

# **Optimization of consumable consumption in hypermarkets during the Coronavirus pandemic period**

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## **Abstract**

Since the appearance of the coronavirus pandemic, the activity of several companies has experienced a remarkable decline. This decline is due especially to several reasons linked to several social, tourist, and preventive factors.

To do this, to find solutions to minimize losses and achieve the objectives, and above all to ensure the continuity of the desired results, we opted for several management methods such as six-Sigma and Kaizen. In this article we will study the case of the decline in activity in large-scale distribution, knowing that during periods of confinement, sales of hypermarkets recorded a strong regression in Morocco, Since the Ratio of all the indicators of management and all expenses of a hypermarket is always linked to sales excluding taxes, this is why they were led to optimize their expenses and review their management method to alleviate the loss.

In this article, we will see the reasons for the decline in activity and the action plans to be taken to optimize the expenses of hypermarkets using the LSS (lean six sigma) method.

## **Keywords**

Keywords— Six Sigma, lean, lean management, CORONA VIRUS,

- No more than five keywords (10 font)

## **1. Introduction**

Lean Management is a method of management and work organization that aims to improve the performance of a company especially during a period of crisis, and knowing that the corona virus epidemic is having a negative impact

on most companies while we do not yet know the end of this pandemic, Companies must then follow a process of permanent and collective quest for continuous improvement by making the best use of the tools available and always keeping common sense in mind common. This is the principle of the KAIZEN method. The first step using this methodology is to define the problem of loss of sales and the increase in shrinkage known following the pandemic, The second step is to measure the regression of the different indicators according to the KPIs The third step is to analyze the KPIs to determine the causes and the 20/80 of each indicator. The fourth step is to improve the process by finding solutions to eliminate the main root causes in order to resolve and minimize the loss. The last step is to monitor the results to ensure lasting and continuous improvement..

## 2. Literature Review

The lean management is a way to make the best work with less effort, to optimize resources. This management method is for continuous improvement, based on eliminating wastes, named in Japanese muda. (1)

The idea of Lean in substance is none other than to rely on the knowledge and inventiveness of the work teams, to focus action on the ground since this is where value is created and this is where improvements are possible (2). Also this methodology implement Just-in-Time to better streamline production according to customer expectations (3). To eliminate waste that costs unnecessarily and hinders processes, we have a range of instruments, methods and good practice such as Kaizen (4), Jidoka and 5s to name. The result we are aiming for is customer satisfaction and therefore a significant improvement in profitability (5). To make this definition concrete, we must first know the lean management equation: Who? The work team that will be involved in this project. Where? In the field. For: Getting it right on time. And? Reduce waste With? Kaizen and monitoring of performance indicators KPI. The seven types of waste are the over production, Inventory, waiting time, transport, process, motion, defectives. (6).

The concept of lean management was known through the book 'the machine that changed the world' in 1990, the lean was a tool for reducing wastes (7), . Much of kaizen thinking relates to quality, not only the quality of products but first and foremost the quality of people (8), Lean management is well recognized as a management philosophy rather than a generic tool set. In other word, its principles are generic but its solution methodology is often case specific (9), The term sigma is a measure indicating the deviation in the performance characteristic of a service from its mean performance (10)

## 3. Methods

A- Define: Map things as they really are

This is the classic framing phase of the project, with preparation and synthesis / understanding work. During this phase, we can formalize the problem addressed, identify the stakeholders, constitute the project team, plan the schedule, also in this phase, the objective is specified. We could seek cost reduction first, without taking into account customer demand, which is why the objective is obtained from customer expectations especially in this period of pandemic where hygiene requirements are mandatory

B- Measure: Baseline measure the value stream

In this step, the data is collected to fully understand the process in order to find the source of the problem and obtain the bases of the study to analyze it in the next step. After identifying the problems in the first step, it is now necessary to focus more on collecting the data and quantifying the loss value in terms of numbers, statistics and trends. It is therefore essential to collect information on the current process, in order to determine the deviation from the objectives, The six-sigma is based on the achievement of very specific objectives, so it is essential to be able to assess at what stage the company is located,

It is important to understand the process to improve and which is at the heart of the KAIZEN approach, which is why it is useful at this stage to make simple diagrams which show the evolution of the data over time in particular by obtaining more information on the causes of delays in the various stages. Also, it must allow the members of the company to better understand the whole process, to identify the elements which contribute to its ineffectiveness and thus to have a detailed overview in order to put in place corrective actions.

C-Analyse : Eliminate what does not add value.

This third phase of DMAIC is fundamentally linked to the previous one as it consists of analyzing the data that was collected during the "measurement" step. Thanks to these data, it is easier to identify the source (s) of the problem and

to quantify the difference between the present situation and the desired situation, in particular thanks to graphical and analysis tools that make it possible to highlight the differences. . Indeed, the previous phase made it possible to collect information on the processes in order to better understand the origin of the problem and it is now necessary to analyze this data and transform them into statistics, trends and visual graphs in order to clarify the relationships between the different elements of the process.

Without this analysis phase, the process is incomplete. This is why it is crucial to exploit the data previously gathered in order to better understand how the incoming elements (inputs) are transformed into outgoing elements (outputs) and what level of the process prevents the company from achieving better results.

D-Improve: Stream value added activities and train

At this point, the source of the problem has normally been clearly identified by the Six Sigma project teams, and the passive analysis period is replaced by a more active period. Stage I "improve" consists in finding solutions able to solve the problems defined thanks to the first three stages of the DMAIC method. This step not only defines solutions but also tests them, in order to ensure their viability, and then to find the means to implement them in the most suitable way possible. We will start by explaining the process of finding the best solutions, then running various tests to determine which solutions are the most relevant, before we look at their implementation.

E-Control: Measure again and monitor

The fifth step is a control and monitoring phase. It comes just after the "improvement" phase which made it possible to implement the new solutions selected by the Six Sigma team following in-depth study of certain quality problems in the company. This step is complex insofar as it must allow the teams to compare a new desired situation with an initially unsatisfactory situation, and thus observe the current situation in order to confirm and then maintain the success of the DMAIC project. Here is some information that helps to ensure the proper implementation of this step.

## **5. Results and Discussion**

First of all, the study is carried out on a leader in large distribution in Morocco in a tourist town, in a hypermarket with an area of 6500 m<sup>2</sup> with an average of 4500 customers per day before the coronavirus,

### **5.1 Numerical Results**

- Define: Map things as they really are

After the outbreak of the corona virus, and the official declaration of containment, people bought large quantities of food items to meet their needs. Supermarkets saw increases in sales just before the start of containment. But after the confinement and the closing of the borders between cities and countries, several hotels have closed their doors, restaurants have experienced a decline in activity, they are potential customers of hypermarkets, the average share of sales of hotels in the 'hypermarket where the study was conducted is 6%,

All the more so, the number of customers who frequent hypermarkets for fear of contamination has decreased. this negatively impacted the activity. Despite these conditions, the hyper market is obliged to highlight these products to retain these customers and keep the minimum assortment

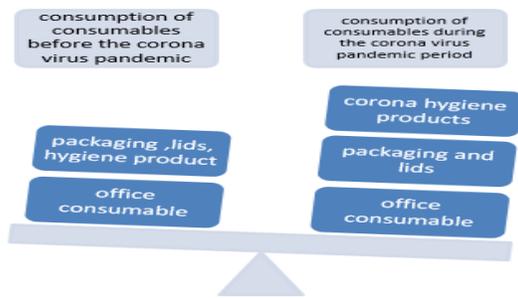


Figure-1-

## 5.2 Graphical Results

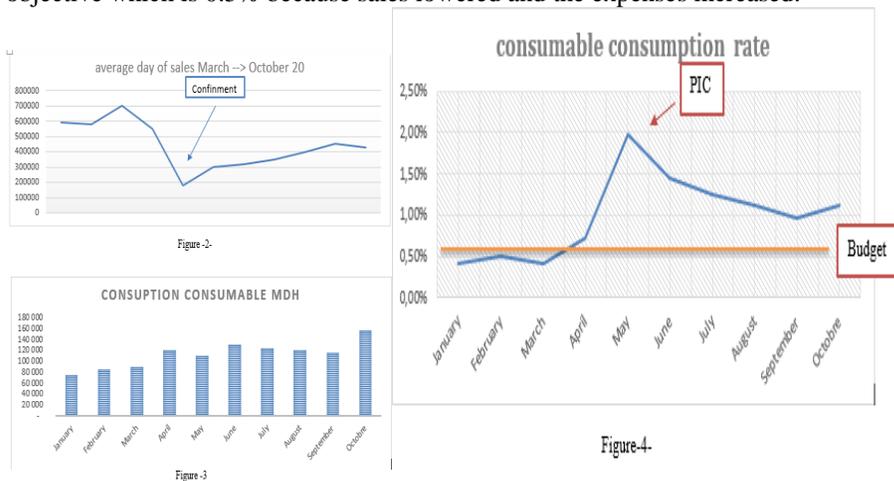
- Measure: Baseline measure the value stream.

This step involves determining the relevant metrics to collect to fully understand the baseline process and the extent of the problem to be resolved. This is the data collection step

In the hypermarket where the study was carried out, sales decreased just after confinement, and the charges relating to the covid-19 pandemic were added to the total charges, these charges contain the masks, the visors, disinfection products, hydro-alcoholic gels, hand towels, plus the work carried out and the equipment purchased to ensure barrier gestures for customers and employees

The consumable products of a hypermarket are unsaleable items that are used for the smooth running of the activity, citing for example the packaging of pastry and bakery items, trays, lids, bottles and plastic bowls from t product which is consumed in whole or in part by the manufacturing process or simply during the exercise of the activity of the company. He catering department that we give to customers, aluminum foil, gloves, hygiene products, office products, in order to be able to respect the barrier gestures and hygiene rules required to avoid the contamination of staff and customers, hypermarkets have introduced new habits, for this the consumption of several articles relating to the respect of these rules

To analyze the consumption of consumable products, we must always convert it into a rate compared to sales achieved, the monthly analysis has shown that the ratio becomes high until 2% and exceeds the history and the objective which is 0.5% because sales lowered and the expenses increased.



After comparison between the diagram of sales (figure2) and that of the consumable rate (figure 4), we see that even if the consumption is high, the ratio begins to decrease since sales has improved.

### 5.3 Proposed Improvements

- Analyse : Eliminate what does not add value.

The objective of this step is then to prioritize the points to be analyzed, by targeting the causes having a significant impact on the faults of the process

First, the products related to the pandemic of covid-19 cannot be reduced or eliminated because the company must ensure a healthy environment for these employees and its customers, this is why the action plan was carried out. On items that do not have a direct relation to hygiene.

Second, improving sales is an ongoing priority for the entire team despite the conditions of the pandemic. But the action focuses on the consumption of items that are not related to staff hygiene

The consumable products of the store were in a common room between all the departments ( figure-4-), there were even common items that several departments use, so we could not identify which department consumes more products

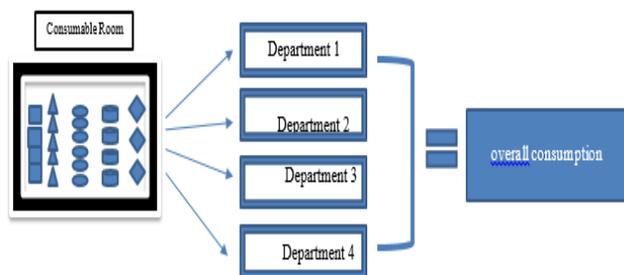


Figure-5-

This method of managing consumables does not make it possible to identify the department that consumes the most products, nor the products most consumed by the departments. This is why we have set up a new process to be able to calculate the consumption by department in order to identify the source of loss and minimize it.

### 5.4 Validation

- Improve: Stream value added activities and train

At this stage, several methods exist to reduce the variability of the root causes identified. These should be adapted according to the level of maturity of the company so as not to get lost in details

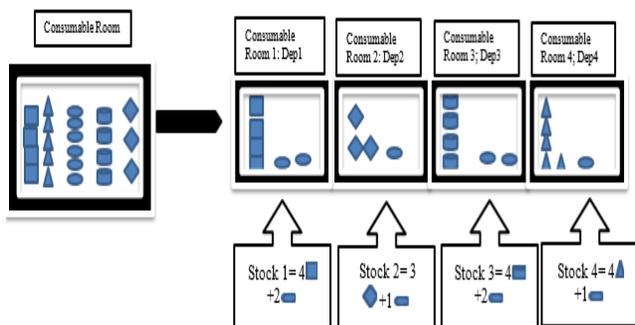


Figure-6-

Equation (1) is the formula for calculating consumption of consumables over a period of time

$$(1) \text{ Consumption} = \text{initial stock value} + \text{inputs and outputs} - \text{Final stock value}$$

- Initial stock Value: it is necessary to distribute the consumable items by department according to their needs in order to have an initial stock by department,
- After having separated the premises from the consumable products, we built an initial stock per department: Stock1, stock 2, Stock 3 and stock 4.
- Inputs and outputs: Each department must manage its stock and place the order according to its needs, it is forbidden to take its need from another department even if they have items in common. The inputs are the orders received; inbound transfers between stores, movements outputs are supplier returns and outgoing transfers between stores

- Final Stock Value: the inventory of consumable products is made at the end of the month to calculate the value of final stock and deduce the value of consumption by department
- The success of this project required the involvement of all staff, training and awareness of the importance of optimizing consumable costs was also carried out.
- Control: Measure again and monitor

After the application of this process in November and December, the consumable load dropped remarkably, firstly because the staff became aware of the problem and were involved in awareness raising and training, secondly we were able to detect the department that consumes the most consumable products and the most consumed product during the month.

Table (1) shows the consumption of the consumable used during one month by each department by involving all teams from the placing of orders to the reliability of the monthly inventory, and after the installation of consumables in premises specific to each department.

Table (1)

Months	overall consumption	Department 1	Department 2	Department 3	Department 4
Novemer	102 821	20 564	30 846	35 987	15 423
December	98 500	24 625	27 580	29 550	16 745

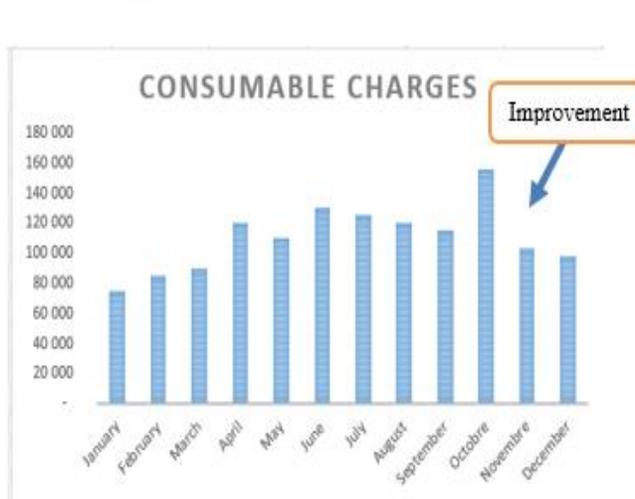


Figure -8-

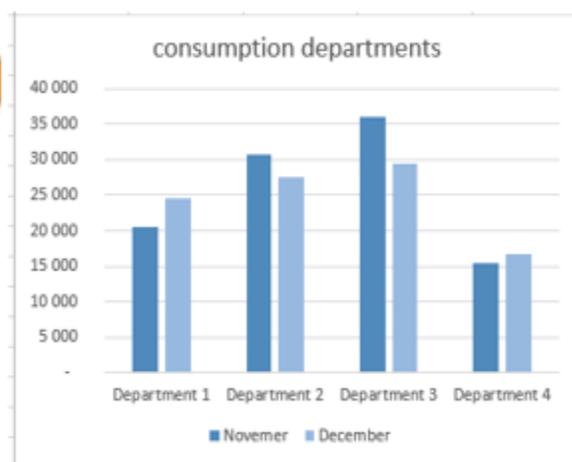


Figure -7-

## 6. Conclusion

This article presented a method of optimizing consumption of hypermarket consumable using Lean Six-Sigma (LSS) project management applied in a Moroccan retail company. The proposed Lean six-sigma approach is KAIZEN. Since there are not many supermarket chains in Morocco, there is a lack of knowledge or application of lean management and six-sigma applied to hypermarkets. The first thing was to be able to present these methodologies and show their benefits for all company management and finally to agree to them to help optimize one component of the costs and why not all the other components. Through this approach, the results of the study showed that improved process and project management and the involvement of the whole team can be achieved by continuously identifying, analyzing and seeing opportunities for improving processes and decisions while optimizing resources and eliminating waste.

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## Biographies

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