

The concepts of lean manufacturing toyota production system



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This Brief report highlights the Concepts of lean manufacturing/Toyota production system, the Concept of value chain made popular by Michael porter in his 1985 best seller, Competitive Advantage and the wastes associated with the lean manufacturing.

Throughout this report emphasis will be given on analyzing the questions given in the assignment itself. As such for the describing purposes this report will consider Toyota Company as the example and in the first part it will focus on the lean manufacturing of the chosen company which is to critically evaluate the lean production in the Toyota Company the company which introduced the lean manufacturing to the world.

Secondly the emphasis will be given to the wastes that are related to the value chain of Toyota Company, and it is discussed under two categories which are primary activities and support activities in value chain. The due recommendations were given.

Then thirdly the emphasis will be given as in how these recommendations impact the resources, and the report will justify as in how it will increase long run sustainability, competitiveness and corporate social responsibility.

The final chapter of the report will consider the porter's value chain as a template and create a frame work which will assist a first line manager in the following areas, identifying the wastes, danger signals and how to respond to the Danger signals.

1) The critical evaluation of lean production in the Toyota Company.

To get an understanding of the uses of lean manufacturing it is essential to get an overview of what is lean manufacturing lean is about achieving more with fewer possibilities as in low time inventory space, labor and money.

Lean manufacturing speeds up the production by the removal of waste from the system and simplifying the methods. Toyota production system was born on two concepts; one is “jidoka” which can be translated as automation with a man’s touch. When the problem occurs the equipment stops at once preventing the malfunctioning of products. The second is “Just in time” which produces the products needed only by the next step of the product line.

Waste is in the form of overproduction, waiting, transportation, inventory, motion, and over-processing, defective units. So lean manufacturing eliminates these forms of waste. According to Becker (2010) the lean manufacturing or Toyota production system established in Toyota corporation was a joint event of four gentlemen: “ Sakichi Toyoda, who founded the Toyoda Group in 1902; Kiichiro Toyoda, son of Sakichi Toyoda, who headed the automobile manufacturing operation between 1936 and 1950; Eiji Toyoda, Managing Director between 1950 and 1981 and Chairman between 1981 and 1994; and Taiichi Ohno, the Father of the Kanban System.”

To achieve lean manufacturing Toyota has used 7 ways.

Reduced set up times

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According to Kotelnikov(2001) the set up activities are always wasteful as long as they tie up the equipment and labor, by organizing the activities and procedures by charts and training to employees Toyota managed to eliminate the setup times.

Small lot production

When a company is manufacturing the products in large quantities it leads to huge set up expenses, high capital, need of high speed machinery, larger inventories, high lead times and defect costs, Toyota has made their path towards low setup it leads them to make things in small quantities.

Employee involvement and empowerment

According to Kotelnikov(2001) the Toyota Company arranged their workers in to teams and appointed a leader giving them the authority to handle many specialized tasks. They are given training of housekeeping and minor equipment repairs and the leader works with the team itself in the line.

Quality at the source

When there is a defect it should be identified immediately and then corrected. Toyota has placed their workers at the best position to identify the defects and to immediately fix it. If the worker can't fix the defect he /she will pull a code called Jidoka and stop the functioning.

Equipment maintenance

Toyota workers are trained to do basic maintenance because they are well aware of the malfunctions. The specialists fix only compound problems, train the employees regarding maintenance and improve the quality of the equipment.

Pull production

According to Kotelnikov (2001) to minimize stock holding costs and lead times the quantity of work performed at each stage depends entirely on the next stage's demand of materials. Kanban coordinates the flow of miniature containers of small material between stages.

Supplier involvement

Toyota treats the suppliers as their partners. The suppliers are trained to reduce the setup times, stocks and breakdowns.

Source: Kotelnikov (2001)

2) Recommendations on the ways how waste is managed in Toyota company.

The value chain is an arranged procedure to examine the development of competitive advantage in a company. The value chain has a number of steps that makes value and they altogether impact on the value delivered by the organization.

How the primary activities can help to minimize waste,

Inbound logistics

Goods are received by the Toyota's suppliers, The goods/ raw materials are stored until they are needed for the production assembly line. Goods are moved around the organization. This company gathers raw material from all around the world to get the best quality, and maintains it. To reduce the rawmaterials that are not used in production line they purchase the very best from the suppliers. To maximize the availability they keep close relationships with suppliers. Toyota use JIT (Just in time) method to handle raw materials.

Operations

This is the arrangement where the raw materials are manufactured and assembled. The individual parts assembly includes making new cars and fine tuning the new car's engine. To reduce the waste the company uses efficient operation methods to assemble and fine tune the car manufacturing.

Outbound logistics

When the products are finished, they need to be sent to the wholesalers, retailers or customers along the supply chain. To minimize the waste the Toyota has built show rooms all around the world and makes the products more assessable.

Marketing and sales

The offerings are based upon target customers. There is a true customer orientation. The Toyota Company minimizes the waste by strongly focusing on the marketing communications and the promotions mix.

Service

This is to remove waste from final delivery, Toyota value customers, so the due training to the service providers, final checking practices, after sales services are done with care.

Support activities to minimize waste

Procurement

This is responsible for purchasing, goods and materials for Toyota. It is essential to arrange a transaction that has a lowest cost and the products with highest quality.

The company has activities such as outsourcing and e purchasing to make the activities more effective and waste free.

Technology development

Technology leads to competitive advantage, Toyota has to innovate to gain and sustain competitive advantage.

Human resource management

Toyota thinks their employees as Human Capital; Toyota uses four ways to retain their employees, as in recruitment, selection training and development, compensation, maintenance.

3) The impact of the report's recommendations as in how it affects the organizations resources and the justification of the recommendation that will increase competitiveness, long term sustainability and corporate social responsibility.

According to Vaghefi (2001), in 2000 the Fortune published its annual rating of the most admired car makers in the world and Toyota became no one which included other manufacturers such as General Motors and Ford. The basic philosophy behind Toyota's success in the global market place is that its corporate philosophy which is an umbrella policy that guides the decisions and activities of the organization. The Toyota philosophy is known as the lean production system. Toyota has invaded the US market and established a name by virtue of its productivity. Toyota's way of thinking the employees as Human Capital and empowering the employees is the main theme of their human resource management system that fosters leads to innovation and employee participation which leads to ultimately winning the employee loyalty. Toyota's procedures in product development and distribution are very much customer friendly and market oriented. Outsourcing plays an important role where the Toyota's domestic and foreign markets externalize many of the direct costs and minimize market risks, at the same time Toyota realizes the importance of using specialized suppliers. Toyota's competitive advantage is mainly attributable to the schedule and the coordinate of activities among the network of 300 components suppliers. Toyota's competitive advantage was gained by a strategic commitment to produce exclusive automobiles. Toyota borrowed technology from established car manufacturers and made the procedures what effectively

helped to regain customer demand. Customer demand has been the most important strategic initiative of the company.

Behind the success of the Toyota Company there are three main components,

A network of suppliers in Japan and in US which can be interpreted as world class.

An effective Just in time system to manage inventory, which is dependent upon the activities of supplier network.

Robot technology incorporated assembly system, the Japan and North America has both won the platinum plant quality award for this function.

The processes and procedures sped up when the waste is eliminated from the company's main stream. Even the quality of the product increases when the waste is eliminated. This means the customer and the manufacturer are equally benefited by the Toyota production method. The company and the customer is in a win- win situation and the profits reflects the improvements. Toyota is famous for its innovations and became the largest manufacturer of cars in 2007 ahead of many leading car manufacturers achieving the competitive advantage by innovations.

Toyota production system has given Toyota company competitive advantage on a global scale. This advantage is gained through elimination of waste by earlier recommendations by the combination of their human resources management policies, their highly effective network of suppliers which

provide them with raw materials whenever they need it and machine
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manufacturers that produce machines which are used in the product lines continuously. The management philosophy is more important for their long term sustainability, Toyota is known for its corporate culture which enhances the employee empowerment. According to Hub pages (2010) “ In an average year more than 700, 000 improvement suggestions were submitted by Toyota’s employees. That is an average of over 10 improvement suggestions per employee per year. What is perhaps most impressive is that over 99% of suggestions were implemented “ This shows how employee centered the company is. Toyota knows that the employees are the key to continuous improvement, their ability and creativity leads to innovation in-house. When the employees are well looked after the company will earn their trust, their loyalty and they will work with an improved morale.

Some of the very common advantages of the recommendations provide earlier are that the Toyota company can pursue to identify and enhance the customer perceived value in the cars they produce in their product assembly lines. This is related with high quality of cars and low delivery times. Toyota Company thinks out of the box and identifies wastes that are crucial to be removed, but other companies do not achieved this mentality fully to recognize the minor wastes types that are crucial for the improvement in production sector.

Toyota Company has strived to with subsidiaries, suppliers to contribute towards a sustainable development of society making good quality automobiles. When lean manufacturing is used to eliminate waste and improve quality, as it is doing so it is effective to reduce the environmental

impact as well. The ways in which Toyota has reduced environmental impact are

Engaging in venture capital partnerships where the Toyota Company examines the innovator to establish a new technique to commercial development and success.

Building working teams and groups of employees to research and development in sustainable practices in technology

Bonding with community organizations which are environmental friendly and working in sustainable issues in order to support and help the community work.

Toyota gives priority to the customers; they have a philosophy of customer first which provides the customers with innovative, safe and outstanding quality products to meet their demands to enrich the needs. The Toyota Company protects the personal information of the customers according to the privacy laws of each country. The employees are well respected inside the company which is a recommendation and it leads to individual creativity, and best team work. This stimulates personal growth of employees. Equal employment opportunities are given to the people and discrimination is not allowed. Toyota strives to provide fair working conditions along with healthy and safe environment to the employees. Human rights were respected in every form and forced labor in any kind and child labor are strictly refused. Through right communication and speeches mutual understanding is built among employees this will in turn help the employees to work for the success of the company.

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Toyota targets for growth that is in harmony with the environment by minimizing the impact which is causing by operational activities, For example reducing the impact on the climate change and biodiversity by vehicle emissions. Toyota is building a relationship between the environment and economic activities to coexist parallel.

They create bonds between the individuals and the organizations that are involved in the environmental preservation. Toyota honors individualism by their philosophy of respect for people and concerns about the culture, customs, history, laws of each country which they are operating in. The evolving needs of sustainable mobility is achieves through continuous use of safe, clean and advanced technology. Illegal means are prohibited by the company to ensure long run sustainability with government and non-government agencies. The enrichment of the society is highly valued by Toyota when they are engaging in business with suppliers and customers. This will strengthen the community of the country which is involved.

4)

a) Identify the types wastes in both primary and support processes

The processes

Waste associated

Primary Processes

Inbound logistics

Operations

Out bound logistics

Marketing and sales

Services

Support Activities

Procurement

Technology development

Human resource management

Motion

Processing

Transportation

Inventory

Waiting time

Motion

Defects

Waiting time

Transportation

Inventory

Transportation

Inventory

Defects

Inventory

Motion

Processing

Transportation

Inventory

Transportation

Defects

Inventory

Processing

Waiting time

Processing

Motion.

Over production

When demand reduces overproduction creates a huge problem with unsold stocks and wasted byproducts which includes material handling inventory space, interest charges, machinery and equipment, and overhead expenses and costs. Manufacturing should be limited to only the adequate quantity with a quality standard, low cost and correct time

Waiting time

This is created due to worker idleness or due to employees who spend time not knowing the way to avoid the malfunctioning of the machines. When the work is specified for an assembly line the speed and volume of the work can be monitored. To reduce the waiting time only the machines and people that are needed to do the work itself can be hired.

Transportation

This occurs due to poor layout of the factory, basically within the assembly floor or storage facilities, which lead to over handling of goods. Long supplier lines will increase the transportation costs, while making higher fuel prices.

Processing

Using best practices to ensure the machinery and fixtures are undergoing regular maintenance.

Inventory

Inventory can be an excess cost to the company unless it is maintained well. It should be minimized to achieve higher standards in production.

Unavoidable and unreliable supply, forecasting errors, poor accuracy is the things that should be avoided to eliminate unintentional inventory.

Motion

This is the time spent without adding value to the product or the process. Even though there is a movement it does not indicate that the work is accomplished through it. The carefully planned layout and fixture selection can be used to eliminate this.

Defects

When there is product defects it causes the company with increased wait time, costs, labor, materials, and in the long run the company would lose customer satisfaction and demand for products. The loss of future business can sometimes happen.

b) The danger signals of each waste

Waste type

The danger signals

Defects

Overproduction

Inventories

Over- Processing

Human motion

Transportation and Handling

Waiting

Confusion

Unsafe or un-ergonomic

Underutilized human potential

Data entry errors in the office wise activities in the Toyota company

Order entry or invoice errors

Any error that goes down stream to the assembly line which comes only to be clarified or correction

Change orders of engineering

Employee turnover

Absenteeism

Design flows

Processing an order for an example an order for 100000 cars before it is needed.

Any processing done on a routine basis without a persisting demand.

Accepting or creating products beforehand they are needed.

Any form of batch processing

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Depending on inspection rather than creating processes for eliminating errors

Sometimes employees will enter data into multiple systems several times by mistake.

Making extra copies of unwanted folders and creating un useful reports.

Walking between the assembly lines

Walking between offices

Movement of inventories

Excessive attachments to the bulk to be transported

Distributing unnecessary stocks to the people that are not needing them

Slow machinery so the work speed reduces.

Waiting time for approvals

Waiting for information from customer and supplier

Waiting for the clarifications or confirmations for the work received by higher positions.

Missed information, any goals, theories that may cause the employees uncertainty as to what should be done.

The factors that cause the employees with health conditions such as back pain eye fatigue etc. This may cause because of the monotonous work they are involved in.

Avoiding the employees in taking regular decisions. Their authority and responsibility is restricted.

Some staff members are highly paid to do routine tasks where their expertise is hidden in some other area.

Not given the proper business tools and the employee's assigned work are not measured.

Not trusting the employees to perform jidoka which is to stop work to fix a problem.

Not trusting the employees to be clean and maintain their work area.

Not trusting that employees will work for the continuous improvement.

c) How Toyota Company respond to the ‘ danger signals’

To Respond/avoid the danger signals in over production,

The company can change their routine stock order replacement using a sell one buy one method. Order cutoff times were scheduled by Toyota to for delivery routes. At once after this the order was processed then picked packed and shipped. Leveling demand considerably improved supplier demand and efficiency while increasing delivery performance. Eliminating or removing the created demand enabled Toyota to cut its inventory and

increase productivity. The excess production must be stored managed and protected as inventory. As the main respond the worker should think next stage of the process as his/her customer and cater to the required amount by this customer with perfection of quality lowest cost and correct time.

To respond/avoid the danger signals in waiting

Toyota coordinated the production and shipping operations with the cutoff times so the shippers can remove having their shipments of products or raw materials delayed and waiting for the next shipment by their logistics associate. Completing only the amount of work required the capacity- both speed and volume of each task can be examined. This will help to use the machinery and people wanted for the in a minimum way to meet manufacturing demands.

To respond/avoid the danger signals in Transportation and handling.

Toyota's system thinking approach and JIT logistics considerably minimized demand fluctuation. In order to minimize the waste improvements should be done in the areas of layout, coordination of processes and other general operations.

To respond/avoid the danger signals in motion

This type of waste can be eliminated by carefully planned layout and fixture selection.

To respond/avoid the danger signals in inventory

By introducing regular small lot ordering throughout the supply chain and maintaining inventory at separate order levels, inventories can be reduced to under one months' supply.

According to Leimbach (2010) the responds to the wastes of inventory are as follows,

Disposal of obsolete materials

Production only of the number of items required by the subsequent process

Purchase of required amounts of materials — savings achieved through volume discounts must be carefully weighed against inventory and storage costs

Manufacture of products in required size lots — measure set up and changeover costs against inventory carrying costs to achieve the most appropriate size

To respond/avoid the danger signals in Product defects

To eliminate Product defect waste, a comprehensive system should be implemented, so that the employees will be educated to identify the defects and they would take the preventive action immediately. Without these preventive actions the other time saving efforts are worthless.

To respond/avoid the danger signals in processing

The principles of design for manufacturing should be employed and taken in to consideration. The processing of waste should be reduced or removed even before the production even begins.

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Conclusion

As the end part the report suggests that the Toyota Company is achieving their fullest potential through lean manufacturing. This success does not happen by accident it has a gradual process which the lean production and waste management came in to play. The commitment, passion of employees where the Toyota thinks as the Human Capital, has contributed towards its success. Following the Toyota way is not impossible but understanding it and achieving the goals are hard to any company at the beginning the Toyota had a passion as the world's first organization to introduce the lean manufacturing the “ Muda” or seven deadly wastes are to be eliminated by the production process at any level according to Toyota which will enhance the productivity plus the long run sustainability of any given company. Now that many companies have followed the footsteps of Toyota and introduced the lean manufacturing in to their system the efficiency of the work processes have increased the understanding of the Toyota production system and the application of it to the necessary steps of value chain is important.