work asset
- Lack of capital asset
- Lack of correspondence
- Lack of thought development
- Lack of time

➤ **Knowledge**

- Lack of preparing
- Lack of comprehension about lean

➤ **Conflicts**

- Conflicts with different activities
- Disparate fabricating climate
- Demand unpredictability

- Conflicts with big business asset arranging execution
- Company culture
 - **Employee**
- Employee oppose to change
- Middle the board opposition
 - **Financial**
- No direct monetary preferred position
- Financial benefits not perceived
- No monetary targets
 - **Experience**
- Past experience of disappointment
- Lack of backbone

VI. SUMMARY OF REVIEW

As we discussed various lean manufacturing concepts and its implementation over the firms of various sectors. By summarizing the above literature review it clearly implies that the implementation of lean manufacturing in the various firms are important meanwhile the proper analysis to be done in the particular industry where the lean manufacturing is going to be implemented in order to find whether the lean implementation is suitable for this industry or not. The second more important thing we understand that how to select an appropriate tool for the selected problem. The proper tool selection will be the good basement for solving the problem [11]. We also understand in the above study that most of the small and medium scale firms refusing to implement the lean implantation is due to financial Issues [10]. Like

what will be the investment if the lean implementation fails after implementation. In order to avoid this problem a pilot implementation will be done on any one department of the implementing industry. By this the industry people will trust the lean implementation techniques over the industry, and it also cooperates with an intention. In the other way we should make an awareness programs to the employees regarding lean manufacturing implementation and its benefits over the firms. Which will make them expertise and immediately to resume the process if any problem occurs after implementation. By this we understand that the post implementation process is also an important during the lean implementation. The ergonomic concepts should also consider while lean implementation because it plays a major role. For example, when an industry needs an approached layout not only a future state developed layout will make the process efficient one. It also to ensure that the machinery, working posture of employee and environmental exposure like lightning, proper ventilation. So environmental exposures should also be considered majorly and to be maintained properly when there is an implementation of lean concepts. Many firms don't have awareness about the lean manufacturing concepts. In order to overcome this technique, we have to conduct a proper awareness programs in the firms. Where we have to mention the key benefits of lean implementation. Then we also need to do pilot implementation in a selected department at the particular industry and shows them the real time benefits of lean manufacturing implementation which will gives a positive approach on lean manufacturing implementation towards their firms.

CONCLUSION

This paper reviewed the literature summary, and it also clearly gives an idea about lean manufacturing concepts to the researchers and industrialist of small and medium scale firms who were not aware of the lean manufacturing concepts and it is also useful to the firms planning to implement lean manufacturing concepts. This paper will also summarize the difficulties while lean implementation in their organizations/firms. It will be also useful for

upcoming research work regarding lean manufacturing concepts and their implementation and allow them to create new concepts regarding the lean concepts and implementation.

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