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Enhancing productivity and consumer value through implementation of lean manufacturing

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ABSTRACT

Lean manufacturing is one of the leading manufacturing systems which are used in reducing non-value-added activities to improve productivity and customer value. Lean is a systematic loom for eliminating waste through continuous improvement. Leading organizations are following this sophisticated technique to realize the huge improvements in production, quality and consumer service. Although few were succeeded because of modern implementation techniques, excellent leadership, and employee involvements. A strong association of using the lean tools is to achieve the desired level of result which focuses on continuous improvement in the production process. Lean implementation was the basic concept following as Just-In-Time (JIT), total productive maintenance (TPM), cellular manufacturing, and lean implementation is a long-term process in which complete contribution of management support and employee commitments are made to attain the objective of the organization. Even though the lean approach is not the resolution for all manufacturing problem, it proposes an exclusively flexible solution for assembling more complicated products.

Keywords: Productivity, Cost, Time, Lean

1. INTRODUCTION

Lean manufacturing is a prominent industrial model being applied in numerous sectors of the world wherever enlightening product quality, reducing production costs, and quick to react to the needs of customers are critical to success. Lean manufacturing focus on forming a continuous improvement culture that engages employees in reducing the intensity of time, materials, and capital necessary for meeting a customer's needs with the elimination of non-value-added activities and employee involvements, the implementation of lean approaches also results in enhancing productivity and quality standards [1].

Lean production approach takes its inspiration and focuses on the entire operation. Through every organization has an opportunity to reduce their production cost, operation lead

time and improve the relationship between organization and employee. A change in technology nowadays might increase manufacture output with a certain quantity of the inputs, in which such an increase in productivity could be further technically effective, nevertheless might not replicate any variation in productivity. Behavioral change was the key in which making lean method more sustainable and successful. Lean activities on the other hand, in which to improve the problem-solving abilities of an employee in the organization whereas eliminating production waste, reducing manufacturing cost, improve product quality and enhancing productivity [2]. Thus, the company who requests to implement lean manufacturing technique should have a solid customer focus and understand the customer needs, should be ready to adopt new working culture from the methods they work on an everyday basis and should have the motivation of development and survival.

Worley and Doolen (2006) examined two exact variables influence lean implementation which is management support and communication. For management support, higher management should not only establish commitment and leadership, it should also effort to create interest in the implementation and communicate the modification to everybody within the organization. According to a case study on Motorola, behavior was significant to change the culture to withstand implementing of lean manufacturing concept. Numerous efforts failed due to the behavior of the organization. Comm (2005) stated that five best-practiced components must present in order to implement lean is Environment change, leadership, culture, employee empowerment, and communication. Emiliani (2004) specified four primary reasons that organization lack of influence over employees; the four components were the barrier to the commitment of whole employees to implement the lean concept. These four components are Trust in employees, Communication, Processes and work Environment [3].

Hayes and Pisano (1994) defined that Lean method uses less, or minimum, of everything required to the produce a product or perform an examination. Jim Womack, Daniel Jones and

Daniel Roos (1991) states that Lean manufacturing approaches as the systematic waste elimination, Womack and Jones (1994) extravagant that Lean manufacturing techniques require that not only methodological questions be fully understood, but the existing relationships between manufacturing firm and the other areas of the firm should also be observed in depth, as should other factors external to the firm [4]. Dankbaar (1997) restates that Lean Manufacturing will be the standard manufacturing mode in the 21st century. Last few years had seen sufficiently of researches into the area of manufacturing development such as the lean manufacturing, the total quality management, the total productive maintenance and their application inside numerous manufacturing companies such as automotive, electronics, ceramic components and etc. Majority of investigation studies have exposed lean manufacturing technique as the best manufacturing and production system in the 21st century.

2. ELEMENTS OF LEAN MANUFACTURING

The Toyota technique has been separated into 14 principles as established by Liker (2004) [3]. The principles can be distributed into four categories: the philosophy, process, people and the problem-solving. Related with the 14 principles are numerous systems and tools (i.e. 5S, Kanban, poka-yoke, Heijunkam, the Hoshin planning (Dennis, 2007)) which are frequently identified as elements of lean manufacturing. Anvari et al. (2010) have renowned that the first methodology to lean manufacturing for many companies is the use of the set of tools which assist in the identification and elimination of waste. As the tools are applied, waste is eliminated and quality improves coinciding with a reduction of production times and costs. Anvari et al. go on to suggest that Toyota utilizes a diverse method which includes other than the simple use of tools. They note that Toyota production target reduction of three categories of waste (Muda or the non-value-adding; muri or an overburden; and mura or an unevenness) in order to expose problems methodically and then use tools to fix the root causes of problems exposed.



Fig. 1: The seven wastes according to Ohno (1988) [5]

The main objective of lean manufacturing was to reduce the production waste and lead time reduction through the seven waste tools it can be achieved.

3. MAINTAINING THE INTEGRITY

The basic tenet of lean manufacturing is that employee is the important asset and for that, because the organization should have the shop floor focus in which order to identify the non-value adding tasks and actions. The popular of Lean Implementations is the heavy focus on TPS tools such as 5S, kanban, the production flow and just-in-time (JIT) and with the companies deteriorating to understand the whole system and the necessary adjacent circumstance [6]. When looked at

more broadly, TPS is concerning applying principles of the Toyota Way of thinking and undertaking a comparative study of lean implementation, Anvari et al. (2010) specify that there are three phases to implementation. The three phases are Preparation, Design, and Implementation. Every organization embarks on the journey of lean implementation is unique and everyone requires a unique and suitable approach for the successful implantation of lean manufacturing method [7].

Table 1: Three Stages of Lean Implementation

Stage	Preparation	Design	Implementation
1	Gap assessment	Mapping the value streams	Starting with a pilot project
2	Understanding waste	Analyzing the business for improvement opportunities	Starting the next implementation projects
3	Establishing objective	Planning the changes	Evaluating & changes

4. PRODUCTIVITY IMPROVEMENT WITH LEAN CULTURE

Lean behaviors are mostly concern with productivity, while we believe the perform of lean culture as exposed to be necessary elements for produce the healthy work environment that can show the way to productivity improvement, in addition, to helping manufacture sustain efforts to develop into the lean manufacturer. The most important focus was on how the individuals can constantly perform in the ways that create the value, with the objective of the eliminating production waste in interpersonal relationships and progress of people that have essential capabilities for the problem-solving in their thoughts and actions to attain value. If the performance of lean behaviors can be experienced by persons and then incorporated into the organization, the productivity will be improved by the lean behavior. The purpose of becoming a completely lean organization can only be reached if the human resources are well associated with new philosophy and work environment [8]. It follows that it is vital for an organization to recognize and apply all the lean behavior tools and principles, additionally to a broad lean thinking which affects whole business model as the key and not exclusively learner production. Figure 2. Shows key participant in a business, everyone has a relationship governed by the process and behaviors governing the generative relationships. Each of these relationships must be carefully managed to minimize the waste and maximize the benefits of enhancing productivity [9].

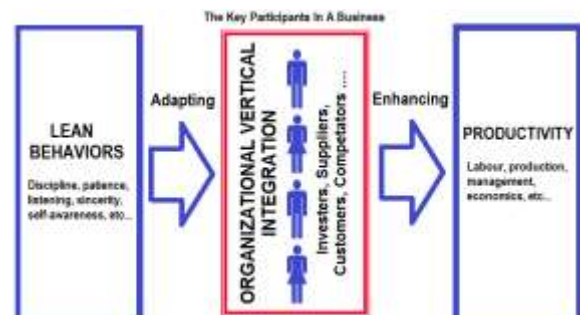


Fig. 2: Enhancing productivity through lean behaviors in a business

5. TOOLS FOR LEAN IMPLEMENTATION

Lean manufacturing is an approach that greatly depends on the flexibility and the workplace organization, is a tremendous starting point for the companies wanting to take a new look at

their present manufacturing methods. Lean techniques are furthermore worthy of the examination because they reduce large capital outlays for the dedicated equipment until the automation becomes extremely necessary. The essential lean manufacturing tools that should help organizations evaluate lean manufacturing solutions for their own applications. They are Continuous Flow, Lean Simplicity, shop floor Organization, the Parts Presentation, Re-configurability, with Product Quality standard, Maintainability, accessibility, and the Ergonomics [10].



Fig. 3. Tools for lean implementation

6. LEAN TOOLS USED IN PROBLEM SOLVING

In most cases, a lean tool for the kitting department can be classified to 9 types such as 5S, total productive maintain (TPM), Kaizen, the visual stream map, visual gauge, just-in-time (JIT), and the standard work chart. With the intention of introducing lean manufacturing thinking within the manufacturing environment, the philosophy relies on identification and the elimination of the waste, which contain well targeted along with applied various lean tools. Thus, the frequency of the employee using the lean manufacturing tool indicates employee understanding identification and the elimination of waste problem developed during the production process. In deduction, the employees have the ability of problem-solving in any sort of manufacturing. The essence of Lean manufacturing implementation is that of the altering or transforming an organization into operating methods and tools with a commitment to the continuous improvement in manufacturing process.

7. CONCLUSION

The worldwide economy is varying and becoming a lot more aggressive. To execute Lean manufacturing technique effectively, the organizations should modify its communication that takes employees well beyond their routine perspectives and moves them to know, own and entrust to the associated initiative. Organizations must focus on customer requirements; these consumers being part of the present Culture of manufacturing environment with the aim of quality defects avoid the customers from tolerant the defected product in the

manufacturing process. Defects, re-work, scrap, corrections comes under the category of waste. Defects direct to waste of money, reduce in throughput and in a few instances loss of valuable customers that leads to loss of organization standard in global markets. Lean manufacturing is touted to keep companies wealth through a process of identifying the value and reducing waste of production process with reduced costs and increased customer value. The lean practices had been making the development of the company in the lean direction and significant of problem-solving capability in eliminating waste and cost reduction thus, enhancing productivity. In summary, we are all looking in the direction of better productivity through better lean manufacturing behavior.

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