

## Implementation of Lean Manufacturing to increase Company Production Efficiency

Suwanda

Universitas Krisnadwipayana, Jakarta, Indonesia

Article Info	ABSTRACT
<b>Corresponding Author:</b> Suwanda E-mail: <a href="mailto:suwanda@unkris.ac.id">suwanda@unkris.ac.id</a>	<p>Lean Manufacturing is known as a management approach that focuses on eliminating waste, process efficiency, and increasing added value. This research aims to evaluate and apply the Lean Manufacturing concept as a strategy to improve production quality in a manufacturing organization. This research uses a qualitative approach with descriptive methods. The research results show that the application of Lean Manufacturing, especially through the concepts of waste elimination, value flow optimization, quality improvement, Just-In-Time (JIT) production, workforce involvement, production flexibility, and the 5S approach, has a positive impact on the operational efficiency of manufacturing companies. Eliminating waste, including excess inventory and unproductive production time, can reduce costs and increase productivity. Value stream mapping helps identify and eliminate waste in every stage of production. A focus on defect prevention and continuous improvement improves product quality, reduces the risk of remanufacturing, and increases customer satisfaction. JIT principles optimize production according to demand, reduce storage costs, and increase flexibility. Engaging the workforce in continuous improvement not only reduces waste but also increases productivity and morale. Lean's ability to respond to market changes and apply the 5S approach in organizing the work environment is also the key to success in improving the company's operational efficiency in a sustainable manner.</p> <p><b>Keywords:</b> Lean Manufacturing, Efficiency, Product, Just-In-Time (JIT), Company</p>

This is an open access article under the [CC BY-NC](https://creativecommons.org/licenses/by-nc/4.0/) license



### INTRODUCTION

Nowadays, the dynamics of the manufacturing industry are experiencing rapid growth in line with technological developments and increasingly competitive global market demands (Garetti & Taisch, 2012). Manufacturing companies are now faced with pressure to not only increase production output in terms of quality and quantity, but also to maintain competitive prices (Miltenburg, 2005). In this context, the main goal of a manufacturing industry is to achieve minimum production cost efficiency while still being able to generate optimum profits (Ajao & Small, 2012).

Increasing production yields is no longer just a parameter of success, but also includes aspects of product quality that are increasingly appreciated by smart consumers (Henard & Szymanski, 2001). Therefore, manufacturing companies are faced with the challenge of implementing production strategies that not only optimize the production process economically, but also improve product quality standards (Jayal et al., 2010). In the face of this complexity, many companies are starting to adopt a Lean Manufacturing approach, which not only prioritizes operational efficiency, but also focuses on eliminating waste and increasing added value (Grewal, 2008).

By integrating technology, innovation and the right management methodology, manufacturing companies can achieve their main goals by ensuring that each step in the production chain provides maximum contribution to product quality, optimal production quantities and significant profits (Corbett, 2007). Thus, the success of the manufacturing industry in this era is not only measured by how much production is produced, but also by the

*Implementation of Lean Manufacturing to increase Company Production Efficiency- Suwanda*

extent to which the company is able to maintain a balance between production costs, quality and competitiveness in the global market (Santos et al., 2014).

Achieving production efficiency is a crucial aspect that must be achieved by every company. Many companies set production efficiency standards by measuring actual production results and comparing them with predetermined targets (Kaplan, 1983). Company leaders actively strive to ensure that each production target is achieved optimally. The importance of production efficiency in the context of a company is to increase revenue, which is the main goal of every business entity (Soelton, 2023).

A production process that is less effective and efficient can be a serious obstacle to the success of a manufacturing company (Bain, 1956). In a competitive environment, delays in production not only impact a company's internal efficiency, but can also harm reputation and customer satisfaction. Therefore, it is very important for companies to identify and overcome potential waste that occurs during the production process (Kucerova et al., 2015).

Waste can occur in many forms, including wasted time, inefficient materials, or unnecessary processes. Waste identification is a critical step in improving the production process (George, 2010). The Lean Manufacturing method is a widely adopted solution, which emphasizes eliminating waste to increase efficiency. The waste identification process involves an in-depth analysis of every production step, from raw materials to finished products (Panwar et al., 2015).

Through a deep understanding of the sources of waste, companies can take strategic steps to optimize production processes. This can involve streamlining workflows, improving inventory management, and using more advanced technology (Kurve et al., 2015). By overcoming waste, companies can reduce production time, increase efficiency, and significantly speed up meeting consumer needs (Nidumolun et al., 2009).

Implementing waste identification and process improvement strategies is not only the key to improving production performance, but also to ensuring the company's competitiveness in a dynamic market (Lewis, 2000). In this way, the company can achieve a production process that is not only effective and efficient, but also responsive to market needs, thereby increasing customer satisfaction and strengthening the company's position in the industry ((Shrivastava, 1995).

The Lean Manufacturing approach adheres to a holistic philosophy in understanding and managing the entire business process of a company. More than just focusing on production processes, this approach embraces a holistic view that includes both material flows and information flows. In this context, each element in the company's value chain is considered an integral, interrelated part (Eaidigah et al., 2016). This approach understands that efficiency can not only be achieved through improvements at production levels, but also through optimizing the flow of materials from supply to finished products, as well as effective information management. By analyzing and aligning these three aspects, companies can identify and eliminate waste, optimize processes and increase added value (Saurin, 2011).

Apart from that, Lean Manufacturing does not only focus on technical aspects, but also on developing a work culture that is oriented towards continuous improvement. The involvement of the entire work team in identifying problems and finding solutions is the key to success (Mahapatra & Mohanty, 2007). Therefore, the Lean Manufacturing approach is not just about streamlining operations, but also creating a work environment that is responsive, innovative and adaptive to change. By understanding the entire business process and applying Lean Manufacturing concepts, companies can achieve greater resilience, reduce waste, increase efficiency, and overall create higher value for customers. This approach not only changes the way companies view production, but also forms a strong foundation for long-term competitiveness in a dynamic global marketplace.

## METHOD

In this research, descriptive qualitative methods are used as an approach to explore and understand the central phenomenon that is the focus of the research. Creswell & Poth (2016) defines qualitative research methods as a method of approach or investigation that aims to deepen and understand a core phenomenon. To achieve an understanding of these symptoms,

researchers conducted interviews with research participants or participants, using general and open questions. The information obtained is in the form of words and text, which is then collected and analyzed. Analysis is carried out by detailing the findings and linking them to previous research conducted by other scientists. The data collection technique was carried out using triangulation, namely combining several data collection methods. The data analysis process is inductive or qualitative, placing greater emphasis on understanding the meaning of the data rather than seeking generalizations. The final results of qualitative research will be presented in the form of a written report, describing the researcher's findings and interpretation of the phenomenon under study.

## **RESULTS AND DISCUSSION**

If a production process in the manufacturing industry does not provide added value to the product, it can be categorized as waste. This waste causes wasted energy and resources used, which in the end can reduce the company's profit value. To overcome the problem of waste, implementing lean manufacturing is an effective solution. By applying this concept, company operations can run more efficiently and focused. According to Lean Indonesia, lean manufacturing is a production practice that considers the effective use of resources to provide economic value to customers without waste. Thus, apart from reducing waste, implementing lean manufacturing can also increase the company's operational efficiency.

Lean Manufacturing or Lean Production can increase a company's production efficiency in the following ways:

### **Waste Elimination (Waste Reduction)**

Lean Manufacturing stands out as an approach that focuses on efficiency and optimization of production processes by identifying and eliminating all forms of waste that may occur. Waste, which is often costly in terms of time and resources, can originate from several aspects of the production process. One of them is excess inventory, which can cause a buildup of goods and result in unnecessary storage costs. By applying Lean principles, companies can minimize inventory so that production is more in line with customer needs.

Apart from that, unproductive production time can also be considered waste. Examples include wasted time due to long machine setup or inefficient movement of goods. By understanding and redesigning production processes, companies can reduce unproductive production time and increase throughput. Likewise, the elimination of unnecessary movements, such as excessive movement or movements that do not add value, is also a focus of Lean Manufacturing. By optimizing workflows, companies can increase operational efficiency and reduce waste in the form of unproductive movements.

### **Value Stream Optimization (Value Stream Mapping)**

In implementing Lean Manufacturing, the use of tools such as value stream mapping is crucial to thoroughly understand how a product goes through the entire production process from the beginning to the end. Value flow maps allow companies to visually map the flow of materials and information, from the supply of raw materials to the delivery of finished products to customers. Through a deep understanding of this value flow, companies can clearly identify each process stage that provides added value and which does not.

Value stream mapping helps companies identify and analyze waste that may occur at each stage of production. This involves observing each step, measuring time, and evaluating effectiveness. In this way, companies can identify activities that do not provide added value, such as time delays or inefficient use of resources. The next step is to eliminate or minimize this waste. By redesigning value flows based on value flow map analysis, companies can improve operational efficiency, accelerate throughput, and optimize resource use. Overall, value flow maps are an important tool in directing companies towards production that is more efficient, adaptive, and focused on added value for customers.

### **Quality Improvement**

Lean Manufacturing emphasizes the importance of defect prevention and continuous improvement as key strategies for achieving efficient and high-quality production. A focus on defect prevention involves taking proactive steps to prevent defects or errors from occurring in the production process. This includes workforce training, close monitoring of production

parameters, and the use of sensor or automation technology to detect potential problems early. In addition to prevention, the concept of continuous improvement underscores the importance of continually improving production processes. By conducting regular evaluations of operational performance, companies can identify areas that require improvement or improvement. Implementing the PDCA (Plan-Do-Check-Act) cycle or Kaizen (continuous improvement) approach allows companies to systematically improve their processes.

Improving overall product quality is a significant strategy in reducing waste of time and resources. High quality products minimize the risk of defects, thereby reducing the need for remanufacturing or reprocessing. In addition, high quality products also contribute to customer satisfaction, strengthen brand reputation, and open up opportunities for market expansion. Thus, Lean Manufacturing does not only rely on reactive improvements to defects, but also encourages a culture of prevention and continuous improvement. By emphasizing overall product quality, companies can achieve higher levels of efficiency and minimize the risk of losses due to production defects.

### **JIT (Just-In-Time) Production**

The Just-In-Time (JIT) principle in the Lean Manufacturing concept brings fundamental changes in the way companies manage inventory and design their production processes. This principle encourages companies to produce goods according to customer demand, on time, without unnecessary excess inventory. The main focus of JIT is to reduce production cycle time, so that companies only produce the required number of goods at the required time. Implementing JIT helps companies avoid storage costs which can be a significant burden. By minimizing inventory, companies do not need to provide large storage space or incur costs to maintain inventory that sits in the warehouse for a long time. In addition, the risk of goods not being sold can be minimized because production is carried out responsive to market demand.

Apart from economic benefits, JIT principles also support production flexibility. Companies can more easily adapt and respond to changes in market demand or product design because they are not tied to large inventories. In this way, companies can maintain high levels of efficiency, reduce the risk of overproduction, and increase responsiveness to customer needs. implementing JIT principles is not only about operational efficiency, but is also a smart strategy in managing inventory and minimizing the financial risks associated with excess inventory. This helps companies achieve an optimal balance between production and customer demand, supports operational sustainability, and increases competitiveness in dynamic markets.

### **Increased Labor Productivity**

Involving the workforce in a continuous improvement process is one of the main pillars of the Lean Manufacturing philosophy. In this context, workers are recognized as resources who have a deep understanding of daily operations and production processes. Through their active participation in improvement initiatives, a responsive and collaborative work environment is created. Involving the workforce in the improvement process not only reduces waste, but also has a positive impact on productivity. By empowering employees to identify and solve problems, companies can speed decision making, reduce production downtime, and increase overall efficiency. Employees who feel they have an active role in improving the production process also tend to be more involved overall in achieving company goals.

Furthermore, involving the workforce in continuous improvement can have a positive impact on morale and motivation. When employees see immediate results from their contributions to operational improvements, this can increase self-confidence and job satisfaction. Engaging in the improvement process provides employees with the opportunity to develop skills, understanding, and a sense of ownership of their work, which in turn increases satisfaction and motivation. Thus, through a participatory approach to continuous improvement, Lean Manufacturing not only creates operational efficiencies, but also builds a work culture based on collaboration, continuous improvement and increasing workforce well-being. In the long term, this can make a positive contribution to overall company performance.

### **Increased Production Flexibility**

Lean Manufacturing provides significant advantages for companies in facing dynamic changes in market demand. One of the main ways in which Lean enables better responsiveness to change is through the ability to make rapid changes in production setups. By minimizing the

time needed to replace equipment or redesign production flows, companies can be more flexible in producing different types of products or adapting processes to meet changing customer demands. Apart from that, Lean also allows adjusting production capacity efficiently. In situations where market demand increases or decreases suddenly, companies can optimize their production capacity to match the actual level of demand. This is done without significantly increasing production costs due to the efficiencies gained from Lean principles.

The ability to respond quickly to changes in market demand is key to maintaining competitiveness. Companies that are able to adapt with flexibility and efficiency have a significant advantage. By adopting Lean principles, companies can position themselves to better respond to market trends, varying customer demands, or even sudden changes in economic conditions. This not only increases competitiveness, but also helps companies to remain relevant and successful in a dynamic business environment.

### **Implementation of 5S (Sort, Set in order, Shine, Standardize, Sustain)**

The 5S approach, which consists of Sort, Set in order, Shine, Standardize, and Sustain, has a significant positive impact on the organization of the work environment in a company. The first step, Sort, involves selecting and arranging the required items, while the Set in order step focuses on placing those items in optimal locations. Thus, the 5S approach helps create continuity in operational processes, increases efficiency, and reduces waste of time previously spent searching for necessary items or tools. Next, Shine's steps involve maintaining the cleanliness and orderliness of the work environment. A clean and organized work space not only creates safe working conditions, but also facilitates easier search for materials and tools. This leads to increased operational efficiency because employees can more quickly find and use the equipment they need without being bogged down by clutter or ambiguity.

The fourth step, Standardize, encourages the creation of standard procedures to maintain the set layout. With standardization, companies can ensure that each team member follows 5S principles consistently, which in turn increases efficiency and ensures order over a longer period of time. The final step, Sustain, creates a sustainable culture where the 5S principles are applied continuously. Through this approach, companies can ensure that the benefits of implementing 5S are not temporary, but rather become part of a work culture that continuously prioritizes efficiency and order in the work environment. Thus, the 5S approach not only helps organizations to organize the work environment, but also creates the basis for continuously improving operational efficiency.

## **CONCLUSION**

The Lean Manufacturing approach is a philosophy and production method that focuses on operational efficiency, waste reduction, and continuous improvement. The Lean concept carries several key principles such as elimination of waste, implementation of Just-In-Time (JIT), prevention of defects, involvement of the workforce, use of value flow maps, and the 5S approach. In its application, Lean Manufacturing has a positive impact on company performance. Through eliminating waste, companies can increase production efficiency and reduce costs. JIT principles help companies to produce according to customer demand, avoid excess inventory, and reduce the risk of unsold goods. Defect prevention and continuous improvement provide focus on improving product quality, which in turn reduces waste of time and resources. Involving the workforce in the continuous improvement process not only reduces waste but also increases productivity and workforce morale. The use of value flow maps helps companies understand the flow of production processes and identify areas that need improvement. Lastly, the 5S approach helps organize the work environment, improve operational efficiency, and create a sustainable work culture. Overall, implementing Lean Manufacturing brings holistic changes in the way companies operate. By integrating Lean principles, companies can achieve more efficient operations, be responsive to market changes, improve product quality, and strengthen workforce engagement. In a dynamic business era, the Lean Manufacturing approach opens up opportunities for companies to remain competitive and sustainable in the long term.

## REFERENCES

1. Ajao, S., & Small, S. (2012). Liquidity management and corporate profitability: Case study of selected manufacturing companies listed on the Nigerian stock exchange. *Business Management Dynamics*, 2(2), 10.
2. Bain, J. S. (1956). *Barriers to new competition: their character and consequences in manufacturing industries*. Harvard University Press.
3. Corbett, S. (2007). Beyond manufacturing: The evolution of lean. *The McKinsey Quarterly*, 3, 96.
4. Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.
5. Eaidgah, Y., Maki, A. A., Kurczewski, K., & Abdekhodae, A. (2016). Visual management, performance management and continuous improvement: A lean manufacturing approach. *International Journal of Lean Six Sigma*, 7(2), 187-210.
6. Garetti, M., & Taisch, M. (2012). Sustainable manufacturing: trends and research challenges. *Production planning & control*, 23(2-3), 83-104.
7. George, M. O. (2010). *The lean six sigma guide to doing more with less: cut costs, reduce waste, and lower your overhead*. John Wiley & Sons.
8. Grewal, C. (2008). An initiative to implement lean manufacturing using value stream mapping in a small company. *International Journal of Manufacturing Technology and Management*, 15(3-4), 404-417.
9. Henard, D. H., & Szymanski, D. M. (2001). Why some new products are more successful than others. *Journal of marketing Research*, 38(3), 362-375.
10. Jayal, A. D., Badurdeen, F., Dillon Jr, O. W., & Jawahir, I. S. (2010). Sustainable manufacturing: Modeling and optimization challenges at the product, process and system levels. *CIRP Journal of Manufacturing Science and Technology*, 2(3), 144-152.
11. Kaplan, R. S. (1983). Measuring manufacturing performance: a new challenge for managerial accounting research. In *Readings in accounting for management control* (pp. 284-306). Boston, MA: Springer US.
12. Kucerova, M., Milkva, M., Sablik, J., & Geigus, M. (2015). Eliminating waste in the production process using tools and methods of industrial engineering. *Production Engineering Archives*, 9.
13. Kurdve, M., Shahbazi, S., Wendin, M., Bengtsson, C., & Wiktorsson, M. (2015). Waste flow mapping to improve sustainability of waste management: a case study approach. *Journal of Cleaner Production*, 98, 304-315.
14. Lewis, M. A. (2000). Lean production and sustainable competitive advantage. *International journal of operations & production management*, 20(8), 959-978.
15. Mahapatra, S. S., & Mohanty, S. R. (2007). Lean manufacturing in continuous process industry: an empirical study.
16. Miltenburg, J. (2005). *Manufacturing strategy: how to formulate and implement a winning plan*. CRC Press.
17. Nidumolu, R., Prahalad, C. K., & Rangaswami, M. R. (2009). Why sustainability is now the key driver of innovation. *Harvard business review*, 87(9), 56-64.
18. Panwar, A., Nepal, B. P., Jain, R., & Rathore, A. P. S. (2015). On the adoption of lean manufacturing principles in process industries. *Production Planning & Control*, 26(7), 564-587.
19. Santos, J., Wysk, R. A., & Torres, J. M. (2014). *Improving production with lean thinking*. John Wiley & Sons.
20. Saurin, T. A., Marodin, G. A., & Ribeiro, J. L. D. (2011). A framework for assessing the use of lean production practices in manufacturing cells. *International Journal of Production Research*, 49(11), 3211-3230.
21. Shrivastava, P. (1995). Environmental technologies and competitive advantage. *Strategic management journal*, 16(S1), 183-200.
22. Soelton, M. (2023). Conceptualizing Organizational Citizenship Behavior and Learning Organization in the Labor Sector. *Jurnal Organisasi Dan Manajemen*, 19(1), 239-255.