

Issue: 2023 No.2 July 2023

The Lean and Clean Strategies in Thai Automotive Parts Company: How to Sustain its Competitiveness in the Industry

Abstract

Since mobile transport still contributes around 20% of total carbon dioxide emissions, the international community obliges every country to commit its efforts to help transition the automotive industry to become cleaner and create more economic value for the industry. Therefore, in this paper, we are mainly examining the strategies that can improve the efficiency of production and be environmentally friendly based on a famous automotive supplier case in Thailand. The content includes overview information about the automotive and auto parts industries, manufacturing and automation strategies, lean energy strategies, and lean renewable energy strategies.

Learning objective

To explore some key strategies that can help the Thai automotive and auto parts industries maintain their competitiveness. These strategies will give readers a profound insight into the industry based on their real-world application.

Introduction

At present, Thailand is known to be the world's 10th-leading automotive manufacturing site since the country has established a comprehensive network of automakers and auto part suppliers over the past few decades. Moreover, Thailand is home to certain natural resources (rubber, tyres, belts, petrochemicals, dashboards, door handles, and airbags), and the country's Free Trade Agreement (FTA) coverage ratio has exceeded 60%. Thailand has signed major trade pacts, namely the Asean Free Trade Agreement (AFTA), the Regional Comprehensive Economic Partnership Agreement (RCEP), and other bilateral trade agreements with its trading partners. Furthermore, Thailand wants to secure its competitive advantage in the automotive and auto parts industries in the near future, so the Thai government is committing its strenuous effort, such as offering financial incentives to auto assemblers and suppliers, to help them transition to a cleaner and more efficient production approach to making automobiles in Thailand. A good rationale for automotive and auto parts players to implement lean manufacturing can allow firms to deprive redundant raw materials of waste during the traditional labor-intensive production approach, and using this approach can smooth the production line using smart technology. The lean energy approach is to extend the concept of "Kaizen' in the production line to reduce energy consumption and at the same time retain the productivity of the industry. Moreover, the clean energy approach emphasizes that the industry is making progress toward self-sufficiency by installing solar photovoltaic panels, and the main goal is to achieve carbon offsets and minimize the impact on the environment.

Country	Car (in million units)
China	27.02
United States	10.06
Japan	7.835
India	5.456
South Korea	3.757
Germany	3.67
Mexico	3.509
Brazil	2.36
Spain	2.21
Thailand	1.88

Figure 1: World's Top 10 Car Producing Sites Ranking

Source: International Organization of Motor Vehicle Manufacturers 2022 Statistics

Figure 2 : Major Auto Parts Suppliers and the Structure of the Automotive Industry in Thailand



Source: Krungsri Research 2020 & Thailand Automotive Institute 2022

Lean Manufacturing and Automation Approach

The company chooses to use Lean Manufacturing to increase efficiency in production processes and operations, strengthen the competitiveness of the organization, reduce costs, and achieve higher-quality services or products for customers. Lean manufacturing is the process of making the production process as slim as possible in order to reduce waste in the production process. For example, it may start with human labor or manual labor. Later, technology was brought to blend with human labor. While the factory is trying to bring technology to full use by adding automation instead of human factions by collaborating with universities in Thailand to invent these automations, doing this will help reduce costs by cutting off unnecessary functions. In addition, it must also be easy to use, easy to maintain and reduce time, and must also be smart to act as a substitute for human faction. This process has been developed since 2015 and has now installed 94 machines. As a result, the number of workers has been reduced by 184 by reducing the number of workers only for non-meticulous tasks, such as handling equipment: for example, moving equipment without waiting for human labor or manual labor. However, factories still rely on manual labor for meticulous tasks, especially Thai workers because Thais have a meticulous nature. Another reason factories still require manual labor is because mechanized robots with meticulousness are quite expensive, which increases unnecessary costs, which is inconsistent with the principles of lean manufacturing. In addition, the factory has made some parts by themselves to reduce costs, which is better than imports. Therefore, the price is reduced, making it able to compete with competitors, and it can also reduce transportation time. For example, The company produces cutting tools by themselves by grinding and reusing them to reduce costs.

In addition, the factory has also reduced the size of the machine from 3000 tons to 250 tons. Reducing the size of the machine can reduce costs and reduce energy consumption. In other words, Lean Manufacturing is a practice that eliminates waste or unnecessary transmissions to improve efficiency and maximize customer value and satisfaction by focusing on continuous improvement as well as employee involvement, optimizing processes, and optimizing processes and taking into account the value.

Lean manufacturing has the following key principles:

- 1. **Value:** As a manufacturer, The company should first understand the exact needs of our customers and adjust and refine the production process accordingly in order to identify the value that our customers perceive and want. so that the company can deliver that value to customers.
- 2. **Value mapping:** The company should create a whole plan from raw materials received to the final stage of production to identify and eliminate waste or eliminate some unnecessary activities to reduce costs. After that, adjust the process accordingly.
- 3. Use the JIT and pull systems: JIT is production just in time, and the pull system is production only when there is demand or an order from customers. This reduces inventory costs, reduces waste, and increases flexibility.
- 4. **Streamline the production process:** reduce interruptions and bottlenecks in the production process. and reduce the waiting time to a minimum in order to produce efficiently.
- 5. **Standardization:** Determining processes and methods of work to be standardized The company may produce a documented form of best practices and standards for people in the company to follow, such as providing clear work instructions. and training of employees according to the established standards to ensure consistency, quality, and efficiency.
- 6. **Continuous Improvement:** Improvement is the cornerstone of Lean Manufacturing. The company will encourage all employees to participate in continuous improvement activities known as Kaizen to identify and solve problems. Process optimization
- 7. **Error Prevention:** The Company will use mechanisms and procedures to prevent errors, defects, and quality problems that may occur. Such a mechanism or process can reduce waste and improve overall product quality.

Lean Energy Approach

Lean energy is an innovative approach aimed at optimizing energy usage and promoting sustainable practices across various industries. Inspired by the principles of lean manufacturing, which prioritize efficiency and waste reduction, lean energy focuses on streamlining energy consumption while minimizing environmental impact. The core idea behind lean energy is to employ smart technologies, efficient processes, and renewable energy sources to achieve the highest possible energy productivity while reducing carbon emissions and overall energy waste.

The key initiatives of the lean energy approach of the focused organization are as follows:

Visualizing Waste and Kaizen:

At the core of the lean energy approach lies the ability to visualize and identify energy waste. By employing techniques such as energy mapping and energy audits, businesses can gain insights into their energy consumption patterns and identify areas of inefficiency. Similar to the concept of Kaizen, which focuses on continuous improvement, lean energy encourages businesses to analyze energy usage and implement strategies to reduce waste systematically.

Optimizing Energy Demand and Supply

One key aspect of the lean energy approach is optimizing energy demand and supply to ensure energy is supplied only when required and in the appropriate amount for production. By connecting the supply side and production side through Production Information systems, companies can implement energy-saving measures effectively. For example, implementing energy management systems that align with the company's operational style can help promote energy savings. On the production side, measures like turning off the main power source during lunch breaks or adopting automated idling stop control can help optimize energy usage.

Reducing Machine Power:

To further enhance energy efficiency, companies are exploring technologies such as the development of 1/N machines. Traditional machines are often large and have high capacity, resulting in the production of excess products beyond demand, leading to waste and energy loss. The 1/N machine technology aims to develop smaller machines with comparable productivity while reducing waste, energy loss, and space occupation. These machines produce only the necessary amount of products, aligning production with demand and minimizing unnecessary resource consumption.

The lean energy approach provides a framework for businesses to proactively manage their energy consumption, promote sustainability, and drive innovation. By visualizing waste, optimizing energy demand and supply, and reducing machine power, companies can create a more sustainable future while improving their operational efficiency and profitability. Embracing this approach not only benefits individual businesses but also contributes to the collective goal of achieving a greener and more sustainable planet for generations to come.

Clean Energy Approach

A clean energy approach refers to a strategy or set of measures aimed at promoting the use of renewable and low-carbon energy sources while reducing reliance on fossil fuels. The primary goal of a clean energy approach is to mitigate climate change, reduce air pollution, and foster sustainable development.

To demonstrate its commitment to sustainable production practices, the organization has implemented various initiatives aligned with the clean energy approach. These efforts contribute to environmental sustainability while also aligning with the organization's commitment to cost competitiveness through improved productivity, waste management, and the use of clean energy sources.

The key initiatives of the clean energy approach of the focused organization are as follows:

Solar photovoltaic (PV) system

The organization has invested in solar photovoltaic (PV) systems to generate renewable electricity on-site by harnessing the abundant sunlight. These solar PV systems reduce dependence on fossil fuels and result in a significant reduction in carbon emissions, supporting the organization's goal of becoming a zero-carbon entity.

Co-generation

The organization has adopted co-generation or combined heat and power (CHP) systems, which produce electricity while capturing waste heat for heating, cooling, and other industrial processes. This optimization of energy use and reduction of carbon emissions align with the clean energy approach.

Biogas

The organization has also implemented biogas plants using anaerobic digestion to generate electricity and heat from organic waste, such as food waste or agricultural residues. This approach reduces waste, methane emissions, and demonstrates a commitment to sustainable energy practices and circular economy principles, all in line with the clean energy approach.

Renewable energy

The organization recognizes the importance of addressing the remaining 70% of its energy needs and sources renewable energy through Renewable Energy Certificates (RECs). By purchasing RECs from renewable energy projects, the organization supports the growth and development of renewable energy sources and effectively offsets its own carbon footprint, contributing to a cleaner and more sustainable energy landscape. This strategic approach aligns with the clean energy approach's goal of promoting the use of renewable and low-carbon energy sources.

Overall, the organization's commitment to reducing its carbon footprint and achieving carbon neutrality through initiatives such as solar energy systems, combined heat and power generation, biogas utilization, and the purchase of renewable energy exemplifies a comprehensive and multifaceted clean energy approach. By integrating renewable energy sources, optimizing energy efficiency, and demonstrating sustainability practices, the organization contributes to environmental sustainability and sets an example for other companies in the industry.

Conclusions

In conclusion, the case study highlights the significance of implementing lean manufacturing and automation, lean energy, and clean energy approaches within the automotive industry. These approaches are crucial for the industry's survival in a competitive and rapidly evolving business landscape. The integration of lean manufacturing and automation optimizes production processes, reducing waste and enhancing efficiency, enabling companies to remain competitive in the global market.

Moreover, the adoption of lean energy and clean energy approaches addresses environmental concerns and societal expectations for sustainability. Emphasizing renewable and clean energy sources reduces the industry's carbon footprint, aligning with growing demands for eco-friendly practices. Additionally, complying with environmental regulations and adopting ethical labor standards is essential to operating responsibly and meeting societal expectations. (Figure 3)



source:http://ameicc.org/aseanjapan_businessweek/2023/summary/_data/day4/1300-1440/Theerawat%20Limpibunterng.pdf

The case study is of utmost importance as it demonstrates the positive impact of these approaches on the automotive industry and society as a whole. Companies that embrace these strategies can gain a competitive advantage, achieve long-term sustainability, and contribute to a greener future. Moreover, the study emphasizes the need for the automotive industry to adapt to changing market demands and environmental challenges to remain relevant and resilient in an ever-changing world. Overall, the case study highlights the importance of holistic and responsible approaches for the automotive industry's continued success and positive influence on society.