

Engineering management at toyota



**ASSIGN
BUSTER**

Toyota Motor Corporation is the second largest producer of automobiles in the world. It has its headquarters in Japan and is present in a large number of countries around the world. This multinational company was established by Kiichiro Toyoda in 1937. It was formed as a result of a spin-off from a company known as Toyota Industries which was owned by his father. At present, the company leads a group composed of 522 subsidiaries.

Toyota has also ventured in to other fields of business like financial services and production of robots in addition to its automobile production operations. The company, in combination with its parent group-Toyota Industries, forms one of the biggest conglomerates of the world. It also has the honor of being the only automobile producer appearing in the top10 BrandZ name recognition ranking. The premier brands owned by the company include Toyota, Lexus and Scion. It has a majority shareholding in Daihatsu Motors and has a minor share in Fuji Heavy Industries, Isuzu Motors, and the engine, motorcycle and marine craft manufacturer Yamaha Motors. The values adopted by the company's management have been developed by its founders and have played a significant role in its success. These values have emphasized the importance of terms like, " Lean Manufacturing" and Just in Time Production (JIT).

Toyota has also developed a unique approach, popularly known as The Toyota Production System (TPS) which forms the basis of its " Lean manufacturing." The TPS is a wonderful blend of the values adopted by the company and the practices implemented by its management. The system is responsible for ensuring a proper coordination with the customers as well as the suppliers. Its preliminary business objectives were to get profit from the

technologies offering potential to develop the customer experience through personalization and streamlining the internal processes in order to ensure a sustained profitability for the business (Liker, J 2004).

However, Toyota has always made improvements in its existing processes to sustain its current growth rate. As a result of this, the company is able to withstand the fierce competition experienced in the automobile sector, for a number of decades.

Just In Time (JIT)

Just in Time is an effective combination of a number of techniques that aim to increase the return on investment of a business-activity. This is done by decreasing the size of the in-process inventory, and various associated costs, related to it. It has been observed that this technique results in remarkable improvement in an organization's return on investment, quality, efficiency and effectiveness. In fact, JIT has been considered as an integral component of an organization's philosophy and not merely as a production technique.

(Ohno 1988)

JIT was first developed and mastered inside the manufacturing units of Toyota by Taiichi Ohno in order to satisfy the requirements of the customers without causing any kinds of delays. Later on, Taiichi Ohno came to be known as the father of JIT. Thus, the credit for publicizing the technique is given to Toyota Motor Corporation of Japan. Toyota was successful in overcoming the increasing challenges for its existence through this technique as it focused upon people, plants and systems. (*Toyota Highlander Hybrid* 2004)

The company was very quick to realize that the successful execution of JIT is possible only when each individual within the company contributed towards it. Toyota pioneered this concept to upgrade its current manufacturing process in order to compete with other major players. For a long time, the company was unable to bear the expenses of huge amounts of land used for storing its finished products and spare-parts. Due to this, the economic lot size of the organization was reduced, which led to a very low return on investment for its manufacturing units. Thus, a need was felt for making these units more flexible and eliminating the overhead costs, which were affecting the profitability.

With the help of constant research-work, the engineers at Toyota redesigned the manufacturing operations in order to develop a commonality of tooling for various production processes. It also made use of flexible robotic systems for performing a majority of these operations. As a result, common subassemblies were designed that could be used in several models, without wasting much time.

The development and implementation of Just In Time technique led to significant improvements for the company. As the work-in process inventory was sold immediately after it was built, a rapid increase in the liquidity was observed. At the same time, the response-time for the customer's demands came down to about a day. The rate of customer satisfaction increased in no time as vehicles were delivered before their expected deadlines. Moreover, the risk of warehousing the vehicles was completely eliminated as the company adopted the built to order policy for them. (*Just in Time- Toyota's Manufacturing Technique* 2008)

The very nature of JIT emphasized heavily on the quality aspect, which in turn resulted in the production of high-quality vehicles with minimum complaints. Finally, Toyota redesigned its entire manufacturing process to remove any kind of tolerances, and implemented efficient statistical controls. Consequently, Toyota trained its suppliers to ensure a quality and timely delivery for the spare-parts.

JIT increased the motivation levels of the workers, who aimed to accomplish more challenging goals. It also allowed Toyota to concentrate on group effort, which resulted in talent-identification, sharing knowledge, problem-solving skills, ideas and the achievement of a common goal. All these helped the company to secure a competitive position for itself.

Stock Control

Automobile industry incurred high cost on storage of materials and components. Companies used to store bulk of materials and components. It is the Toyota Corporation that invented just-in-time, a system of stock control. Toyota has adopted JIT method of ordering inventory, for instance it does not keep many assembled cars in its stock. Rather, it manages to assemble the cars in 4 hours after the order is placed. There are many plants of the company who deliver parts and components for manufacturing.

Wastage of time is minimized through just-in-time stock control. Detailed production schedules were worked out by manufacturers to find the efficient manufacturing system. Card ordering system ' Kanban ' was developed to reduce the space and cost attached with large quantities. In Toyota, components were ordered only after the instruction of ' Kanban '. According

to this plan, material that can be used in 1 hour is kept in the stock. But production of whole car plant would be stopped if there is any delay of more than 1 hour. Initially, it was not easy to cope with the new system 'just-in-time'. Very soon, Toyota outperformed and developed effective production system. (Hancock, Bolling & Pearce 2001)

Toyota production system is surprising and highly successful. The production system is valuable and useful due to its integration. Toyota production system focuses on removing waste. Lean manufacturing specialist says 'just find and eliminate waste' (*Lean manufacturing* , 2001). Searching for the waste and eliminating it leads to continuous improvement. Wastes are of many types such as organizational, psychological and materialistic.

Bad design is one of the most terrible and careless mistakes, which occurs due to negligence. Bad design problem starts at the commencement of manufacturing and have an effect on other functions. Designing not only includes the design of tools and parts but also the design of manufacturing process. It is expensive to fix the poor design. (*Lean manufacturing* 2001)

If there is a defect in any manufacturing phase, it goes down the line. This defect leads to losses that increase exponentially.

Toyota has quality control system, which emphasizes on finding defects. Quality of work in an organization cannot be improved if labor feel shameful on their mistakes and have fear in their mind. (*Lean manufacturing* 2001) In Toyota, there is an environment of pointing out of fault by the person who has committed it. The organization has an efficient manufacturing

environment, in which an employee is encouraged not to commit the mistake again instead of being punishing for that mistake.

Employee training is of paramount importance in Toyota Production System. Voice of employees is listened by the management of company. Consumer demand is center of gravity in inventory management of Toyota production System. Employee feedback is also an important part of production system.

Strict actions are taken on management mistakes, as they are important and harmful than the mistakes committed by the worker. Management mistakes are taken seriously and proper attention is given to them. Layout of production floor reduces motion of workers and assemblies.

Employees at Toyota have specialization in many tasks, which is helpful when main skills of the workers are not required. In the period of low demand, plans are set to hold the meetings and improvements are made in off time.

Inventory is highly reduced in production system. Toyota Production System stresses on consumer demand for material resource planning. Inventory is not pushed from behind rather it is pulled forward through manufacturing chain. Major source of waste is overproduction, which is minimized.

The company tries to maintain relationships with few trustworthy suppliers as many suppliers involve much time and paperwork. Manufacturing process is standardized so that efficiency can be maintained. Design of the manufacturing process is such that it is forward looking as it helps in reducing the expenses of changeovers.

Environmental Protection

Toyota Corporation has always been known for its active participation in the environmental protection efforts. It regards the protection of the environment as a key issue for the constant growth of a business organization. In 2000, Toyota framed the Toyota Tsusho Group's Environment Policy for guiding the actions of its managers and employees in accordance with the environmental issues. In the same year, the company set up the Earth Environment Committee, to promote its environment-related efforts. In fact, this committee formed the basis for the current Conference on the Global Environment.

Another major effort of the company in this direction came in the form of Toyota Turkey Project. This project is assigned with the responsibility of economic development and progress based on acceptable principals of the ecological studies, for the coming generations. Since, high-quality products are manufactured in secure and hygienic working-environment; the project ensures that its operations strictly follow the global Toyota environmental policies in product development, design and manufacturing processes. (*Environmental Factors 2008*)

Toyota aims to achieve its environmental protection goals with the help of following processes-

- Manufacturing automobiles with minimum utilization of natural resources, increased usage of renewable resources, low waste production, and causing less environmental impact by the release of hazardous substances and high levels of noise.

- By obeying the rules concerning the legal requirements associated with environmental issues and other environmental protection legislatures to continuously assess its environmental performance.
- By increasing the awareness about the environment issues among various sections of the society by training them.
- By starting open communication with customers and public institutions in regard to environmental management system efforts and environmental protection practices.

Thus, to constantly upgrade its environmental performance, Toyota sets annual goals and targets with respect to the environmental management system. Due to its responsible behavior and exemplary efforts in this direction, the company has been certified with the ISO 14001 Environment Management System Certificate.

Nearly, 5. 644 m² of the manufacturing area of the company is being lightened by the sunlight, in order to decrease the electricity consumption. Similarly, the water-pipes constructed of steel are converted into HDPE pipes, to control the wastage of water. Toyota also motivates its business-partners to actively participate in the environmental protection campaigns.

With the help of the trainings, members' recognition about environmental concerns is increased. For this, the company celebrates the month of June as the ' Environment Month', every year. In this month, various programs are organized for increasing the level of environmental awareness among all people associated with the company. On similar lines, the company has launched an environmental bulletin- Toyota Green, to complement its efforts in the given direction.

In addition to this, the company undertakes detailed inspections before making further investments in business to determine its environment-related impact. It is interesting to note that these inspections are based on surveys aimed to protect the environment, before setting up any new manufacturing units. For this, the company demands detailed investigation from its procurement sources to avoid any kinds of problems related to the environment. In addition to this, check sheets are designed for undertaking surveys and properly dispose off the waste materials, released as a result of the manufacturing operations carried out at the given location.

Conclusion

It has been seen that the company has a strong presence in the automobile market-segment. The company has a very impressive history and believes in strong cultural values. It lays a great emphasis on the aspect of quality and efficiency to win the confidence of its customers. Moreover, the company believes in making constant changes in its existing processes to remain competitive. In fact, Toyota has always been known for the adoption of latest technologies and concepts to increase its work-efficiency and productivity from time to time.

This attitude of the company is supported by the introduction of modern concepts such as JIT, Kanban and Robotics, etc. At the same time, Toyota is always prepared to experiment with the new ideas suggested by its employees, suppliers or customers. Due to this flexible approach, the company has been successful in maintaining its position in a very fierce competitive scenario. At the same time, it has been able to satisfy and fulfill

the demands and requirements of its customers, in the most profitable manner. Thus, the company would be able to sustain its current growth-rate and profitability, without facing any difficulty in the near future along with its mission to protect the environment from further deterioration. It is also expected that the company would continue to develop efficient and revolutionary work-methods which would be of great utility for the entire industry. However, it has to remain attentive to the constant changes taking place in its external environment and its areas of operation.

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