

Lean Manufacturing Practices with Context to Senior Management: A Study of Manufacturing Companies of Pakistan

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Abstract— Organizations are nowadays focusing on utilizing the latest technologies to reduce the overall manufacturing costs without compromising on the product quality, and getting a competitive advantage. Lean principles are hence the mostly used manufacturing principles to get this objective of increased productivity by lowering the waste. Lean management and implementation is surely a complete teamwork as we can say, but is still majorly dependent on the senior management of any organization. This study goes with the purpose of investigating the criticality of the role of the senior or executive level management in the successful implementation of the lean manufacturing principles and how much difference it's going to show with the current scenarios. The data has been collected by sending a questionnaire, which has 8 statements, targeting on the critical success factors, to the top management of 50 automotive manufacturing organizations of Karachi. The lean manufacturing trend and the involvement of the senior management towards its implementation is being identified after critically examining the received feedbacks.

Index Terms— Lean manufacturing, Upper Management, Perception, Waste Reduction, process improvement.

I. INTRODUCTION

MANUFACTURING industries are facing stiff competition around the world because of, the frequent new entrants in the business environment with advanced technologies. Optimum quality and low manufacturing cost are the most popular strategies for taking the competitive edge and lead the business in this current situation. In this concern, many organizations have implemented process improvement plans for reducing wastages. However, among all of them, lean manufacturing practices are quite widespread in the manufacturing companies nowadays.

Lean manufacturing is a tool for improving competitiveness, but its implementation required serious attitude of all employees including senior management [1, 2]. They are fear of its costly execution and thus, are not aware of its potential outcomes in the future. Top administration commitment and participation is necessary while implementing any process improvement plan [3]. Same as, lean practices require effective corporative initiatives from the administration.

II. LITERATURE REVIEW

A. Lean Manufacturing

The need of lean manufacturing originated from the start of automobile manufacturing industry. Cars that were built by the skilled artisans had high in costs but low in volume due to production inefficiencies. Henry Ford first critically identified these limitations, and he split the assembly process into small repetitive tasks that requires 30 seconds to complete. The frequency of each task was thousand times in a day [4]. In 1950's Eiji Toyoda and Taiichi Ohno introduced the concept of Toyota Production System (TPS) for standardization and improving production efficiencies by reducing wastages. In 1988, "lean production system" initiated by John Krafcik came into practice and the term "lean manufacturing" changed the whole concept of production in the manufacturing industry [5-7].

Various research studies defined lean manufacturing, specific to manufacturing industries whereas, others explained the term in more general way, that can be applicable to various others industries. In this research paper, the context of lean manufacturing can be defined as; "and approach of removing wastages from all value stream by all the members of an organization in a systematic way". Waste is a non-value added activity that consume resources but not produce valuable output [5].

S, kanban, value stream mapping, pull production and kaizen are some of the practices of lean manufacturing [6]. Several studies have confirmed the benefits of lean manufacturing in term of; reduced inventory, enhanced quality, increased customer satisfaction and reduced manufacturing time [6, 8]. Although, organizational performance can be optimized using lean principles, some of the challenges do exist. Constrains like; resistive employees, uncooperative suppliers, management policies and commitments, may become hindrance in the way of lean implementation [9-11].

B. Senior Management and Lean Manufacturing Practices

The responsibility of senior management is to lead and create the interest of employees in employing any process improvement plan [11-13]. Many studies have confirmed that,

top management commitment and involvement is quite important about lean implementation in an organization. If any of lean manufacturing implementation, plans become unsuccessful in an industry, the behavior of senior management become intentionally or unintentionally resistive in its ay of future implementation [12]. Absence of management support and lack of investment due to limited knowledge and awareness regarding the potential benefits of lean may also effect its successful implementation [14].

III. METHODOLOGY

In order to collect data survey methodology was used. Survey is the most efficient method of gathering, analyzing data. Fifty (50) automotive manufacturing organizations of Karachi were selected, and questionnaires were sent to the senior management by email. Survey questionnaire was based on previous research literatures, followed by the general rule of [5] explained the basic structures of question and answer for efficient measurement of data. Eight statements that are quite critical in the implementation of lean manufacturing practices were included in the questionnaire [6, 8]. Respondents were requested to rate the statements based on two criteria: 1) the importance or significance of factors in lean implementation with regard to their own perception and 2) the extent to which respective organization is currently practicing these factors. Five point Liker scale was used to rate the response with; 5 points represents = very important for the 1st criteria and very high for 2nd criteria and 1 point represent not important for 1st criteria and very high for 2nd criteria.

IV. RESULTS AND ANALYSIS

Out of 50 companies, only 33 automotive manufacturing companies responded back. Its means that percentage of response was low that is only 66%. General characteristics of the respondents were first investigated including; age, years of experience and position in the organization. General aspects of organizations were also recorded in order to gather information related to the type of products, and the age of organization. Table 1 shows the characteristics of respondents and respective organizations.

A. Objective of the survey

Following are the eight most important success factors taken from the previous studies in the way of lean implementation. The purpose of this research was to investigate these factors from the perspective of senior management in term of its importance, and then compare their response with the actual practices being carried out in their respective.

Some of the significant issues on the role of senior management in the implementation of lean manufacturing practices were highlighted after this survey. Figure 1 shows the percentage of eight critical factors for lean manufacturing implementation and the perception of upper management regarding each criterion. It can be seen from the figure 2 that the very important factors perceived by upper management in the implementation of lean manufacturing have low applications in the organization.

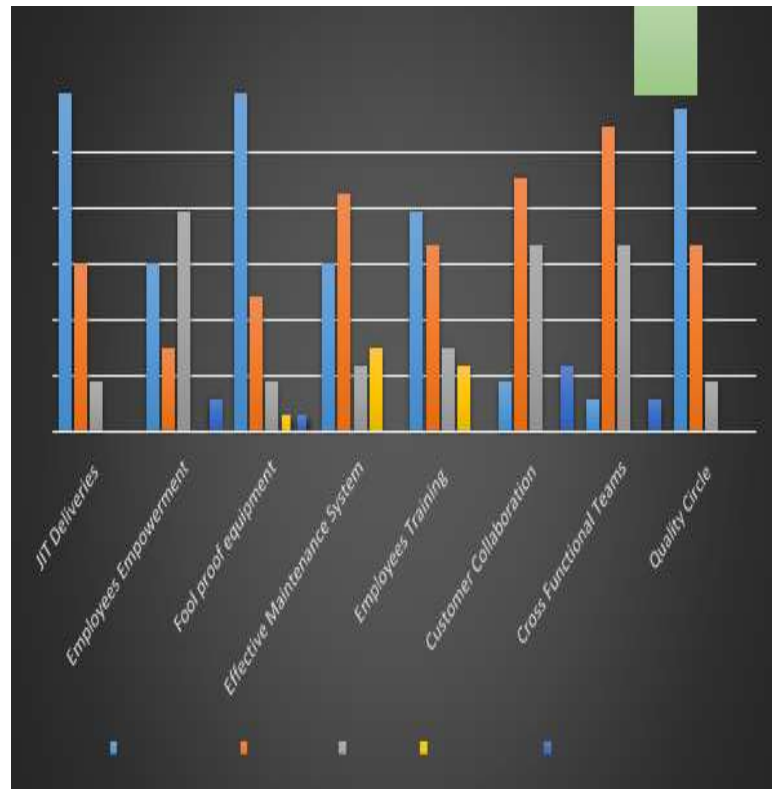


Fig. 1. Importance of Lean Manufacturing from the perspective of Senior Management.

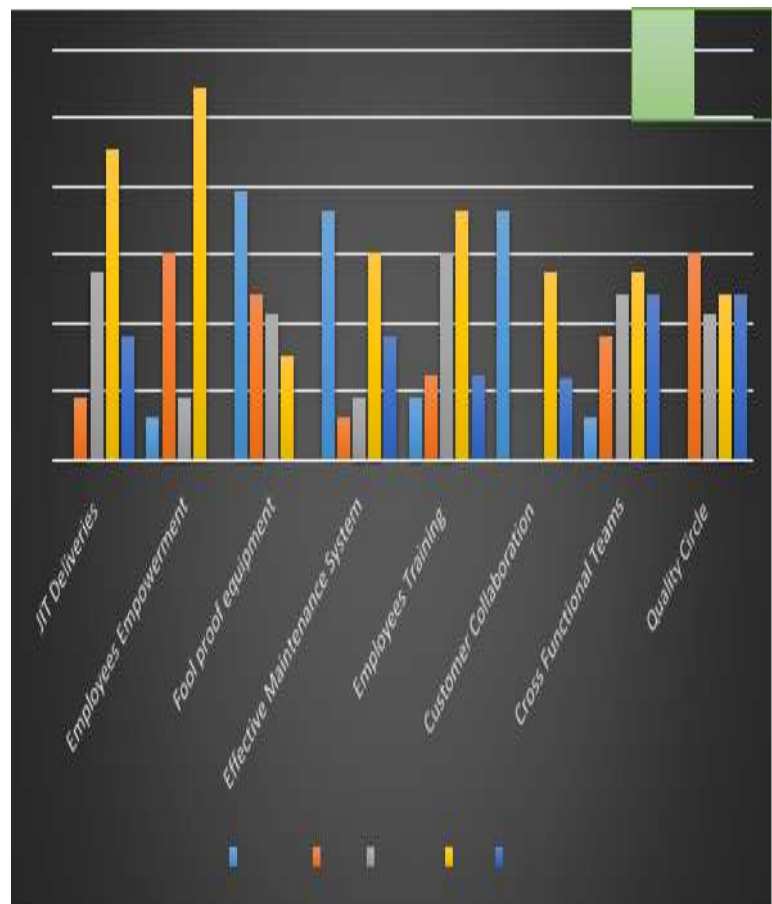


Fig. 2. Extent of Lean Manufacturing Practices Implemented in the respective organizations.

It can be seen from the results in Figure 1 that three factors; JIT deliveries, quality circle and fool proof equipment have received highest percentage ranking (more than 58%), and 5 value on the Likert scale, represents the most crucial for the lean implementation in an industry. Next important factors that received 4 points rating on the Likert scale (Avg. 47.47%) are; effective maintenance system, customer collaboration and cross-functional teams. Thus it can be concluded from the survey results (Fig. 1), that senior management consider six factors crucial for the implementation of lean.

Thus it can be concluded from the survey results (Figure 1), that senior management consider six factors crucial for the implementation of lean, that are; 1) Just In Time (JIT) supplies from the vendors, 2) Teamwork for establishing quality circle and reducing wastes, 3) Fool proof equipment for approaching zero defect, 4) Effective maintenance system, 5) Customer collaboration in the designing and modification phase of product and 6) Cross functional teams. Whereas, employee empowerment and employee training were not considered important criteria by most of the senior managers. Hence, these two factors received lowest percentage ranking. This means, according to senior management these two factors does not contribute towards the successful implementation or failure of lean practices in an organization. This view point may be due to their traditional way of dealing workforce in which employee's input has no value.

Figure 2 represents the actual situation of the respective organizations, in terms of practicing lean manufacturing tools. From the results, it can be seen that only three factors out of six, are implemented up to some extent with an average percentage ranking of 37.37%. These are; 1) Upper management's role in purchasing and installing fool proof equipment 2) Senior management role in implementing effective maintenance system and 3) Role of top management in customer collaboration in the designing and modification phase of product design process. On the other hand, two other factors that received lowest ranking are JIT deliveries and employee empowerment with an average ranking of 50%

V. CONCLUSION

The findings of this research conclude that senior managers can play an important role in implementing lean manufacturing practices in an organization. Despite of small sample size, the study is quite useful in identifying critical areas of other industries of Pakistan, where the commitment of senior management is more important for lean applications. The researcher summarized the six important factors as per upper management perception; 1) Just In Time (JIT) supplies from the vendors, 2) Teamwork for establishing quality circle and reducing wastes, 3) Fool proof equipment for approaching zero defect, 4) Effective maintenance system, 5) Customer collaboration in designing and modification phase of product and 6) Cross functional teams are significant in lean implementation. And the results revealed that respective industries are currently practicing some of the highlighted lean Principles.

By comparing the impression of significance and actual applications regarding lean principles, few similarities and mostly discrepancies were highlighted. In actual scenario, factors that were given highest rank by the management were observed low in practice, representing the lack of commitment and involvement towards lean principles implementation.

However, it is surprising fact (shown in both Fig. 1 & 2) that senior management is least bother about employees training and empowerment. Whereas, motivation, commitment, self-confidence and involvement of employees is quite important in implementing any change in an organization. Employee's must need to be involved in a job if he realized the need of creativity and is willing to accept the varying nature of job by new or improved methods. Spending on the awareness and training of employee payoff later. Because, many human and societal problems including; personal, cultural and behavioral can be resolved with training and changing mindset. The Negligence of these crucial aspects (shown in figure 2) justify the reason of failure of other two factors; 1) Cross functional team and 2) Quality circle formation that received lowest ranking in 2nd criteria despite of its highest percentage ranking in 1st criteria.

This research has limitations, as it is conducted based on 33 manufacturing companies, operating their business in Karachi. However, researcher believed that the trend of lean manufacturing perception and practices among the upper management could be clearly identified in the manufacturing sector of Pakistan.

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Characteristics of respondent	N	Percentage %
Age:		
30-35	5	15.15
36-41	7	21.21
42-47	9	27.27
48-53	8	24.24
54 and above	4	12.12
Position in the organization:		
Director	6	18.18
General Manager	5	15.15
Operation Manager	6	18.18
Senior Manager	7	21.21
Executive position	3	9.09
Other senior position	6	18.18
Years of experience at the above position:		
3-5 years	3	9.09
6-10 years	7	21.21
11-15 years	15	45.45
15 years and above	8	24.24
Characteristics of organization	N	Percentage (%)
Age of organization(since beginning):		
5 years or less	3	9.09
5-10 years	7	21.21
10-15 years	10	30.30
Above 15 years	13	39.39
Type of product produced:		
Plastic products	6	18.18
Sheet metal products	13	39.39
Metal products	8	24.24
Rubber products	6	18.18