

APPLYING LEAN MANUFACTURING TO RETAIL BUSINESS TO PREVENT THE SPREAD OF COVID 19

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ABSTRACT

Lean is a continuous improvement approach, with the aim of eliminating waste and any non-value-added activities by targeting the steps that do not add value to the customer such as avoidable interruptions, delays and mistakes to improve the process flow. In this research, the concept of lean manufacturing is used to improve the service provided by retailing stores with the possibility of using this concept to minimize the spread of COVID 19 virus. Results indicates that the adaption of lean manufacturing philosophy in retail business will have a huge positive impact on customers' satisfaction may lead to minimize the spread of COVID 19 virus.

INTRODUCTION

Lean manufacturing is; therefore, a quality improvement tool which can significantly enhance service quality and efficiency. While lean was issued in a large volume, the repetitive manufacturing setting within the automotive industry sector, its principles, can almost be applied to all processes (e.g., health care, service industries, high technology enterprises, sales and marketing and fast-food providers) (Niall & Rich, 2009). Lean thinking is a term coined by Womack (Womack & Jones, 1996) to describe a process management philosophy approach for improvement originated in manufacturing sector by Taiichi Ohno at Toyota Motor Corporation. Lean is a continuous improvement methodology focusing on eliminating the non value added activities (waste) in order to reduce the cycle time, improve quality, improve the flow of customers, products or information and to increase labor productivity (Krajewski & Ritzman, 2002). Lean has drawn a widespread attention due to the extensive effort of Womack (1990); Womack & Jones (1996). Lean is focusing on waste elimination, problem solving, partnership, process improvement and increasing value to customers (Liker, 2004) through the application of the five lean principles. The five main principles of lean are value identification from the perspective of end customers, value stream mapping and identification for each product or service and waste elimination, creation of product continuous flow, the use of pull mechanism, and pursue perfection (Womack et al., 1990; Womack & Jones, 2003). An organization looking to be successful in lean implementation necessitates changes in behaviour, mind-sets and culture that can be considered as the core step in the lean implementation process (Liker, 2004; Shah & Ward, 2003; Spear & Bowen, 1999; Hines et al., 2008). How Toyota and their suppliers applied the lean manufacturing concept was studied and popularized within the book. The Machine that Changed the World (Womack et al., 1990). The authors concluded that the basic idea of lean is attractively simple in that the organization should be obsessively focused on the most effective means of producing value for their customers. An organization which has lean approaches this challenge by applying five basic lean principles, with a focus on understanding waste within its systems. It recognizes the value of its work, the importance of staff training and their role within improvement teams to bring about change (AlRifai, 2008; Abdelhadi, 2016). The five lean principles to be applied are as follows (Abdelhadi, 2015) :

- (1) Specify what customers value most – Value is what the customer wants and expects. This requires a precise understanding of the specific needs of the customer;

- (2) Understand the value stream – The value stream is the activity that when done correctly and in the right order, produces the results (a product or level of service) that the customer values;
- (3) Improve the flow – A lean organization work should flow steadily and without interruption from one value-adding activity or its supporting activity to the next activity;
- (4) Pull – The system should be able to readily respond to customer demand, in other words, the customers pull the work through the system;
- (5) Perfection – Having implemented the first four principles, the organization will understand the system ever better and from this be able to generate ideas for further improvement.

A lean system becomes leaner and faster and its waste becomes easier to identify and eliminate. A perfect process delivers the exact amount of value to the customer. Each step within the process is value adding, capable (producing a good result every time), available (producing the desired output and the desired quality every time), adequate (free of delays), highly flexible and is continuous in its operation. If one of these factors fails, some waste is produced. This research attempt to use lean manufacturing to minimize the waste in a grocery store setting by using some of lean manufacturing concepts.

To prove that lean manufacturing is a way of life not only for industries, as well it could be applied in our daily life tasks. We found out that in the supermarkets, there is a major problem which is that a lot of time get wasted waiting in lines to checkout. Which causes crowding. This problem could lead to losing the customers and may help spreading the respiratory viruses such as Covid19.

In order to solve this problem, we applied several leans concepts in grocery stores settings such as 5S, Kanban, labelling, Andon, maintenance and some other ways to make the process more efficient.

Applying Kanban Concept

One of the common problems that is faced while you are getting served through the cashier is that the bill machine and the ATM card machines paper's finish. So, the customer is forced to stay and loose time in order to insert papers and then re-served again. Of course if you look at it from out of the box we will find that all the customers after the one that had the problem will lose time, so for example, if there were 10 customers and each one lost 10 min, we lost 100 min that people could have done something beneficial in them.

Two Proposed solution could be taken into consideration:

- We can add a technical feature to the machine itself that when it is near to finish it will give a light or an alarm to let the cashier know that he should call someone to quickly change it.
- We can make the last three print with a different color than the used color which will indicate it si time to change the roll.

Applying Sorting From 5S Concept

To wait in line for the customer that have more than 30 items (drinks, food, etc.) is an unfair time waste for the person especially if he doesn't have much items, but he is forced to wait.

The solution for this issue is simple and costless, it is making two custom lines for people that have 10 parts or less they go through these two lines and that have more than that they go to the other line. Of course, there are to major things that should be taken into consideration while applying this concept:

- If it is a season, like in Ramadan people mostly buy a lot.
- It also depends on how many lines you have in total in the shift.

Applying Labelin Concept

Labeling the floors or places of things is an important principle for arranging and organizing the place, as these signs help reduce wasted time and not to interfere with each other. In addition, you can use it in any place like factories, supermarkets and inventories.

In this case study, marking the lines in the supermarkets would help to reduce the waiting time for customers. Because many customers do not respect the order of the queue. The absence of queue marks that save the right of the buyer who is present in the queue, will contribute to the occurrence of overlapping in the queue sometimes, which may cause crowding and lack of commitment to the regulations. The application of the concept of labelling will be by clearly specifying for each cashier a specific number of buyers and clearly identifying where they line up in the queue.

This will help to organize queues in the supermarket and reduce the time consumed in the purchase process, which makes the phenomenon of overcrowding in the cashier disappear. In addition, in our time, it helps us prevent viruses, such as corona virus.

Applying Andon Concept

Andon is a “visual and/ or audible notification control” device that shows machine, line or process status. It is a very useful tool in lean manufacturing systems where the main goal is to reduce production waste in all levels.

One of the common issue that face the customer while they shopping in supermarkets is to know if the cashier is crowded or no, so we will apply Andon light to all cashiers. Also if the cashier have any problem and he want a quick help, it is very useful to help all cashier as fast as possible to avoid any latency. So customers can have a smooth experience when checking out.

For applying Andon concept we will choose four colors to solve the issues. First color is “Red” to tell the customer that this line is very busy to let the customer go to another line. Second color is “Yellow” to tell the customer that this line is somehow busy so the customer will decide if the customer will go with this line or look for another one. Third color is “Green” to tell the customer that the line is going smoothly. Fourth line goes to the company itself we will use the “white” light to tell the service team that the cashier have an issue so the team will see the light and go directly to solve the issue as fast as possible.

Applying Self-Checkout

Self-checkout is a major key factor in a successful supermarket, but it all depends on the execution of the process itself. if it’s complicated it could cause confusion among the customers. What should be considered in the self-checkout is who are the costumers eligible for it, the quality and ease of use of the machinery and the labeling/coding of the layout.

Therefore, what best to be used is the 3S technique: Sort, Sweep and Standardize. Sort: sorting the costumers based on the number of items *i.e.*: between 1 and 15 items those are eligible for the self-checkout based on that the regular cashiers will only be for costumers with >15 items and that will make them less crowded hence less queue time for both. Sweep: cleaning the machinery is literally eliminating waste to make it more appealing to costumers it also gives an opportunity to find defected machines which helps in the inspection and the over-all flow of the process. Standardize: standardizing the sort process with visual aids to inform the costumers with less than 15 items so they know they have a place to checkout and voice announcement as well, clear routes of the station. Cleaning the machines twice a day and putting items that were returned back to the shelves and also to make sure that the machines all work perfectly so the self-checkout station won’t get crowded

Applying Maintenance Concepts

While shopping customers always notice, that some problems which some of them might be considered as minor problems, have a big effect on the efficiency of the process. Problems like:

- Cash registers getting stuck and have to be opened manually, which lead the cashier to call for help, which waste more time, than if handled the situation by himself.
- And, in the worst case, the system gets shut down in some of the registers which cause crowding on other cashiers lines.

Almost, in every visit you can see these problems occurring. To solve these problems Panda have to apply two types of maintenance, which are:

- Preventive maintenance.
- Corrective maintenance.

Preventive Maintenance

Retail stores should install a periodic maintenance system that will fix these problems. Examples:

For the system and cash registers, they should assign a team to do a periodic maintenance on these machines, and specify the periods to perform the maintenance based on time intervals or the number of transactions, and document their procedures on each machine, this will reduce the possibility of the failure of these machines, and the time of waiting for backup to arrive to work on the problems.

Corrective Maintenance

For the cash registers, supermarkets should set a procedure, train each cashier, and give him the authority to handle this problem. So, they can save the time of waiting for backup, because usually the waiting time for backup is much longer than fixing the problem.

For the system, they should also set a procedure to be followed by the cashier, if the problem is beyond his capabilities, then we will need other methods to speed the process which we will cover later in the report.

Note: maintenance is applicable in every other method that we are using to speed up the process of checking out, like: maintenance of Andons, etc.

After shopping the items that the customer buy, it will be in a bag that made of plastic bag which will affect our environment, Reasons Why Plastic Bags Should Be Banned:

- The plastic bags are made from non-renewable sources and on this account, highly contribute to climate change
- A lot of energy is used in producing these bags
- Plastic bags do not degrade
- Plastic bags are harmful to human health
- Plastic bags are not easy to recycle

We can replace it by other material or methods that will lead to Applying lean to eliminate waste, protect our environment and our customer:

- Paper Grocery Bags
- Reusable Cloth Shopping Bag
- Canvas Shopping Bags

If the buyer wants still be using the plastic bags we can add cost for each bag, by this situation; customer will move to buy the other methods that will be less cost and useable anywhere.

CONCLUSION

Some important implications from the present study indicates that managers at retailers should know some concepts and principals of lean manufacturing in order to improve customers' services. This research illustrates the need to use lean manufacturing principals in retail stores and this will lead to increasing the efficiency of the process. Managers will be able practice lean manufacturing in their day to day operations and become well informed about their operating efficiency. Practicing manager will be in a position to understand the pace at which his staff must perform in order to keep the pace with customers. Practicing manager may also be in a position to deploy requisite staff in accordance with the changing demand. This study also motivates practicing managers to target those processes which need improvement to reduce process time. This study illustrates the importance of using lean manufacturing in retailing business which will lead to quality improvement.

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REFERENCES

- Abdelhadi, A. (2015). Investigating emergency room service quality using lean manufacturing. *International Journal of Health Care Quality Assurance*, 28(5), 510-519.
- Abdelhadi, A. (2016). Using lean manufacturing as service quality benchmark evaluation measure. *International Journal of Lean Six Sigma*, 7 (1), 25-34.
- AlRifai, N.B. (2008). *Optimizing a lean logistics system and the identification of its breakdown points*. Faculty of the graduate school, University of Southern California, Los Angeles, CA, PhD thesis.
- Hines, P., Found, P., & Harrison, R. (2008). *Staying lean: Thriving, not just surviving*. working paper, Lean Enterprise Research Centre, Cardiff University, Cardiff.
- Krajewski, L.J., & Ritzman, L.P. (2002). *Operations management: Strategy and analysis*. 6th international Ed. Prentice-Hall.
- Liker, J. (2004). *The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer*. CWL Publishing Enterprises, New York, NY.
- Niall, N., & Rich, N. (2009). Lean transformation in the pure service environment: The case of the call service centre. *International Journal of Operations & Production Management*, 29(1), 54-76.
- Shah, R., & Ward, P.T. (2003). Lean manufacturing: Context, practice bundles, and performance. *Journal of Operations Management*, 21(2), 129-149.
- Spear, S., & Bowen, H.K. (1999). *Decoding the DNA of the Toyota Production System*. Harvard Business Review, September-October, 97-106.
- Womack, J.P., & Jones, D.T. (1996). *Lean Thinking*, Simon and Schuster, New York, NY.
- Womack, J.P., & Jones, D.T. (2003). *Lean Thinking: Banish Waste and Create Wealth in Your Corporation*, Simon & Schuster. New York, NY.
- Womack, J.P., Jones, D.T., & Roos, D. (1990). *The machine that changed the world*. Macmillan, New York, NY.