

A Research on Implementation of Lean Tools Across Verticals in Manufacturing

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ABSTRACT--- *With the rapidly growing demand for products in the market, manufacturing has become a crucial part owing to the value addition that it creates. Customer will opt to go for the manufacturers who provide better value for money which is the very basis of sustainability. Implementing Lean methodology would complement the purpose. Lean methodology basically tries to reduce the waste in the process to finally result in process involving mostly value addition to customer. In other words, Lean means 'producing more and more with less and less resources' using various Lean Tools. There are various Lean tools each meant for a specific objective such as identifying the Non-Value-added Activities, workflow improvement, reduction in the variation of the output, Lead Time reduction and much more. Every manufacturing industry will have a wide-variety of challenges.*

This paper attempts to map a high-level picture of the various lean tools used across multifarious domains while attempting to co-relate and compare the choice in a relevant fashion. The entire work is done through analyzing the literatures of the lean researchers and practitioners work. This paper will also help the relevant domain people to choose and to understand the reason for selecting the specific lean tools, while implementing Lean methodology.

Keywords - Lean methodology, Lean tools, Manufacturing, Lean implementation, Lean in Manufacturing verticals, Automotive Industry, Machine tool Industry, Construction Industry, Electronics & Consumer Product Industry, Process Industry, Textile Industry

I. INTRODUCTION

In the current industrial trends where competition is immense, the very sustainability of any company is based on how they serve their customers in terms of giving the customer a quality product that would cater the need, reliability of the product, customer friendliness and above all the cost. Market giants have gained their own customer and if any emerging industry has to compete with the giants in the market competition, value to money is essential which can be achieved by doing value added activities for the product or eliminating the non- value added activities / wastes in the process. Lean is one of the most powerful methodology to identify and eliminate the waste.

Lean is all about producing more and more value to the customer with less and less resources so as to fulfill the customer need in the least possible cost by using various tools to identify and eliminate / reduce various wastes in the

process. Any activity / operation that customers are willing to pay for is a Value Added Activity and any activity / operation that consumes resources but don't create any value is a Waste [1].

According to K.Liker, seven main types of wastes were identified as a part of the Toyota Production System. [2]

1. Transport
2. Inventory
3. Motion
4. Waiting
5. Over-processing
6. Overproduction
7. Defects

II. LEAN TOOLS IN BRIEF

There are various lean tools of which notably some tools are commonly employed [3], 5S :

- Sort (Removing all unnecessary items from the location)
- Set In Order (Everything has a place and everything in its place)
- Shine (Clean and inspect work area)
- Standardize (Standardize the processes used to above)
- Sustain (Sustain the developed processes by self-discipline of the workers).

Value Stream Mapping (VSM) – A complete representation of the value-added and non-value added activities across the defined area / service.

Andon – A Visual feedback system for the shop floor to signposts production status, alert for support when needed, and empower operators to halt the production process.

Just –In-Time (JIT) - Pull parts through production Just in the time when the customer needs by avoiding excess inventory.

Kaizen - A strategic continuous improvement tools where workforce collaborate proactively to achieve regular, incremental improvements in the process.

SMED (Single Minute Exchange of Die) – Reduce setup changeover time.

Kanban - A technique for regulating the supply of components is using instruction cards which are sent along the production line and in some cases within the factory and with outside suppliers and customers. A pull system to be precise.

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