



# Lean Manufacturing as an Automobile for Improving Productivity and Customer Satisfaction

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## ABSTRACT

This paper is to review lean manufacturing literature and report in their definitions, objectives, tools, techniques and methodology.

This study aims to improve productivity and customer satisfaction through lean manufacturing for metals and engineering industries. Its aims also to understand the concept of lean manufacturing, various tools and techniques of lean, lean implementation benefits and barrier toward its implementation. Then, on the basis of the result, a conceptual frame work was developed to reduce the existing gaps.

**Keywords:** Waste elimination; Lean manufacturing; Auto industry; Manufacturing industry

## INTRODUCTION

Lean Manufacturing (LM) is distinguished as “A philosophy, based on Toyota manufacturing process, and other Japanese management application that strives to decrease the period between the customer order and the packaging of the final product, by the consistent omission of waste”. A wide range of organizations, producing, measure, dispersion, programming advancement or monetary administrations can profit from embracing the lean way of thinking. Up to an organization can recognize a worth stream, from when the clients request an item to when they get it, lean standards can be applied and squander eliminated. Likewise, lean assembling is: “Adding value by eliminating waste, being responsive to change, focusing on quality, and enhancing the effectiveness of workforce”. Lean manufacturing can also be defined as: “An organized approach to mark and eliminate waste (non-value added activities) through continuous up-gradation by following the product at the pull of the customer in pursuit of excellence [1]”.

Global competition, uncertain demand environment and higher consumer expectations are among the many drivers for companies to adopt optimized productive improvement tools such as lean. As quality influences developing economies, offering high-quality product at affordable costs has always been a challenge for manufacturing firms. However, by implementing best practices such as lean manufacturing methods, there is a

possibility to narrow the price range to the playability and demand of customers. According to Deif and ElMaraghy, lean principle can be characterized, in short, by “doing more with less” [2]. The strategy was familiar during the 1980s when Toyota became popular for efficient operations all over the world by effectively implementing the Just-In-Time (JIT) system [3]. JIT production is a manufacturing philosophy that identifies and eliminates all forms of waste from the system and calls for continual improvement. In this philosophy, non-value adding activities are identified and either reduced or eliminated, resulting in cost reduction, productivity improvement, quality improvement, delivery improvement and, as a consequence, improving customer satisfaction.

In recent days, developing nations such as Ethiopia has set strategies to transfer technologies from emerging countries to shift from agricultural to industrial-based economy. For instance, the firm-level study conducted by Japan International Cooperation Agency (JICA) found out that Ethiopian Basic Metals and Engineering Industries (BMEIs) is identified as one of the priority sub-sectors for medium and large industries’ development to contribute toward import substitution-based industrial development. Initial investment cost of all manufacturing industries in general and metal and engineering industries in particular is too much to afford for lower economies [4,5].

Appropriateness of the journals are:

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**Received:** September 09, 2021; **Accepted:** September 23, 2021; **Published:** September 30, 2021

**Citation:** Kebede F (2021) Lean Manufacturing as an Automobile for Improving Productivity and Customer Satisfaction. *J Ergonomics*.11: 288.

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- It contributes different types of lean manufacturing process that available in manufacturing Industry
- It gives understandings for how to improve customer satisfactions a system specifically suited to the manufacturing industry.
- It tries various to eliminate waste and to improve productivity during its study.

## Objective

The objective of this article is to understand the concept of lean manufacturing. The various tools and techniques and to eliminate waste by concurrently reducing or minimizing supplier, customer and internal variability. The main concept is lean manufacturing is globally use widely applied manufacturing industry and to provide quality product. Many organization/industries have started the lean manufacturing concept.

## LITERATURE REVIEW

Lean manufacturing is a universal philosophy that can be practiced and implemented to a certain extent in any industry. Its main goal is improving operational efficiency by waste elimination and cost reduction by decreasing non-value activities. It is a continuous process that aims to eliminate wastes and improve processes by minimizing queue lengths, lot sizes and setup times. Many scholars defined lean in different approaches. Some of the common scholars those defined lean manufacturing from their own scientific perspectives [6,7].

Lean, in its origins, refers to companies' overall management philosophy and strategy in a long-term perspective. The concept was born in the wake of the Industrial Revolution. The system was derived from the Toyota Production System or JIT Production and Henry Ford's philosophy [8,9]. Before the coming of lean thinking, in 1911, Fredric Taylor wrote a book called Principles of Scientific Management, which underlined the close and intimate personal cooperation between the management and the employees for the betterment of the organization as well as the employees. A mere two years later, Henry Ford discovered the introduction of the first assembly line in the auto industry and introduction of mass production system. Furthermore, Ford added the importance of mechanization and the use of machinery to pace work [10,11]. However, mass production required high levels of inventories for the needed materials as well as large amounts of capital and space. Besides, low quality of the products and over-standardization of the products had happened.

The generic term "LM" came into existence from the International Motor Vehicle Program researchers of the Massachusetts Institute of Technology. The project was focused to bridge the significant performance gap between Western and Japanese automotive industries. In 1980, because of the growth in Japanese imports, western companies were beginning to realize that the Japanese were outcompeting them, and they became highly interested in lean manufacturing [12-14]. In 1990, the book called "The Machine That Changed the World" was published by Womack and Jones, which transferred the world to lean manufacturing the book, had been considered a changing

agent for all manufacturing industries in general and automotive sectors in particular. The core idea of the authors spanned on the evolution of lean manufacturing practices in the automobile industry [15,16].

Hence, the lean concept originated in Japan after WWII, when Japanese manufacturers realized that they could not afford the massive investment required to rebuild devastated facilities. This article presents a review 140 journal of the literature and attempts to identify the important and useful contributions to this subject. And they have highlights various definitions by various researchers [17-20].

It is a systematic way to solve a problem. It is a science of studying how research is to be carried out. It is also defined as the study of methods by which knowledge is gained. Its aim is to give the work plan of research.

The study of methods by which knowledge is gained. Its aim is to give the work plan of research [21-24]. The methodology is presented in

- Secondary data investigation was conducted.
- Reviewing scientific article
- Survey data
- Using reputable databases

## DISCUSSION

- It is proposed that lean manufacturing system can be sustained in competitive environment [25].
- Lean manufacturing utilizes a wide range of tools and techniques the choice of tools is situation specific many factors contribute to lean success, not only is it mandatory to implement most of the lean tools, but an organization culture needs transforming too.
- Industry/organization following lean manufacturing has better flexibility and a good market share [26].
- Moreover, lean manufacturing produces an operational and cultural environment that is highly conducive to waste minimization.
- Lean manufacturing is an integrated socio-technical system whose main objective is to eliminate waste by concurrently reducing or minimizing supplier, customer and internal variability".
- The problem is aroused because of: machine, worker, material, measurement or method. It leads very quickly to discovery [27].

## Draw-back/limitation

By eliminating waste problem overcoming resource limits.

This paper highlighted the importance of lean manufacturing and its effect on firm's productivity and customer satisfaction in the MEI. Lean manufacturing aims to eliminate waste and to improve productivity, which enhances customer satisfaction. It has been found in literature that elimination of waste is done through VSM, i.e. identifying value-added and non-value-added activities. Lean manufacturing eliminates non-value-adding activities that have no contribution at all, and minimizes necessary non-value-adding activities.

Developing countries' MEIs have faced various challenges to meet their objectives even with lower capacity utilization rate. This, in turn, has significantly affected their productiveness. Eliminating non-value-adding activities play a major role for productivity improvement, which is focus areas for all manufacturing industries. After analyzing barriers of lean manufacturing by considering various studies globally, a model was developed to increase competitiveness of MEI.

## CONCLUSION

To conclude, differentiating the use of lean principles, based on service types, offers a greater potential for improvements in efficiency that will not negatively affect customer satisfaction. Therefore, a lean approach to service productivity is not necessarily a deafening silence; its applicability depends on the type of services offered. The proposed implementation structure reduces the implementation duration and reduces manufacturing system divergence.

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