

A Review of Literature on Lean Manufacturing Practices in Automobile Industry

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Abstract---*India has established itself as a manufacturing hub with a good number of multinational automobile organizations preferring India as their export base and is mainly because of quality principles adopted by the manufacturing companies in India. The Indian automobile industry is flourishing with high growth in the domestic as well in the export market. To remain continue with this phenomenal growth, the manufacturers need to be competitive simultaneously maintaining the quality standards which may be possible with implementing lean techniques in their operation. At the backdrop of this, the present paper is an attempt to study review of literature related to Lean Manufacturing Practices in Automobile Industry.*

Keywords: - Lean, Waste, Production, Cost, Improvement, Industry, Automobile.

I. INTRODUCTION

Lean Manufacturing has become a worldwide phenomenon. A large number of organizations are implementing Lean technologies and experiencing great improvements in quality, production, customer service, and profitability. Lean Manufacturing technology is not only a management style or a way of producing better products rather it has emerged as a production philosophy. Lean Manufacturing is a systematic approach to identifying and eliminating waste through continuous improvement. It is aimed at the elimination of waste in every area of production including customer relations, product design, supplier networks and factory management. In Lean Manufacturing, the production output or non-value added activity is transformed into value added activity.

II. OBJECTIVES & RESEARCH METHODOLOGY

The present paper aims to study review of literature related to Lean Manufacturing Practices in Automobile Industry and to study the different dimensions of Lean Manufacturing Practices with the help of review of literature. This paper is based upon review of literature and secondary data collected from various websites, journals, magazines, newspapers and reference books. Literature review has shown prior research work done in this area.

III. LIMITATIONS

There are limitations to this review of the literature. Research was also limited to peer-reviewed business, organizational psychology, and management journals, online journals to identify the different dimensions of Lean Manufacturing Practices in Automobile Industry with the help of review of literature.

IV. CONCEPT AND DEFINITIONS OF LEAN

Womack coined the phrase "Lean Manufacturing" so as to encourage its adoption of TPS methods everywhere (for

competitors to admit they were borrowing from Toyota was not feasible, nor politically possible; the old "Not Invented Here" syndrome). Karlsson and Ahlstrom (1996) Lean aims to increase productivity reduce lead time and cost, and improve. Unfortunately, most didn't realize that Toyota had borrowed heavily from Henry Ford's principles of the 1930's.[1] Liker and Wu (2000) Lean is a philosophy of manufacturing that focuses on delivering the highest quality product on time and at the lowest cost.[2] Hines, Holweg, & Rich (2004) Lean has undergone a significant evolution and development and has attracted more attention to be applied in the service sector.[3]

Worley (2004) Lean is the systematic removal of waste by all members of the organization from all areas of the value stream.[4] Taj (2005) Lean Manufacturing as manufacturing without waste.[5] Bhasin & Burcher (2006) Lean is not only tools and techniques, but it should be viewed as a philosophy. It is a 'way of thinking' and not a mechanism to action these thoughts.[6] Dennis (2007) the foundation of the lean system is stability and standardization.[7] Kosuge, Holm, Modig, & Ahlstrom (2009) Lean has its own uniqueness as an initiative for improvement.[8]

V. REVIEW OF LITERATURE

A. Sánchez, A.M. and Perez, M.P. (2001) highlighted the effects of lean tools when applied in small enterprises particularly in manufacturing sector. In this competitive world, muda is to be reduced and the result there from is for better productivity and simultaneous cost-curtailment in production sphere of manufacturing. In this paper two tools of lean i.e., kaizen and why-why analysis have been applied over small manufacturing enterprise and its impact on the cost-effectiveness at the shop-floor of various component production has been analyzed to ascertain the lean concept which can be applied in the small enterprises for its betterment and making it competitive in the global market.[9]

B. ISAC, Claudia; ISAC, Alin (2002) asserted that with the rapid growth of innovation and technology, it is not only necessary to accelerate operations but also to create error-free procedures. Such error-free procedures can be realized through the technique called 'Pokayoke'. Pokayoke is a technique that can be used to change process designs such that human error is eliminated. While other management tools only help reducing errors, Pokayoke ensures that an error does not occur in the first place. The research study reviewed the various dimensions of Pokayoke as a quality tool and as a mistake-proofing device. The research also scrutinizes the use of Pokayoke in various organizations namely the automotive industry, manufacturing industry, construction industry, the garment industry, and the health

care sector, etc. The project also illustrates the design that is done to implement Pokayoke in pump manufacturing industry.[10]

C. George, M., (2003) described the significant milestones over the past few decades in the field of Total Quality Management (TQM), which can be considered one of the most promising methods for quality management. The purpose of this research study is to make an overview of direct marketing and quality management and use these findings in order to incorporate them into Linea Directa Communications (LDC), using the most suitable method of quality management through the application of the DMAIC methodology. Furthermore, the intent of this study is to improve the quality of certain processes as well as the output of the company in its direct marketing actions.[11]

D. Niall C. Piercy and Nick Rich (2004) investigated the short-comings of the value definitions contained within the lean enterprise, and propose that an opportunity exists for the strategic integration of marketing activities and lean operations to provide marketers with access to a tool kit for quality and efficiency improvements, whilst at the same time resolving shortcomings in the lean enterprise to improve organizational effectiveness in the marketplace.[12]

E. C. C. Huang and S. H. Liu(2005) revealed in their study that the lean control approach has been successfully applied to reduce waste and improve customer service in numerous Taiwan-funded enterprises. Although numerous models have been developed to overcome its limitations, such as determining unnecessary moving, unnecessary inventory, and redundant transportation, they do not; however, identify focused stages in which to start lean control. To secure Taiwan-Funded Enterprises in Mainland China (TFEMC), in this study, after using Value Stream Mapping (VSM) to show the current state of manufacturing processes, rough set theory is adopted and used to identify types of focused stages, where lean controls are most required. A generalized label-correcting algorithm is then developed to determine the desired stages of lean manufacturing, which are difficult to show in the VSM.[13]

F. Bhasin, S. and Burcher, P. (2006) highlighted that the Lean is not only tools and techniques, but it should be viewed as a philosophy. It is a 'way of thinking' and not a mechanism to action these thoughts. Lean viewed as a philosophy.[14]

G. Nick Oliver, Lee Schab and Matthias Holweg (2007) explored the relationship between lean principles and success in markets for premium products. Drawing on data from two sectors — automobiles and high-end audio equipment — the paper noted that the development of premium brand products is often driven by strong organizational values, such as uncompromising technical excellence. These values can result in product attributes that are far in excess of functional requirements, which in lean terms represent waste. This implies that companies that adhere too narrowly to lean principles may be disadvantaged in niche, premium markets.[15]

H. Anand Gurumurthy and Rambabu Kodali(2008)remarked that to achieve a competitive

advantage over other firms in these circumstances, some managers' attempt to transform their organization by implementing highly successful management philosophies proposed by Japanese and Western management gurus, such as Just-In-Time (JIT), Total Quality Management (TQM), Total Productive Maintenance (TPM), Six-Sigma (SS), Lean Manufacturing Systems (LMS) etc.[16]

I. Gary G. Bergmiller, Paul R. McCright (2009) presented models for increasing effectiveness and efficiency of a firm's production system through implementation of Lean Production have several points in common. Models for reducing the negative impacts of organizational activities on the Earth's environment through the implementation of Green initiatives are similarly consistent in structure.[17]

J. Nitin Upadhye, S. G. Deshmukh and Suresh Garg (2010) discussed the issues of MSMEs and presented a case to demonstrate the improvements achieved in an Indian mid-size auto component's manufacturing unit after the implementation of LMS. They further remarked that competitive market is forcing big organizations to utilize the untapped potential of Medium Size Manufacturing Enterprises (MSME). [18]

K. Prakash D and C.T. Sunil Kumar (2011) highlighted learning from the literature and actual practices in USA, UK, and India. Attempts are made to present the gaps between the principles and practices. Some pertinent propositions are put forth to enrich the knowledge base of professionals to make the implementation process more pragmatic and robust in the long run and for furtherance of empirical research by academics.[19]

L. Monica Sharma and Rambabu Kodali (2012) discussed the findings of the empirical study of proposed framework of manufacturing excellence (ME) in the Indian industry. The study included companies from five major sectors, namely automobile, process, machines and equipment, electronics and components and textile. Responses from 90 companies were analyzed to explore the validity and reliability of the proposed framework of ME in Indian industry. The developed questionnaire is outlined along with the results obtained from the analysis of the data from the Indian industry. The framework shows high level of reliability and validity. [20]

M. Hariom Sharma (2013) asserted that manufacturers have always searched for efficiency strategies that help reduce costs, improve output, establish competitive position, and increase market share. Early process oriented mass production manufacturing methods common before World War II shifted afterwards to the results-oriented, output-focused, production systems that control most of today's manufacturing businesses- Lean is simply about creating more value for customers by eliminating activities that are considered waste. Any activity or process that consume resources, adds cost or time without creating value becomes the target for elimination. Lean Manufacturing is a systematic approach to identifying and eliminating waste through continuous improvement.[21]

N. Abdulaziz Banawi and Melissa Bilec (2014) developed a framework and integrated three different approaches – Lean, Green and Six Sigma – in a systematic approach

with the goal of improving the quality and environmental impacts of the construction process. A case study of pile cap installation was conducted to illustrate the application of the framework and associated results. The study highlighted two issues within the pile cap construction process responsible for waste: delay and potential errors in material estimation and ordering.[22]

VI. CONCLUSIONS

Lean is the systematic approach to identifying and eliminating waste through continuous improvement by flowing the product or service at the pull of your customer in pursuit of perfection. Lean manufacturing system is regarded as intended direction, rather than a steady state. For the transformation towards lean system, organizations should have a better understanding about lean and there is also an urgent need to be aware about the change management principles. It is found that for successful organizational change towards lean organization, the critical factors are strong employee involvement, effective communication, top management support. Literature review revealed that Lean techniques like Kaizen drive employees to look out for new opportunities to improve their work, workplace resulting in productivity improvement.

Large organizations do not have any difficulties on adopting lean practices and are likely to implement all practices compared to small organization. Lack of skill and knowledge on lean practices may cause wrong interpretation. As large organization have more resources (finance, manpower, and equipment), they might not encounter difficulties on lean implementation. But small organization may face obstacles especially on financial matter. Small organizations are likely to implement multifunction employees compared to large organizations. The traditional manufacturing practices are indicated inadequate representation in lean management. The review clearly indicated the major reasons for the low level of lean management were anxiety in changing the attitude of workers, lack of awareness, and training about the lean management concepts, cost and time involved in lean implementation.

A detailed literature review revealed that the status of Lean Manufacturing (LM) implementation is still in thriving stage. Undoubtedly, the automobile industry is confronted with challenges and looking to implement improvements in their key activities or processes to cope with the market fluctuations and increasing customer demands.

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