Supporting Factors to Improve the Lack during Lean Manufacturing Implementation

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Abstract. Product quality and customer satisfaction were challenges faced by many manufacturing or services companies which considered the global challenges, thus encouraged many companies to improved quality and satisfied customer needs. Most of companies implemented lean with their unique way it caused by internal problems such as the lack of knowledge and understanding of lean, and etc. This can result the lack in implementation lean manufacturing. To avoid the lack in implementation of lean manufacturing required support factors such as support factors continuous improvement (kaizen). For this reason, previous literature research needed to resolved this problem. Implementation of lean manufacturing required good leadership that impacts in implementation process and employee contributions.

1. Introduction
In recent years, the product quality and customer satisfaction are challenges faced by many manufacturing and services companies with consider the challenges of global competition, so that many companies are encourages to find ways, improve quality and fulfil customers need[1]. The company has various tools and techniques which use to decide an effective manufacturing system, it is one of strategies to improve manufacturing operations with Lean Manufacturing Implementation, Lean manufacturing in general is manufacturing process without waste by minimization the number equipment, materials, part and working hours, which are required for production[2]. The history of Lean Manufacturing book entitled “Lean Manufacturing –Today and Tommorow” by Henry Ford in 1926, After World War II, Japan have very limitation of ability to resources acces from all of type capital, land and skill of labor and etc. These limitation cause techniques development, especially Toyota for manage bussines in lean improvement. These techniques hae developing into what is now describe as Lean Manufacturing [3]. Until now lean manufacturing implement in Japan, especially Toyota [4]. Many companies have the advantage of lean manufacturing practices to increase quality and productivity. However, most of company implement and practice lean in their own unique, this is due to internal problems as if the lack of knowledge and understanding of lean, maintenance and etc [5]. It is cause the lack in Lean Manufacturing Implementation. Therefore this paper will present a discussion from previous researches, and evaluate to avoid the lack in Lean Manufacturing Implementation from previous researchers. Regarding lean manufacturing techniques to help this problem will be discuss implementation Just-In-Time (JIT) and Kaizen in this paper more cleary.

2. Literature Review
Lean manufacturing is manufacturing process without waste by minimize the number of equipment, materials, part and working hours, which required for production [2].
2.1. The characteristics of Lean Manufacturing were according to [3]: (1) minimum material inventory; (2) minimum incompatibility, revocation, rejection and return of product; (3) minimum the lack of production through unplanned downtime, time of transition, and quality problem; (4) minimum cycle time and minimum delay time on process; (5) minimum variability in levels and process of production; (6) minimum unit cost of production; (7) Good On-time delivery performance and customer satisfaction; (8) Focus and continuous improvement on market share.

2.2. The 5 phase of Lean Manufacturing development according to [6], called key performance indicators, were: (1) Change Management: Lean Implementation Team have solved the problem during implementation, all level of employees actively encouraged and facilitated to taken part of identified problems and implementation tools were suitable on production [6]. (2) Policy Development: good organizational vision and the commitment who have by employees to achieved conditions at the future [6]. (3) Knowledge management: The training program about lean for employees of all levels to increase awareness [6]. (4) Participative Management: Employees were involved from several function and level to overcome problems or improve certain process [6]. (5) Process Management: Implemented Lean Manufacturing tools and techniques such as Value Stream Mapping (VSM), Visual Management Techniques (VTM), 6S (5S and Safety), Total Productive Maintenance, Error Proofing, Kaizen, Standardisation, Quick Changeover (QCO), line balancing and Kanban [6].

3. Discussion
Many companies have the advantage of lean manufacturing practice to increase quality and productivity. However, most of company implemented and practice lean in their own unique, It was due to internal problems as if the lack of knowledge and understanding of lean, maintenance and etc [5]. It caused the lack in Lean Manufacturing Implementation.

3.1 The lack of lean manufacturing implementation was disclosed through previous research, it was followed by [1]: (1) Improvement and elimination waste cause employees were pressured in implementation of lean concept which impact in productivity and efficiency, (2) No Margin for Error which tools of lean like Just in Time (JIT), Inventory and Six Sigma allowed no reserve stock, (3) Over-focused on waste: over focused on waste tend to override other problems. Lean strives to ensure productivity and efficiency through eliminate waste and that important parameters were ignore such as employees welfare, and corporate responsibility, (4) Over-focused on present time was impact on future such as didn’t take time to anticipate future challenges and made the change what required to respond challenges. Lean also stifles creativity, innovation, or experimentation were not impact in organization to responded the better change, but also difficult to realize opportunity, (5) Lack of understanding of standard methodologies used in lean implementation.

To overcome the problems at point (1), (3), (4), and (5) which research conducted by references [1]. They needed continuous improvement such as Kaizen, Kaizen started with found new area to increase and spur creativity for good ideas were generated about how to create improvement, which end up as transactional process such as repaired movement to standard work, measure value, and ideas were filtered [7]. Kaizen in Japanese mean improvement which employees involved in the organization [8]. Kaizen was effort of continuous improvement in proactive worklife [9]. The company emphasizes the involvement of employees on the factory floor with some levels of improvement given for employees to identified and solve problems which related the problems in the workplaces and employees encouraged to thought differently about their worked and increase morale and sense of responsibility through empowerment given by top management, employees begun to felt themselves also partly involved in decision making and improvement process [10]. Encouraged force in desire to improvement was not management’s encouragement but general attention to welfare organization and confidence which the continuous improvement given benefit for organizational and individual. It was facilitated by positive climate and culture that supported improvement [8].
Besides Kaizen which overcome the lack of Lean Manufacturing Implementation, to overcome the lack of applied of point (2) of research references number one. Just-in-Time (JIT), one of the tools and techniques used by Lean Manufacturing Implementation, it was widely carried out by many companies, the term Just-in-Time (JIT) came from the concept of purchase without hold parts of the component which sent at the production time [11]. In the western industrial system, criticism of the conditions required for the effectiveness of JIT implementation was not finished [12]. Criticism of the conditions required for the effectiveness of JIT implementation, which the condition were included [12]: (1) The sequence of products to be processed repeatedly in a long time, (2) The changes to high technological was needed for production flow and short set-up time, (3) Standarization was needed: materials, components, ways of working, tool, and etc, (4) Flexible workers were needed, (5) Activation of supply contracts was required. Continuous improvement (such as kaizen), Just-in-Time (JIT), and Lean Manufacturing Implementation were implemented and there were supported clearly in the followed by research and literature before in Table 1.

| Research/Literature | Year | Title | Result |
|---------------------|------|-------|--------|
| [8] 1991            |      | Total Quality Management for Engineers. Chapter 10: Continuous Improvement | This book explains about continuous improvement especially kaizen, it was support the role of team and leadership in implementation of continuous improvement for lean manufacturing |
| [13] 2010           |      | Success and failure issues to lead lean manufacturing implementation | To improve implementation of lean is not only observe tools and techniques, but also human aspect |
| [9] 2012            |      | A Comparative Approach of Japanese Project Management in Construction, Manufacturing and IT Industries | Project and program management in Japan combines 3K (Kakusin, Kaihatsu, and Kaizen) in the construction, manufacturing, and IT industries |
| [6] 2012            |      | Impact of Lean Manufacturing on Performance and Organizational Culture: A Case Study of an Apparel Manufacturer in Sri Lanka | This research use key performance indicators in Apparel Manufacture at Sri Lanka for evaluate performance and qualitative analysis to find the impact of lean on organizational culture |
| [14] 2013           |      | Applying lean thinking in construction and performance improvement | This research focuses on increase performance improvement and construction |
| [5] 2013            |      | A Conceptual Model of Lean Manufacturing Dimensions. | This study explains 7 dimensional relationship, which is contributes in lean related to waste in manufacturing, which increase the effectiveness of manufacturing performance and understanding of lean |
| [10] 2015           |      | A Review of Contributing Factors and Challenges in Implementing Kaizen in Malaysian SME research and the success factors of Kaizen and challenges faced |
Small and Medium Enterprises. by the company in implementation Kaizen

[7] 2016

Project Management in Product Development: Leadership Skills and Management Techniques to Deliver Great Product. Chapter 7: Lean Product Development

This book explains the various techniques for implementation Lean Manufacturing, Lean innovation and mature Lean Product Development in an effort to better lean practices

[15] 2016

Strengths and weaknesses of small and medium sized enterprises regarding the implementation of lean manufacturing

The conflict between principles implementation of Lean Manufacturing with characteristics of SMEs need strong leadership

To avoid the lack lean manufacturing implementation required support factors such as support factors of continuous improvement (Kaizen), it was needed tools and techniques such as kaizen implementation in lean manufacturing implemeatation, according to [10] i.e : comunication between top management and employees, define strategy clearly, good knowledge, and empowerment of employees to ensure success implemetation of Kaizen. According to [15], key of success Lean Manufacturing in Small Medium Enterprises was power of the leader in decision making. It was the high role in implementation. From the two reviews can be understood, the implementation factors of continuous improvement (kaizen) required good leadership, which impact the implementation process and employees more contribute to achieved common goals. The clear contribution to improved the lack of Lean Manufacturing Implementation can used by some method which done in the researches or literatures before in Table 2.

Table 2. The clear contribution to improved the lack of Lean Manufacturing Implementation

| Problem | Solution |
|---------|----------|
| Improvement and elimination waste cause employees were pressured in implementation of lean concept which impact in productivity and efficiency | Management Support and Employee Motivation[14] |
| No Margin for Error which tools of lean like Just in Time (JIT), Inventory and Six Sigma allowed no reserve stock | Reduce the time of set-up and agreements with suppliers [12] |
| Over-focussed on waste: over focused on waste tend to override other problems. Lean strives to ensure productivity and efficiency through eliminate waste and that important parameters were ignore such as employees welfare, and corporate responsibility | Offer Well-Being Initiatives to Employee [16] |
| Over-focused on present time was impact on future such as didn’t take time to anticipate future challenges and made the change what required to respond challenges. Lean also stifles creativity, inovation, or experimentation were not impact in organization to responded the better change, but also difficult to realize opportunity | Performance Improvement Mechanism [14] |
| Lack of understanding of standard methodologies used in lean implementation | Knowledge Management through training [6] [17] |
3.2. The clear contribution to improved the lack of Lean Manufacturing Implementation, which the problems have solutions from researches or literatures before were followed by:

3.2.1 Problem (1): Improvement and elimination waste cause employees were pressured in implementation of lean concept which impact in productivity and efficiency. It has solution which according to [14]; Management support was characterized by: (1) personal involvement in improvement efforts, (2) recognizing and rewarding the efforts and success, (3) hiring employee who contributed in improvement, (4) Training for resources were provided. Which management support also improved the performance of employee to increase their work or tried new ideas.

3.2.2 Problem (2): No Margin for Error which tools of lean like Just in Time (JIT), Inventory and Six Sigma allowed no reserve stock. It has solution which according to [12] explained reduce the time of set-up and agreements with suppliers. To reduce the time of set-up needed changes the operations performed at the work center, and agreement with suppliers which JIT production system managed to have supplier deliveries whose has good reputable and possibly localized deposits.

3.2.3 Problem (3): Over-focussed on waste: over focused on waste tend to override other problems. Lean strives to ensure productivity and efficiency through eliminate waste and that important parameters were ignore such as employees well-being, and corporate responsibility [1]. It has solution which according to [16] The company offered well-being initiatives to employee through methods: (1) Sait Industries, which investigate well-being needs, it was improved the participation and working conditions of employee, which simultaneously improve performances and strengthens the Total Quality Management (TQM) approach, (2) Royal Insurance, which it was negotiate well-being needs through conducted negotiation process which done by Human Resource department to agree compromise between employee needs and company, (3) Project Consulting was anticipating well-being needs.

3.2.4 Problem (4): Over-focused on present time was impact on future such as company didn’t take time to anticipate future challenges and made the change what required to respond challenges. Lean also stifles creativity, innovation, or experimentation were impact the organization inhibited to responded the better change, but also difficult to realize opportunity [1]. It has solution which according to [14]; The problem needed Performance Improvement Mechanism. Performance Improvement Mechanism can be grouped in three categories [14]: (1) Learning from experience which include observation and analysis existing process in office or field, after action reviews, and organizational activities were review and evaluation through any methods and organization’s ability increased through identified the problems and improvement, (2) Gathering Intelligence, identified potential improvement by monitoring the external environment. It was included: exploring developments outside the company, and keep up the new design, methods and technologies where happened in outside the company. (3) Learning through Experimentation included the new methods and techniques used. These could be production technologies, management methods (e.g., last planner), new information systems, incentives systems, etc.

3.2.5 Problem (5): Lack of understanding of standard methods used in lean implementation. It has solution which according to literature [6]: Training, it was conducted in the local language and workshop with practical demonstrations used to improve the awareness on lean for all employees, and examinations were conducted to assess their knowledge gained. And According to literature [17]: Training were important for bringing both management and workforce up to speed with lean. A different type of training required for management of training operator of a machine.
4. Conclusion
The lack of lean manufacturing implementation can be overcome by continuous improvement, the improvement used to spur and increase creativity of employees to solved the problem and new ideas were generated to faced challenges. In addition, lean manufacturing implementation require good leadership that impact on the implementation process and contribution of employee. The clear contribution to improve the lack of lean manufacturing through literature review of previous research has given the solution of such as: pressure employee can be solved through management support and employees were given motivation to increase their work; no reserve stock can be solved through reduce the time of set-up needed changes the operations performed at the work center and agreements with suppliers whose has good reputable; important parameters were ignore such as employees well-being and corporate responsibility can be solved through investigate well-being needs, negotiate well-being needs and anticipating well-being needs; organization inhibited to responded the better change, but also difficult to realize opportunity can be solved through Performance Improvement Mechanism which grouped in three categories: (1) Learning from experience,(2) Gathering Intelligence, (3) Learning through Experimentation; and the last problem of the lack lean manufacturing was the lack of understanding of standard methods used in lean implementation can be solved through training. So, these solutions were sufficient to helped improve the lack of lean manufacturing implementation.

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