BARRIERS TO LEAN IMPLEMENTATION IN SMALL AND MEDIUM-SIZED INDIAN ENTERPRISES

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ABSTRACT

The present research work is an attempt to capture the barriers in implementation of Lean Manufacturing and improve understanding with the Lean philosophy in small and medium enterprises in India. The work has two steps. The first step attempts to document the barriers in lean implementation based upon literature review. In the second step the methodology includes surveying a large number of Indian small and medium enterprises (SMEs) having implemented lean to crystallize the major barriers in lean implementation.

Key words: Barriers, Lean Implementation, Small & Medium Enterprises (SMEs).


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1. INTRODUCTION

"Lean" is a operational philosophy that considers the expense of any type of resources for any aim other than the creation of value for the end customer as waste, and hence that is a target for elimination. Lean has been defined as a philosophy, as a set of principles and as group of practices. (Ramunė Čiarnienė, Milita Vienažindienė)

Lean manufacturing is a manufacturing strategy that eliminates waste and increase the value of manufacturing activities to achieve smooth production flow. Without lean manufacturing strategy an organisation cannot succeed in the current global competition where higher quality, faster delivery and lower costs are a must. (Norani Nordin & Baba Md Deros).

It is a difficult task to shift from a traditional manufacturing system to a lean manufacturing one. The change requires attention to impact both the processes and the people. Availability of extensive documentation about the benefits gained from lean manufacturing implementation could not spread it across large number of companies.

Manoj Kumar Dora, Maneesh Kumar and Xavier Gellynck (2016) under a study explored circumstantial or key factors and their impacts on lean manufacturing in small- and medium-
Barriers to Lean Implementation in Small and Medium-Sized Indian Enterprises

Barriers to Lean Implementation in Small and Medium-Sized Enterprises (SMEs). The inherent characteristics of these industries, like the extremely volatile demand and supply present barriers to lean manufacturing implementation. In contrast to large enterprises, the SME environment has great resistance to change.

This study focuses on the barriers in implementation of lean in Indian small and medium enterprises (SMEs).

2. PROBLEMS TO THE IMPLEMENTATION OF LEAN MANUFACTURING IN SME’S (LITERATURE REVIEW)

Boyer et al. (2003) researched on the issues towards implementation of lean manufacturing. While exploring the barriers or obstacles to implementation, and the ground realities, the authors have found that the individual companies are segmented due to their individual personalities, characteristics, and pools of knowledge, skills, and abilities. However, they have very similar barriers to change and causes of failure. The common obstacles being the underestimation of the cultural and managerial impacts, the illusion of progress, conflicting measures, believing the excuse list, absence of principles, and using lean as a set of tools rather than a way of working. In order to ensure a successful lean implementation inclusion of the lean principles in strategy, identifying the facts of change, focusing efforts and attaining fast results, and analyzing, identifying, and resolving cultural and managerial constraints.

The researchers identified other major barrier to lean manufacturing implementation is paucity of resources, such as time, expertise and financing. This poses the major hurdle in the adoption of lean manufacturing in small and medium enterprises (SMEs).

The most frequent problems mentioned by Mariusz Bednarek, Luis Fernando Niño Luna (2008) include:

- overcoming the rigid corporate culture;
- ignorance about the implementation tools and methods;
- efforts are focused on individual tasks, instead of comprehensive objectives or the development of the enterprise as a whole;
- resistance from the work force;
- using models without defining as per the characteristics individual enterprises;
- lack of proper implementation strategy;
- lack of required training and skills;
- lack of resources required for lean implementation;
- little support of the board of directors and middle level officers in project implementation.

A. Yang pingyu & B. Yu yu (2010) have concluded through a detailed survey of SMEs in Wenzhou, China, that few SMEs implement lean production is because that many companies having not heard of lean production; misunderstanding of lean production; the staffs’ resistance to lean production; implementing lean production mechanically without revision according to the environment of enterprise.

The critical barriers to lean implementation have been studied by a number of researchers. Z. Radnor et al. (2006) identified three issues that organizations come across: the people issue, the process issue, and the sustainability issue. In a similar type of classification M. F. Bollbach (2012) has explained the social and the technical barriers vital to Lean implementation. The barriers in Lean construction were studied by H. M. Alinaitwe (2009). The barriers to implementation of lean health care have been explored by Brandão de Souza and L. Pidd (2011).

Ramunė Čiarnienė , Milita Vienažindienė (2013) did a detailed literature review. The Literature review concludes that various authors have emphasized almost similar barriers and challenges to lean manufacturing implementation. Some of them depict social and the technical barriers and some have highlighted the barriers related with people, process, and
sustainability issues. The authors have suggested a classification of the barriers into two categories: people related and organizational specific barriers.

In another study the same authors (2013) have reported that the main barriers that were seen as preventing the adoption of Lean Manufacturing principles and techniques were the backsliding to old ways of working, lack of implementation know-how, and employee and non willingness of middle management.

Mohd Azhar Sahwan et al. (2012) have reported that the main barriers to implement lean manufacturing successfully in Malaysia is lack of clarity in this new knowledge and cultural change required during the transition.

According to a study of Malaysian companies by M. Manzouri et al. (2010), the highest level of obstacle in implementation improvement programs are paucity of expert employees and lack of awareness about lean. Some industries do not propagate the concept of that continuous program can improve their efficiency and cost management. This is due to lack of proper direction and guidelines from company management and the Government.

The findings derived from a research study done by Jagdish et al. (2014) have led to the identification of 24 lean barriers. The success of lean implementation will not be entirely based on application of appropriate tools and techniques alone but also on the top managements’ involvement and leadership, workers’ attitude, resources and the organizational culture.

As per the study by Dora et al. (2016) the small size of the plant, the traditional setup, and rigid layout make it difficult to implement lean manufacturing in SMEs. The study also helps practitioners to anticipate potential obstacles and take proper measures to deal with them during lean implementation.

Table 1 summarizes previous studies’ findings on the barriers that can delay or prevent the implementation of lean manufacturing within organisations.

<table>
<thead>
<tr>
<th>Table 1 The Barriers to Lean Manufacturing Implementation</th>
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<tbody>
<tr>
<td>Misunderstanding the concept and purpose of lean</td>
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<tr>
<td>Lack of Resource availability (time, expertise, financing)</td>
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<tr>
<td>Cultural differences</td>
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<tr>
<td>Absence of clear communication</td>
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<tr>
<td>Little support from Top Management for change</td>
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<tr>
<td>Lack of interest in and commitment to lean</td>
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<tr>
<td>Having not heard of lean production</td>
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<tr>
<td>Lack of adequate training</td>
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<td>X</td>
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<td>x</td>
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</table>
Khim L. Sim, John W. Rogers (2009) have reported results from the survey that show the problem persists primarily with the aging experienced workforce and a lack of committed leadership. The salaried employees consistently supported the lean initiatives. Another important finding was that employees do not feel valued while they contributed to the improvement processes. The authors have also reported that all the temporary male employees were of the opinion that the employees are not regarded as the most important asset.

3. RESEARCH METHODOLOGY

This research aims to identify the barriers implementation of Lean manufacturing in SMEs in India. A survey is economical methods for the data collection in order to achieve quick respond rate and it enables to get a larger amount of data to be gathered (Crute, V., Ward, Y., Brown, S. and Graves, A. 2003).

The researchers have adopted the method of surveying a cross-section of variety of Indian SMEs to find the barriers in lean implementation. This has been achieved through a detailed questionnaire.

The questionnaire comprised of two main sections. The first section investigates the demographic information of respondent/enterprise. This includes the sector and organization of the enterprise, size of the enterprise, Number of employees, contacts, The Second Section inquired about the scope, period of association of the respondent with Lean Implementation and duration of lean implementation, etc. The third section of the questionnaire explores the barriers or difficulties faced in trying implement Lean in the small and medium Indian enterprises. The items in the barriers to implement Lean are measured by a seven point Likert scale with 1 indicating “Not at all Important” and 7 indicating “Crucial”.

A pilot study was done to finalize the questionnaire. Its feedback was used to modify the questionnaire. Experienced lean consultants were also consulted. The comments and feedback were analyzed and necessary corrections were incorporated to the questionnaire. Most of the experts found the content of the questionnaire to be satisfactory and have reported it to be acceptable for the data collection.

In order to search more respondents, the researcher contacted the government departments promoting lean in India.

The offices provided some information related to the clusters of Lean Implementation. This in turn led to the contacts of Lean done industries through telephonic and e-mail contacts. Feedbacks were collected person to person in two industrial areas. Feedbacks from other industries were received through Google Forms. The total feedbacks received are 149.

The questionnaire was checked for its reliability using Cronbach’s alpha coefficient. This was done in order to ensure the internal consistency of the research instrument. If Cronbach’s Alpha is more than 0.70, the data is suitable for study. The results of the data collected under this study coefficient alpha 0.896. This is regarded as high internal consistency, and hence considered reliable.

<table>
<thead>
<tr>
<th>Reliability Statistics</th>
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<tbody>
<tr>
<td>Cronbach's Alpha</td>
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<td>.896</td>
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</table>
4. RESULTS AND DISCUSSION
The survey was conducted in one phase to 321 respondents at varieties of manufacturing companies. A total 151 responses were received and 2 of them were incomplete, resulting in 149 i.e. 46.41% valid response rate. This was achieved by sending follow up mails to respondents and making phone calls in order to increase respondent rate.

The responses were analyzed using a statistical software package.

4.1. Company Demographics
Out of the 149 responses received, 16 are from Medium sized, 127 are Small Scale and 2 are Micro Enterprises.

The industries are from Engineering, Foundry, Machinery, Textile, Garment, Food Processing, Polymer, Pump & Motor, Auto Components and Steel sectors.

Geographically respondents belonged to Madhya Pradesh, Maharashtra and Gujarat states of India.

4.2. Barriers to Lean Implementation
The data received through one to one interview and feedback, from Google forms were analysed. The analysis of the results is summarized in the following table. It indicates the difficulties experienced by Indian SMEs in lean implementation. In order to investigate the barriers faced by these SMEs, the respondents were asked to submit and rank the greatest barriers they experienced through the survey form.

Most of the respondents have submitted that “Resistance to change by middle management” with mean score 4.62 and “Lack of Flexible Working Arrangement” with the mean score 3.36, are the highest obstacles towards achieving successful lean implementation. See table 2. These are followed by “Absence of a lean implementation team, Lack of flexible working arrangements and Lack of reward system” with mean score more than 3.2, have a tendency to be agreed in Likert scale.
Table 2 Results on Lean Implementation Barriers

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Factor</th>
<th>Mean</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Resistance to Change the Middle Management</td>
<td>4.62</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Lack of Flexible Working Arrangement</td>
<td>3.36</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Absence of Lean Implementation Team</td>
<td>3.26</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Lack of Reward System</td>
<td>3.17</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Little Support from Top Management</td>
<td>2.37</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>Poor Lean Training</td>
<td>2.21</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>High Cost/Investment</td>
<td>2.08</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>Absence of Consultant</td>
<td>1.76</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>Other</td>
<td>1.69</td>
<td>9</td>
</tr>
</tbody>
</table>

4.3. Differences of Barriers in Implementing Lean Based on the Size of Company

A hypothesis test is conducted to find out whether there was any significant difference between small and medium sized enterprises related to their barriers implementing lean manufacturing.

We have two or more independent samples of equal or different sample sizes. Hence, the test to compare the samples is Kruskal-Wallis test. We have involved Kruskal-Wallis test to compare the means since the data are not normal distribution. Table 3 shows the results of the test on Lean barriers for size of company.

Table 3 Kruskal-Wallis results on Lean barriers for size of company

<table>
<thead>
<tr>
<th>Barriers to Implementation of Lean</th>
<th>Mean Barriers</th>
<th>Kruskal-Wallis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Micro</td>
<td>Small</td>
</tr>
<tr>
<td>Little Support from Top Management</td>
<td>4.00</td>
<td>2.11</td>
</tr>
<tr>
<td>Resistance to Change the Middle Management</td>
<td>5.50</td>
<td>4.52</td>
</tr>
<tr>
<td>Poor Lean Training</td>
<td>4.00</td>
<td>1.98</td>
</tr>
<tr>
<td>Absence of Lean Implementation Team</td>
<td>4.00</td>
<td>3.08</td>
</tr>
<tr>
<td>Lack of Flexible Working Arrangement</td>
<td>3.00</td>
<td>3.30</td>
</tr>
<tr>
<td>Absence of Consultant</td>
<td>2.50</td>
<td>1.69</td>
</tr>
<tr>
<td>Lack of Reward System</td>
<td>2.50</td>
<td>3.14</td>
</tr>
<tr>
<td>High Cost/Investment</td>
<td>3.50</td>
<td>1.94</td>
</tr>
<tr>
<td>Other</td>
<td>2.50</td>
<td>1.63</td>
</tr>
</tbody>
</table>

From the results obtained, it is found that there is significance difference between micro, small and medium enterprises on “Little Support from Top Management”, “Poor Lean Training” and “Absence of Lean Implementation Team” barriers with p<0.05.

5. CONCLUSIONS

This paper presents the results of a survey conducted on the Indian SMEs with the main purpose of identify the barriers during the implementation of lean manufacturing practices and comparing the barriers had been faced to implement lean between small and medium enterprises.

The results show that one of the highest barriers in implementing lean manufacturing practices is Resistance to change by middle management and Absence of a lean
implementation team or Lack of skilled people and followed by Lack of flexible working arrangements and Little Support from the top management.

Another finding in context to the Indian SMEs where lean has been implemented, as per the results obtained, that there is significance difference between micro, small and medium enterprises on “Little Support from Top Management”, “Poor Lean Training” and “Absence of Lean Implementation Team” barriers.

REFERENCES


