

# Applying Lean Manufacturing to Grocery Stores, Case Study

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## Abstract

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, especially in Panda 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.

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

## 1. Introduction

Companies are looking for ways to reduce cost without threatening quality. One way to reduce expenditures is to focus on waste, as there are ways of cutting wastes of some of them by lean habits. Lean Thinking is mainly inspired by the Toyota Production System (TPS), which has been focused on elimination of waste and improving customer satisfaction. Lean manufacturing was initially introduced as a management philosophy aiming to reduce waste within and between manufacturing processes and systems. It is a set of principles, philosophies and business processes to enable the elimination of waste that did not add value to customers. It was mainly derived from Toyota Motor Corporation's Production System, and the word "lean", in this context, was first mentioned in James Womack's book (Womack et.al. 1991), *The Machine That Changed the World*. Lean practices have become popular among large-size companies (Abdelhadi, 2016). However, small and medium companies can learn and benefit from the application of lean practices in order to detect and reduce waste. Lean production systems focus on continuous improvement of processes, and respect for workers, customers and other contributors in the production process. This continuous improvement quest consists of identifying all possible types of waste and working on eliminating them or at least minimizing their impacts on the values provided. At first, lean principles were perceived to be exclusive for manufacturing firms. Meanwhile, lean thinking principles are extended and applied in the service industry although some firms are not aware that they are practicing core production concepts. In the context of Lean Management, "Lean" essentially means flexible, agile or light. Lean is a collection of principles, strategies and habits for the active and adequate composition and testing of the whole pipeline in the organization. Main purpose of Lean Manufacturing is making value without leaving waste ("Muda" in Japanese). The added value is defined as any action or process that the consumer would be willing to pay for.

Lean tools therefore help to identify and to eliminate waste. When the waste has been reduced, quality levels and standards rise up while costs and service time are reduced. Lean manufacturing techniques have successfully reduced waiting times for patients and service users within the delivery process of inpatient pharmacies by improvement to workflows within the pathway. Additionally, operating costs can be significantly reduced mainly through improving service efficiency and reducing waste within the process (Hintzen et al., 2009). Therefore, the application of lean manufacturing within inpatient and outpatient pharmacies forms the main purpose of this study, by serving as an internal benchmarking comparison.

## **2. 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 yellow they will also give a caution to the cashier that he should change the papers.

## **3. Applying Sorting from 5S Concept**

To wait for the pervious 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.

## **4. Applying labelling concept**

Labelling 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 our project, we thought that 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 labeling 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.

There are many types of labeling, could be by label shape, label color and label text or images.

## **5. 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 Panda 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 colours to solve the issues.

First colour is “Red” to tell the customer that this line is very busy to let the customer go to another line.

Second colour 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 colour 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 has an issue so the team will see the light and go directly to solve the issue as fast as possible

## **6. 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

## 7. Applying Maintenance Concepts

While shopping from panda we 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.

Panda 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.

Panda should avoid reaching to this stage, but if they did, they need to prepare the fastest procedures to handle the situations.

Examples:

For the cash registers, Panda 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.

## **8. Lean and Green (side notice)**

Green engineering is the systems-level approach to product and process design where environmental attributes are treated as primary objectives or opportunities rather than simple constraints. Which aims to Sustainability.

Lean manufacturing is the business model and collection of tactical methods that emphasize eliminating non-value- added activities (waste) while delivering quality products at lowest cost with greater efficiency.

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.

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