

Lean management principles

Abstract

This project deals with the principles and methods associated with lean management. Different aspects of lean management techniques used by the manufacturing firms have been discussed in the paper. Based on this discussion, it has been found that lean management practices adapted by the companies allows them to utilise their resources in the optimal manner.

Introduction

The current manufacturing and service industry has encountered many changes from that of the traditional manufacturing and service system which was prevalent in the past. Today the assembly work is regularly categorized by the constant decrease in batch sizes and short production cycles. However, the variety of products and the models are increasing and the production capacity has also increased with the change in the manufacturing system. There has been a constant urge for reducing the lead times which add demand for more production and thus creates a challenging mix for the innovative and large manufacturers. In order to react quickly to the ever growing and changing customer demands, there is a need for efficient manufacturing system that are capable of expanding and re-configuring during their course of operation. It should also have the ability to accommodate new procedures in the assembly techniques in such a way that it does not make any investments for manufacturing obsolete products (Fliedner, 2011).

The lean manufacturing concept is also applicable to the service operation. There have been huge changes in the service operation too from that of the past. The lean principle for the continuous improvement and respect for the employees are applied to every service. It includes the healthcare services, call centre services, higher education, public and professional services and also in the software development services.

The Lean manufacturing approach in both the manufacturing and services operation highly depends on the workplace organization and the flexibility of the production system. Lean manufacturing can be defined as an outstanding initial point for the companies those who want to create a fresh and new look for their existing manufacturing system by introducing innovative methods of production. The lean techniques are worth for investigation since they have the power of eliminating the large capital investment which is needed for efficient and dedicated machineries till the mechanization is fully necessary. The lean manufacturing concept thus signifies an important decline of the automated factory which was popular during the past years. The “less is better” method in manufacturing guides to a remarkably simplified and uncluttered

environment. The environment is cautiously tuned in accordance with the demands of the manufacturers (McGiven, 2013). The manufacturing of the products are carried out once at a time, after getting confirmation from the customers and are not done in batches, which adds up to the stock of the companies if not sold. The main goal of the lean manufacturing is to produce what is needed and not more than that. As there is production of limited number of products, it is important to change the processes during the day. It is required so as to accommodate various parts of the products and employ maximum effort from the workers, proper utilisation of the equipments and the floor space so as to save the scarce resources (Wincel, 2004). The flexibility that is inbuilt in the manual assembly cells is preferable for the automated assemblies. Thus, there is a prerequisite for the utmost flexibility so as to create unique demands on lean work cells and also, for the mechanism that are used for making the lean work cells. However, it can be observed that the lean approach is not always a resolution for the manufacturing problems. It is realised that it offers unique flexibility to the solutions for the assembling of the complex products. The essay thus elaborates the principle and the techniques of the lean management along with examples (Toyota Production System). It also highlights the lean just-in-time practice that is exercised by the companies. The essay also highlights the assumption whether lean principles can be applied in the low volume high variety manufacturing.

Lean Management Principles and Techniques (including Just-in-time)

The lean concept originated from the Japanese manufacturing areas. Lean can be described as the group of tools which enables identification and elimination of the wastes. The elimination of the wastes improves the quality of the products and also, reduces the time and cost of the production. The examples of such lean practices are Kanban, Value Stream Mapping, Six S and Poka-Yoke. The car manufacturing giant, Toyota, has supported the approach and added new methods to the manufacturing concepts. The focus of the same is on recuperating flow of the work by incessantly eliminating unevenness in the process of production. Wastes are also reduced in this

process of production (Kilpatrick, 2003). The techniques supporting the flow of the work consider the production levelling, Heijunka Box and pull production. The lean management terminology thus puts forward the concept that anything which is not successful in creating any value must be eliminated from the production system. It thus describes more value for the purpose of less work. The lean principles started in the manufacturing environment and are known under different names such as, the Lean Production, Lean Manufacturing and Toyota Production System (Virender, 2010).

It is the process which is basically based on the performance. It is used by the manufacturing organisations for increasing their competitive advantage and differentiating their production system from their competitors. The essentials of lean manufacturing system takes into consideration the continuous development in the processes which focuses on the elimination of the wastes or the non-value added methods that are employed by the organisation. The difficulties that are encountered by the organisation in employing lean manufacturing is that they have to make a lean culture which will sustain and enhance the long term goals of the top management and also, of the organisation through the well-utilisation of workforces (The Folk Group, 2009). The lean manufacturing techniques have their foundation on the following principles which directs the management of any organisation towards the attainment of its goal and success:

1. Flow: The interruptions are eliminated from the process so as to ensure that there is no stoppage in the value stream flow.
2. Value: There is need for establishment of value stream that identifies the price which the customers are willing to pay for the products (Taylor and Brunt, 2001).
3. The Value Stream: There is a need for identifying and mapping the precise actions that are required for eliminating the non-value activities from the design stage to the customer usage stage.
4. Pull: There is a need for streamlining the processes and products during the production till the customer usage.

5. Perfection: There should be an ability to promote the right things through the application of efforts that will improve the process.

For manufacturing high volume and low variety products four thrusts are required which the organisation should give emphasis on. They are solid leadership, team-based culture, continuous improvement process and simultaneous development and lastly, the communication system. The solid leadership is based on communicating the vision of the manufacturing design. It also facilitates the behaviours and the models of the lean manufacturing systems. It concentrates on setting a standard for the organisation and also, helps the workforce in adapting to the changes taking place in the production system. It also creates a gateway of trust for the workforce on the organisation and inspires them to fulfil their commitment efficiently (Plenert, 2012). The process also develops the skills of the workforce by providing them proper coaching or training. The process continuously challenges the system. The team-based culture makes use of the team-based and project-oriented structures that mainly focus on the empowerment of the system. The knowledge of the workers are enhanced by providing them with leveraged knowledge and making them highly skilful for any job. It also promotes the employee responsibility and accountability for the work that are assigned to them. It also focuses on advocating the continuous improvement of the labour force. Value is added to the diversity that is encountered by the system. There is a belief that the ownership of the employees for the final products is shared throughout the process of production. The communication system advocates and develops the flow of the process for identifying the critical issues for the designs so that the production is not hampered. It concentrates on encouraging the abrupt decision making process which takes into consideration fewer resources for resolving the critical issues that arise in the production design. It also helps in promoting the sharing of the knowledge between the workers, design personnel and the management hourly. It also helps in driving the behaviours of the internal operations as well as the behaviours of the customers and the suppliers. It accepts the informal and formal communication behaviours that are needed for the process. The continuous development of the process includes designing of the product for the first time. Continuous improvement process is implemented in order to recognise the problems that are arising from the non-value-added products and methods (Pearson Education, 2010). Thus, the drive for commitment is needed for the elimination of the problems. It also includes the management of the just-in-time control systems for the materials. Continuous development in the supply chain

process is promoted by the system. The knowledge base of the organisation is enhanced by providing them knowledge regarding the customers and the suppliers. The workforce is continuously trained for developing their skills and there is a need for the use of measurement system or scoreboard for monitoring their progress (Serum, n.d.).

The example of lean manufacturing can be put forward through a well-known example of Toyota Production system. The paragraph elaborates the wastes that are produced by the company during their production and operation. The wastes that are described above include the non-value-added activities which are the eight wastes for the lean practitioners. Taiichi Ohno, the co-developer of Toyota Production System, has suggested that wastes accounts up to 95% of the costs in the environment of the non-lean manufacturing system. The wastes originate from the overproduction. These occur when there is an extra production with respect to the customer demand (Panneerselvam, 2005). Thus, it can be rectified if the production is in accordance with the demand of the customers, which has its foundation from the pull system. The products which are produced in excess to the required demand employ the valuable time and the hard work of the labour and also, the materials which are needed for the production. These time and resources can be used for responding to the customer demand. It has also been observed that the waiting time for the information, materials, equipments and the tools are also reasons which add up to the waste. The transportation of materials should be in time so that it does not occupy the inventory. The lean manufacturing advocate that the raw materials should be directly delivered to the point of use, instead of shipment of the materials to the receiving point from the vendor which is in fact processed through the warehouses and then carried to the assembly line. Thus, the lean management demands that the materials are to be carried directly to the assembly line from the vendors where the materials are used. The technique is known to be the point-of-use storage (POUS). A method known as the Value Stream Mapping is used for identifying non-valued-added steps in manufacturing and service industry. When there is excess inventory related to the overproduction, the customer is negatively impacted and the cash flow of the organisation is hugely affected. There is also wrong utilisation of the floor space in the workplace.

To eliminate the wastes that are described above, the company have taken various models or the lean building blocks. These building blocks are applied to the manufacturing as well to the service industries. The pull system is described as the technique which is employed for

producing goods or products after getting order from the customers. Kanban is defined as the method for the maintenance of a methodical flow of material. Kanban cards are utilised for indicating the order points for the materials, the quantity of material needed for the production of the products, from the place where the material are ordered from and the place where it will be delivered. The work cells are identified as the technique for arranging the operations or the people in the cell (like, U-shaped) and not in a traditional assembly line. The Total Productive Maintenance (TPM) works on the progressive and proactive maintenance of the procedures and thus, calls for the co-operation of the equipment vendors, operators, engineers and supports the personnel for optimizing the performance of the machine. Thus, the results of the optimized performance comprise of the decline in scheduled and unscheduled downtime, eradication of the breakdowns, improve the utilisation of the resources and build higher throughput along with production of better quality products. The bottom line products thus include the decrease in operating costs, increase in the life of the equipment and the decrease in overall cost for maintenance. The Total Quality Management can be defined as the system of management that is utilised continuously for improving various areas of the operation of the company. TQM can be employed for many operations in the organisation and it also helps in recognising the strength and weakness of the employees who are involved in the operation. The application of batch size reduction is seen in the manufacturing companies which operate in large batch sizes for maximizing the machine capacity and assume that the changeover times are fixed which can also be reduced.

The wastes that can be identified in the lean service are elaborated further. Delay experienced by the customers who are waiting for any kind of service or delivery of any good. If there is a requirement for re-entering data in form or copy some information or answer certain question for several times, these are treated as the wastes for the service operation. If any confusion is created due to unclear communication then it leads to waste of time. Out of stock is a big problem for the companies when they are getting orders from the customers but are not able to deliver them their required goods.

The example of lean manufacturing in the service operation is elaborated further. The Life Insurance provider Jefferson Pilot Financial (JPF) have applied lean model for their success in 2000 and it was successful. The concept that was applied by them was to treat the processing of

insurance policies as the process of manufacturing. The development in any insurance policy is broken into several steps such as the underwriting, application, issuance and risk assessment. The focus is given on these main items and the wastes are simultaneously reduced. This process can save huge amount of time and money for the company. It was identified that the company has reduced 50% time from the application to policy issuance, 26% of the labour costs has fallen and the reissues have dropped by 40%.

An assumption is made that lean principles can be used in the low volume and high variety manufacturing. These can be managed by mapping the production system. The mapping will identify the choke points that are not adding any value to the process and are slowing down the process. By modifying the whole system the process can be managed and both can be increased in order to the desired outcome. The amount of time is also reduced. An example which proves the above is the service that is provided by Wisconsin Manufacturing Extension Partnership. The company by employing low volume and high variety manufacturing reduces 50% of the lead times, 75% of the reduced setup times, increase capacity by 20% and increase the WIP inventory turns by 50% (Wisconsin Manufacturing Extension Partnership, 2012). Another example for high variety low volume is Technical Change Associates Inc. It applies lean process for production of low volume and high variety manufacturing. The process helps them to reduce the setup cost, setup time and also to make the best quality products that are required by the company. It reduces the lead time and also accelerates the productivity of the employees (Dixon, 2012).

Comparing high volume, low variety and low volume, high variety it is observed that the later reduces the lead time and whereas the former increases the efficiency of the production system by limiting the production quality. The former increase the production capacity of the system whereas the later increases the quality of the products that are produced through the production system. In both the cases the wastes are reduced by upgrading the production capacity or the product quality.

In the manufacturing and the service operation sector, the lean management works and takes in to account the broad approach of just-in-time. Just-in-time (JIT) is defined as the production

strategy that attempts to improve the return on investment of an organisation through the reduction of the process inventory and the carrying cost associated with the process. The process relies on the signals from the Kanban for meeting the objectives that are set for the system. It helps the system to identify when the process should implement its next step. The JIT concentrates on the continuous improvement of the organisation and also, on increasing its return on investment, efficiency and quality. For achieving the continuous improvement, the main areas which are focused by the organisation are the quality and employee involvement (Feld, 2001).

The main components of lean just-in-time with broader application in manufacturing and service industry are the following:

Kanban is defined as the technique that is used for release of inventory and work. It is a major component of both lean management and Just-in-Time. It was invented at Toyota in 1950s for the management of material flow in the assembly line. From the past few decades, Kanban process, which is an efficient factory production system, had been developed for the optimal manufacturing environment that will lead to the development of the competitive advantage of the companies. The core of Kanban concept lies in the fact that the warehouse, supplier or the manufacturer should deliver the components when it is needed, so that there is no accumulation of inventory. The workstations that are located within the system and along the line of production can deliver only desired components only after receiving the card and empty container. It indicates that there is requirement for more parts in the production process. In case there is interruption in the production line, the workshops produce components which are sufficient enough to fill the containers and then, stop the production.

Kaizen is defined as the practice in just-in-time which calls for change for best. It focuses on the continuous development of the processes in engineering, manufacturing and business management. The practice when applied in the business refers to the activities that continuously improve all the functions and also, involves the employees. It is also applied to the processes like, the logistics and purchasing the products in the supply chain. The Kaizen aims at eliminating the waste from a process by developing standardized processes and the activities.

Conclusion

Thus, it can be concluded that there is huge application of the lean just-in-time management in the manufacturing and service industry. It not only saves the resources of the organisation, but also utilises the floor space and the workforce of the organisation in an efficient manner. It helps in reducing or eliminating inventory so as to make efficient use of the products and fulfil the demand of the customers. Lean management is a process which is basically based on the production performance. It is used by the manufacturing organisations for increasing their competitive advantage and makes a difference in their production system from their competitors. The example of Toyota Production System has highlighted the fact that the wastes can be managed by the organisation in an efficient way by undertaking different lean management techniques. The principles of lean management however enlighten the foundations of the concept and explain the ways in which the organisations are implementing the processes, thereby moving towards the point of success. Kaizen and Kanban are the components of the lean just-in-time which is applied by the organisation for accomplishing their goal of reducing wastes. If the processes are implemented successfully, it can increase the production rates and the capacity of the organisation to produce products.

The lean concept in the service operation has been success for the companies who have applied it. The practice helped in reducing complexity in the workplace and increases the productivity of the employees by eliminating the waste of time and money. It also assisted the organisation to create a lean culture among the employees and the workforce so as to run an uninterrupted business. The performance of the employees is tracked. The managers evaluated their performance by recording the actual time taken by the employee to complete the work. Thus the service operation is also benefitted from the lean practices.

Reference List

Dixon, K., 2012. *Low Volume, High Variety Production, No Problem for Lean*. [pdf] Technical Change Associates Inc. Available at: <<http://www.technicalchange.com/Low%20Volume%20High%20Variety%20Edited%20Fabtech%202012.pdf>> [Accessed 17 December 2013].

Feld, W., 2001. *Lean manufacturing: Tools, techniques and how to use them*. New York: St. Lucie Press.

Fliedner, G., 2011. *Leading and managing the lean management process*. New York: Business Expert Press.

Kilpatrick, J., 2003. *Lean Principles*. [pdf] Manufacturing Extension Partnership. Available at: <http://mhc-net.com/whitepapers_presentations/LeanPrinciples.pdf> [Accessed 17 December 2013].

McGiven, M., 2013. *Lean Manufacturing Techniques*. [pdf] Development Dimension International. Available at: <http://www.wip.ddiworld.com/pdf/ddi_leanmanufacturingtechniques_wp.pdf> [Accessed 17 December 2013].

Panneerselvam, R., 2005. *Production and operations management*. New Delhi: Prentice Hall India Private Limited.

Pearson Education, 2010. *Lean Operations and Just-in-Time*. [online] Available at: <http://wps.pearsoned.co.uk/ema_uk_he_slack_opsman_4/17/4472/1145076.cw/index.html> [Accessed 17 December 2013].

Plenert, G., 2012. *Lean management principles for information technology*. New York: Taylor & Francis Group.

Serum, S., n.d. *Just-In-Time Manufacturing System*. [pdf] n.p. Available at: <<http://smartenterpriseexchange.com/servlet/JiveServlet/previewBody/2022-102-1-5376/Just%20in%20Time%20by%20Sandeep%20Kumar%20Seeram.pdf>> [Accessed 17 December 2013].

Taylor, D. and Brunt, D., 2001. *Manufacturing operations and supply chain management: The lean approach*. London: Thomson Learning.

The Folk Group, 2009. *Lean Manufacturing, 5S and Six Sigma*. [pdf] The Folk Group. Available at: <<http://www.folkgroup.com/leanmanufacturing.pdf>> [Accessed 17 December 2013].

Virender, S., 2010. *Production and operations management*. New Delhi: Gennext Publication.

Wincel, J., 2004. *Lean supply chain management: A handbook for strategic procurement*. New York: Productivity Press.

Wisconsin Manufacturing Extension Partnership, 2012. *HVLV Manufacturing Assistance*. [pdf] Wisconsin Manufacturing Extension Partnership. Available at: <

<http://www.wmep.org/sites/default/files/HVLVInfoSheetND.pdf> > [Accessed 17 December 2013].