

Innovation in Waste Management: A Study on Challenges faced by MSMEs in implementing Lean Manufacturing Techniques

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ABSTRACT

Manufacturing sector plays a momentous role in the intensification of an Indian economy. A dynamic change in Globalized business environment has been posing challenges of competitiveness and survival of manufacturing sector. MSME manufacturing units across the world are struggling hard to minimize their costs and maximise their performance. Lean manufacturing techniques offers a proven method to reduce costs, eliminate waste, increase productivity, maintains high level of quality and also higher profit. It requires top-down commitment and bottom-up involvement. It offers tools to identify the different types of wastages and defects within the manufacturing operation and provide remedial steps to eliminate them. Hence, the study is proposed to understand the role and importance of lean manufacturing tools and techniques and the challenges faced by MSMEs in implementation of Lean manufacturing.

1. Introduction

“Doing the same things, but differently”

According to the World Bank report of 2016, MSMEs contribute about 45 per cent of employment all across the globe and 33 per cent of national income in growing economies. In India, MSMEs contribute about 8 per cent of the country's GDP and they have a potential of making to 50 per cent (Economics Times report, December 2016). Nevertheless, Manufacturing operations are continually striving to increase productivity and output of their operations. Their goal is to satisfy the customer with the exact product, quality, quantity, and price in the shortest amount of time. Lean manufacturing is more than a cost reduction program or a problem solving approach (Tapping¹, 2002). Under the National Manufacturing Competitiveness Programme (NMCP), a component 'Lean Manufacturing Competitiveness Scheme' (LMCS) has been conceptualized, and the main objective of the scheme is to assist Indian MSMEs to reduce their manufacturing costs through proper personnel management, better space utilization, scientific inventory management, improved process flows, reduced engineering time etc., with the application of Lean Manufacturing techniques.

2. Statement of the problem

Besides the MSMEs contribution to economic growth, Indian MSME's are facing tremendous challenges. Imports, especially from china and MNCs are becoming the major threats to Indian industries. Globalization and new technologies have a major impact on the manufacturing industry. In the era of stiff competition and customer expectations, MSME manufacturing units across the world are struggling hard to minimize their costs and maximise their performance. Lean Manufacturing have not received due attention in MSME's globally (Gunasekaran, A.,L. Forker and B.Kobu², 2000). Indian government has also started focusing on MSMEs through

cluster formation to implement Lean but many MSMEs have failed to implement Lean successfully. In order to implement Lean successfully, it is necessary to identify the various challenges faced by them, while implementing Lean tools and techniques (Ravikumar, Marimuthu, Parthiban, & Zubar³, 2014). Hence, the study has proposed to identify the role and importance of lean manufacturing tools and techniques, challenges in implementation of lean in Indian MSMEs and attempts have been made to provide realistic solutions to overcome major barriers identified, for the successful implementation of Lean techniques.

3. Review of Literature

Manufacturers in the Indian industry have always faced discriminating challenges such as increasing customer's expectation, demand variation, and competition in markets (Khadse Priti, Sarode Avinash and Wasu Renu⁴, 2013). Sujatha and Prahlada Rao⁵ (2013) have aimed to find out the adoption of lean manufacturing tools and techniques in the silk production industry in Andhra pradesh. A sample of 350 manufacturers has been identified randomly and questionnaires have been distributed to them using postal mail. The result of the study has revealed that the companies are found to have a good understanding of lean manufacturing, and since its implementation, they have gained many benefits such as reduced cost and improved productivity. Harsimran Singh Sodhi, Bikram Jit Singh and Doordarshi Singh⁶ (2016) have observed that Lean Six Sigma is very rarely used technique in Indian industrial environment. Therefore, there is a huge scope of implementing LSS technique in Indian SMEs and to notice the subsequent changes. Saumyaranjan Sahoo and Sudhir Yadav⁷ (2018) have examined the extent to which lean management practices are adopted by small- and medium-sized manufacturing organizations in India and their impact on firm's operational performance (OP). They have identified the barriers and challenges faced by Indian SMEs that are striving to succeed with improvement efforts based on

lean manufacturing. The result of the study has indicated that all the three lean constructs are significantly related to OP. In the context of Indian manufacturing SMEs, “process improvement (PI)” and “waste minimization (WM)” practices have shown a higher level of significance on OP, compared to “Flow management (FM)” practices. “5S -workplace organization” was found to be the most practiced lean tool. “Attitude of workmen” was highlighted as the main obstacle in successfully implementing lean. Sajan, Shalij, Ramesh and Biju Augustine⁸ (2017) have investigated the linkage between lean manufacturing practices (LMPs) in Indian manufacturing small and medium enterprises and their sustainability performances. The study is based on a survey conducted and data collected from 252 manufacturing SMEs in India. The hypothesized relationships are then analyzed with structural equation modeling. The result of the study has shown that the LMPs are positively associated with various sustainability performances categorized as economic, environmental, and social performances. Further, the study shows that environmental sustainability is correlated with economic and social sustainability performances. Ekasuthan T⁹ et al., (2018) have examined the implementation of Lean Manufacturing practices adopted by different industries in Coimbatore, India. For successful organizational change towards lean organization, the critical factors are improved customer satisfaction, reduced scrap and inventory, adapt to changes by top level management. Top management’s support is vital in supporting lean and its practices; initiating and for relishing its sustained benefits in the future run. The findings of the study have shown that Lean manufacturing system is regarded as an intended direction, rather than a steady state. Ravikumar, Marimuthu, Parthiban and Abdul Zubar (2014) have investigated the various critical issues faced by the Indian MSMEs while implementing lean. A questionnaire containing 29 problems under five categories has prepared and sent to 200 MSME’s all over India. Eighty two companies have responded and their responses have been analyzed using SPSS statistics. The result of the study has revealed that organizational issues, Supplier issues, Customer issue and Employee issue are the major barriers faced by MSMEs in implementing Lean.

4. Objectives of the study

The objectives of the present study are:

1. To understand the role and importance of Lean manufacturing, tools and techniques adopted in lean management.
2. To identify the major challenges in implementation of Lean management in Indian MSMEs

5. Research Methodology

The study is conceptual in nature and all the data have been collected from secondary sources such as books, journals, magazines, portals etc.

6. Scope of the Study

The present study has confined only with challenges faced by Indian MSMEs in implementation of Lean management.

7. Main Kinds of Wastes

The following are the seven main types of wastes identified as a part of the Toyota Production System.

1. Overproduction: It is unnecessarily producing more than demanded, or producing it too early before it is needed. This increases the risk of obsolescence, increases the risk of producing the wrong thing and increases the possibility of having to sell those items at a discount or discard them as scrap. However, there are some cases when extra supplies of semi-finished or finished products are intentionally maintained, even by lean manufacturers.
2. Defects: In addition to physical defects which has been directly added to the costs of goods sold, the errors in paperwork, provision of incorrect information about the product, late delivery, production to incorrect specifications, use of too much raw materials or generation of unnecessary scrap.
3. Inventory: It means having unnecessarily high levels of raw materials, works-in-process and finished products. Extra inventory leads to high inventory financing costs, high storage costs and high defect rates. Inventory tends to increase lead time, prevents rapid identification of problems and increase space requirements, thereby discouraging communication.
4. Transportation: It includes any movement of materials that does not add any value to the product, such as moving materials between workstations. The idea is that transportation of materials between production stages should aim for the ideal that the output of one process is immediately used as the input for the next process. Transportation between processing stages results in prolonging production cycle times, the inefficient use of labour and space and can also be a source of minor production stoppages.
5. Waiting: Waiting is idle time for workers or machines due to bottlenecks or inefficient production flow on the factory floor. It also includes small delays between processing of units results in a significant cost, as it increases labour costs and depreciation costs per unit of output.
6. Motion: It includes any unnecessary physical motions or walking by workers which divert them from actual processing work.
7. Over-processing: It is unintentionally doing more processing work than the customer requires in terms of product quality or features- such as polishing or applying finishing in some areas of product that will not be seen by the customer.

Table-1-Tools and techniques

| Techniques | Description |
|-----------------|--|
| 5S System: | Helps in getting the “junk” out of the work area and set of procedures to keep it that way. 5S stands for Sort, Set in order, Shine, Standardize & Sustain. |
| Visual Control: | Cartoons, charts, light signals, Lane marking on floor, Safety instructions, Warning signs, Poka-Yoke instructions etc., can be displayed all over the work place. |

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|---|---|
| Standard Operating Procedures (SOPs): | All verbal instructions should be converted to SOPs to remove dependency on skilled personnel in achieving required product quality level, consistency, effectiveness and efficiency. |
| Just in Time (JIT): | It's a Japanese manufacturing philosophy to make the right product in right quantity at the right time. This almost results in zero inventory and shortest possible cycle time. |
| KANBAN System: | In this technique, components are pulled by assembly or subsequent work centers and the containers are replenished with the right quantities by the previous work center, which reduces the inventory of unwanted components |
| Cellular Layout: | In this improved manufacturing system, family wise component completion is aimed at within the smaller self contained cell, which is a part of a big factory, as compared to operation wise completion in traditional functional layout. |
| Value Stream Mapping: | It covers all activities, both value added and non-value added, and helps in arriving at best layout of all resources required for making the product. |
| Poka Yoke or Mistake Proofing | It is again a Japanese technique used to prevent errors occurring at their source of origin, and it finally leads to a 'Zero Defect' situation. |
| Single Minutes Exchange of Dies or Quick Changeover (SMED): | Applying ingenious methods, set up time is minimized and brought to less than ten minutes; thereby smaller batches as required by the customer can be taken up for manufacturing. |
| TPM (Total Productive Maintenance): | It involves operators, maintenance staff and management working together to improve overall operation of any equipment. Operators, who first identify noisy or vibrating motors, oil or air leaks, can be trained to make simple repairs to prevent major and costly break downs. |
| Kaizen Blitz or Rapid Improvement Process: | It is an intense management programme, results in immediate change and bottom line improvement. Both management staff and workers are involved in this. |

8. Benefits of Lean Manufacturing

The following are the benefits of lean manufacturing:

- Improved Customer Service: It delivers exactly what the customer wants when they want it.
- Improved Productivity: Improvements in throughput and value add per person.
- Quality: Reductions in defects and rework.
- Innovation: involvement of staff to improve morale and participation in the business
- Reduced Waste: Less transport, moving, waiting, space, and physical waste.
- Improved Lead Times: Business able to respond quicker set ups and fewer delays.
- Improved Stock Turns: Less work in progress and Inventory, hence, less capital tied up.

9. Challenges in Lean management implementation in Indian Context

Individual challenges of Lean implementation has been identified and classified into four major categories:

- A. Management issues
- B. Organizational issues
- C. Finance issues
- D. Other issues

A. Under Management issues, challenges of lean implementation are:

1. Lack of Management Focus
2. Lack of Management Support
3. Lack of Capital Fund
4. Lack of Implementation of Know-How
5. Lack of Long Term Vision
6. Past Experience of Failure
7. Lack of Need to Create Sense of Urgency

B. Under Organizational issues

1. Lack of Labour Resources
2. Company Culture
3. Lack of Innovative Ideas

4. Lack of Communication

5. Lack of Time

6. Lack of Training

7. Lack of Understanding about Lean

8. Clashes with Other Initiatives like TQM, TPM, JIT 9.

Different Manufacturing Environments

C. Finance issues

1. Perceiving lean will cost more and is largescale companies
2. No financial targets and sliding back to former state in the absence of staying power.
3. No Immediate Financial Advantage 4. Not Recognizing Financial Benefits

D. Other issues

1. Unstable Demand
2. Conflicts with ERP Implementations
3. Middle Management Resistance
4. Employees Resistant To Change

10. Findings

1. Lean consists of various tools and techniques, which is related to reducing non-value added processes and improving quality of the product. Hence, it plays a dual role.
2. MSMEs have an assumption that, Lean tools and techniques are not meant only for large scale manufacturing units. But this assumption is not true as lean is a creative tool which is best suited for all industries irrespective of their scale of operations.
3. Challenges of Lean implementation has been identified and classified into four major categories such as Management issues, Organizational issues, Finance issues, Other issues.
4. Challenges are closely related to technical, cultural, organizational and economic factors to the implementation of Lean management in companies.

11. Suggestions

- Lack of finance is a major challenge for Indian MSMEs, as they start up their enterprises with very less initial capital. But for implementation of lean techniques namely, 5S, Poka yoke, implementation cost is very less. Hence, the MSMEs should use these techniques to improve their product quality.
- Lack of support from employees can be addressed through awareness drive about what is lean and how lean will help to achieve their individual goals and organisational goals at large. In this drive, it must clearly state that in implementation of lean will not lead to job cuts nor decrease the salary, but main aim is to retain only those processes which adds value and eliminating non-value added activities (wastes) in the Industry.

- Frequent training sessions about the new practices adopted under the lean management must be provided time to time to upgrade their employees.
- Intensive training by professional lean practitioner is necessary in order to implement lean in a very effective manner from management level to low level of employees in the industry

12. Conclusion

Lean manufacturing techniques facilitates the manufacturing firms to stay competitive in the global market. In a nutshell, it is revealed that the successful implementation of lean manufacturing is a major challenge faced by an Indian MSMEs. If these suggestions are considered by MSMEs, along with advice from the experts in the field of Lean, It certainly leads to an increase in production, reduction in wastage and maximizing the wealth of a firm.

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