

Service Model Based on Lean Service and TQM to Reduce Returns in SME from the Mass Consumption Sector.

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Abstract

Companies have been affected by the inflation caused by the country's changing commercial and geopolitical environment. Nevertheless, there has been significant growth in the volume of purchases from them. In this case study, the company buys from manufacturers and distributes to wholesalers and retailers. In Peru, the main channels through which mass consumer products are purchased are supermarkets, bodegas, and markets. It has been identified that one of the areas with the greatest pain point is the delivery of perfect orders, which generates losses for the companies. The purpose of this research is to reduce the number of returned orders through 5S tools, process standardization and using the TQM methodology. In addition, to validate this model, the Arena software will be used to simulate the process from picking until the products are delivered to the customer, in which the results will show the decrease of returned orders from 7% to 5.32%.

Keywords

Lean Service, 5S, Standardized work, Mass consumption, Returns.

1. Introduction

Currently, mass consumption companies face a changing commercial and geopolitical environment, where the economy experiences inflation and a risk of recession (Handrinos et al. 2023). This leads to increased costs and that several companies have been affected by the decrease in their gross margin. Mass consumption in Peru, despite the price increase, had a growth of 1.7% in volume and 11% in value, comparing the second quarter of 2022 with the year 2019, since it was the last year before the pandemic (Luna 2022). Likewise, in the fourth quarter of last year, the gross domestic product grew by 2.5% in the trade activity, which was largely due to the positive performance of the wholesale and retail trade subsector (INEI 2022). The study company is a distributor of products in the mass consumption sector, which is responsible for purchasing products directly from manufacturers and sells them to its customers. In the United States, wholesale distributors have about 410,000 stores and in total generate annual sales of approximately \$9 billion. In this way, the profitability of these companies depends mostly on the efficient management of their inventories and order fulfillment (First Research 2023). As for Peru, bodegas and markets are the channels preferred by Peruvians, since, according to a report by Kantar División Worlpanel Perú, each of the channels represents 31.5% of the family basket spending (El Comercio 2022). Therefore, the role of the distributor is essential to be able to supply them and comply with the client. On the other hand, SMEs worldwide have a strategic importance in economic growth, due to their great contribution in terms of production, sales and development. They are also the largest employer, providing security for the majority of people (Alexander et al. 2019). In this way, in 2022, SMEs represented 96.4% of Peruvian companies and employed 45.8% of the EAP (Comex 2022).f

Worldwide, there are several literatures that expose the same problem. For example, a distribution company in the mass consumption sector had a high rate of returned products due to inadequate warehouse distribution, inefficient demand planning, and a lack of inventory management. This did not allow them to meet with the delivery schedule, quantity and quality of the products (Bonilla et al. 2019). Likewise, in another case study, it was identified that there was a high rate of imperfect orders due to a lack of work standardization, lack of quality control, and lack of order of the products. These reasons generated low productivity in the dispatch process and high disorganization in the warehouse (Zelada et al. 2022). Finally, in another investigation, the use of 5S, ABC and a model of continuous inventory review was proposed, in this way, using these tools, it was possible to reduce the imprecision of the inventory record and the percentage of shortages (Serna et al. 2022). With the above mentioned, it can be concluded that the high rate of rejected products is a fairly common problem in distribution companies, so it is important to use the correct tools and new proposals to solve this problem.

The causes of returned orders are given for different reasons such as the quality of the product presentation, errors in order assembly and quantity errors. Therefore, to solve this problem, an improvement model will be proposed and developed using Lean Service tools such as 5S, Standardization of work and under the TQM (Total Quality Management) methodology, which is based on improving the quality of products through its processes and services. This methodology will be applied because it has been identified that it effectively satisfies the problem. Likewise, a detailed investigation has been carried out where problems, like the one in this case study, have been found and were successfully resolved. In this way, we seek to reduce the number of returned products, focusing the investigation on SMEs, which usually do not have the money to apply new technologies, do not carry out any type of audit and do not seek to improve their processes, since they are accustomed to the way they already have of working. Currently, there are not many scientific articles that develop the TQM methodology in mass consumption industries, especially in Latin America. Therefore, it is necessary to carry out this investigation.

This article will be divided into 6 parts: Introduction, Literature Review, Methods, Data Collection, Results and Discussion, and finally the Conclusions.

1.1 Objectives

- Reduce the number of returned products through 5S tools, work standardization and TQM.
- Reduce the number of errors in orders through the implementation of 5S.
- Reduce the number of defective products through work standardization and TQM.
- Validate the proposed model through a pilot test and simulation in the Arena software.

2. Literature Review

2.1 Lean Service

Lean Service is a methodology that is based on continuous improvement and whose purpose is to reduce operating times and eliminate activities that do not add value to optimize their processes (Hidayati et al. 2019). Likewise, its use is beneficial, because by eliminating the waste found in the development of operations and optimizing its resources, costs are reduced and, therefore, it generates a positive economic impact for the companies that use these tools (Valdivia and Rivas 2021). This is how it is possible to increase customer satisfaction, since it is possible to reduce delivery times, productivity, and quality in the level of service that is being provided (Mautino et al. 2022).

2.2 5S

5S is a tool that organizes and standardizes the workplace. Likewise, within its phases are also classification, cleaning, and discipline, which are essential to have high-quality services, improve workflow, avoid tasks that do not add value and improve efficiency in the work area. (Güzel and Asiabi 2022; Mlkva et al. 2016). In companies, it is quite common that the warehouse or workplace is not properly organized, which causes product and information search times to increase (Silva et al. 2022). For this reason, this is a tool that is used quite frequently and is applied mainly to improve order, distinguish what is necessary from what does not add value, and keep workstations in the best possible conditions (Bonilla et al. 2019).

On the other hand, by having a more organized and clean work environment, it is possible to reduce the number of errors (Zelada et al. 2022) and the elimination of waste such as: unnecessary movements, waiting and defects (Nuñez

et al. 2019). Likewise, the model identifies that the training stage is crucial to ensure a successful implementation and an improvement in the performance of workers (Valdivia and Rivas 2021).

2.3. Standardized work

Work standardization is a tool that serves to carry out activities without errors, without waste and with an already established sequence, which describes exactly how it should be done (Míkva et al. 2016). For this, it is necessary to evaluate the current situation and, if it is not working correctly, propose new methods and detailed manuals of the process (Salas et al. 2022). Likewise, this tool is being used in various sectors to improve its performance, since it increases efficiency, by reducing execution times, and optimizes resources (Chinchay et al. 2022; Chuman et al. 2022). In addition, it is necessary to mention that to obtain the desired improvements, a work culture must be created with the established standards, where there is training, talks and motivation for the staff to avoid resistance to the implementation (Shafeek et al. 2018).

2.4 TQM

The Total Quality Management methodology is a continuous process whose objective is to improve and maintain the quality of products and processes. Likewise, it is based on the participation and commitment of all the components of the company to successfully achieve quality results that generate customer satisfaction (Isnaini et al. 2021; Modgil et al. 2016). In this way, the implemented processes must be constantly monitored and periodically take measures to improve quality (Jain et al. 2022). These practices include use of control charts, quality reporting, product innovation, and research and development management (Ulloa et al. 2022; Modgil et al. 2016).

The implementation of this methodology has had a positive impact on the performance of SMEs, due to the fact that a significant increase in the services and products offered is achieved, losses are minimized and process efficiency is increased (Marjan et al. 2022; Briones et al. 2021). In this way, it is possible to offer a high level of service to customers, whose satisfaction is of the utmost importance in the implementation of TQM and where the commitment of leaders and employees to bring quality products is important (Krajcsák 2019).

3. Methods

This case study is based on a topic about the mass consumption industry. For the realization of the model, several research that applied Lean Service to improve their processes and the service delivered to the customer were taken as a guide. Currently, it has been identified that the high rate of returned products is a frequent problem, not only in distribution companies, but also in companies belonging to different sectors. Therefore, this aspect motivates the search for tools that can solve this problem. With respect to the diagnosis of the order assembly process, it has been detected that there is a high time in the picking area, this was identified during the pilot tests. Likewise, by applying the lane diagram, the process of each area and its activities are detailed. Three components will be developed for the model.

3.1 Component 1: Problem diagnosis

It is essential to have detailed information about the company in order to develop an improvement proposal. Based on this, accurate system data will be collected, interviews will be conducted with management and process times will be taken. With all the information obtained, a lane diagram will be made to detail the process from the beginning to the end of the orders. Then, a Pareto diagram will be made to specify the main causes of the problem. Finally, a problem tree will be made in which a summary of the reasons and root causes that generate the main problem will be presented.

3.2 Component 2: Implementation

5S will be developed with the aim of reducing errors and picking time when processing orders. To this end, red cards will be used to separate unnecessary elements, a detailed analysis of the order and cleanliness of the company will be carried out, and constant training and audits will be done to ensure that workers are meeting the objectives, self-discipline is generated, and motivation can be achieved within the staff to maintain the improvements implemented. On the other hand, work standardization will be carried out to reduce the error rate of products in poor condition. In this way, procedures manuals will be established to standardize the distribution of products when loading trucks and avoid misplacements that occur when workers put the products without any order or criteria. Finally, the TQM methodology will be applied, which seeks to ensure quality in each of the operations and improve the inspection

process of the products. In this way, it will be possible to reduce the number of damaged products delivered to the customer and improve their satisfaction with the service provided.

3.3 Component 3: Validation

First, a pilot test will be carried out, where the 5S will be implemented in the warehouse and another pilot test will be carried out, on a small scale, for the standardization of the work in the distribution of the products in the truck. In this way, the aim is to collect data to be able to simulate it in the Arena software. Subsequently, the simulation will be developed and from this, the results will be obtained to verify if the proposed objectives of the research were achieved, in addition, it will be observed if there was much variation in the indicator.

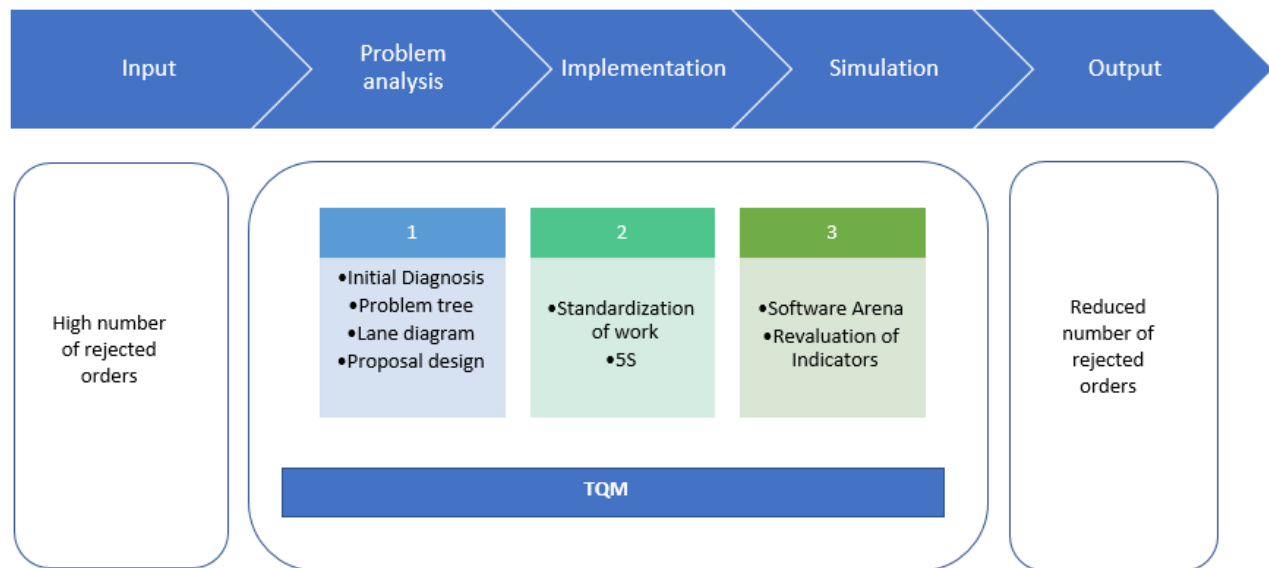


Figure 1. Proposed model

4. Data Collection

To collect the data, an interview was conducted with the company's managers. In addition, the information collected by the company and from other sources had to be studied to achieve a complete analysis. Then, a lane diagram was made to organize and detail the processes, followed by a Pareto diagram to order the causes by priorities and a problem tree to recognize the essential causes. Based on the above, the tools to be used in the research case have been defined.

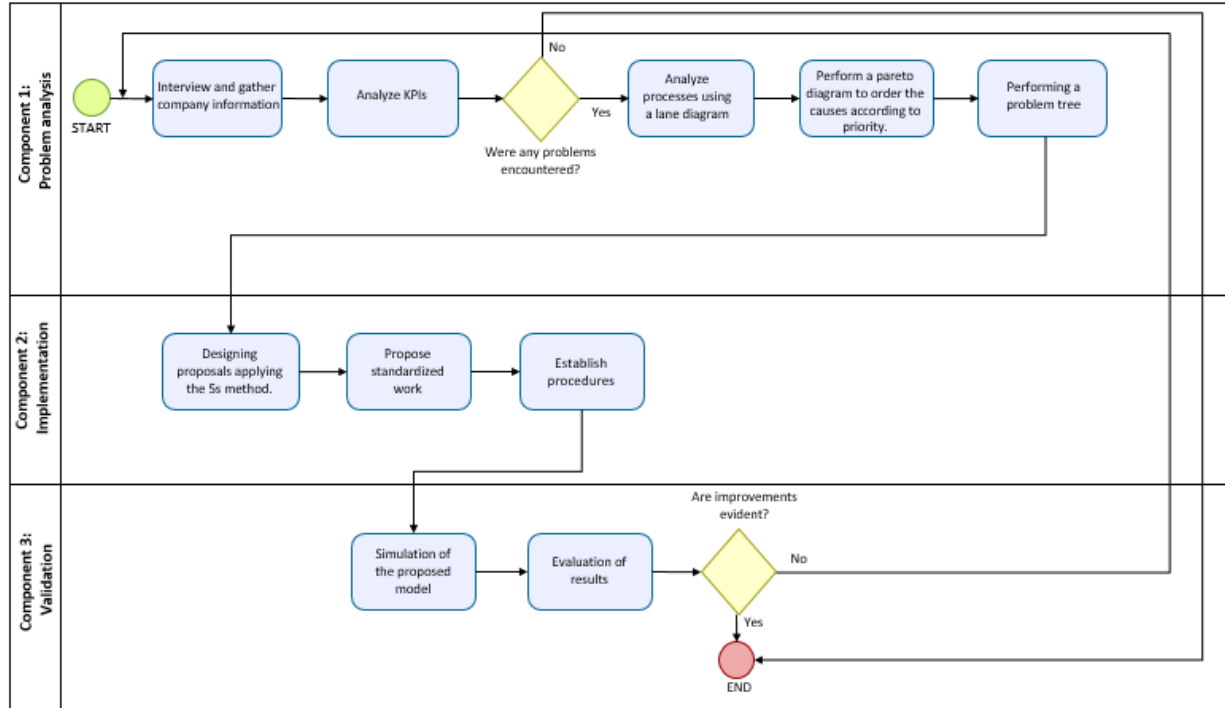


Figure 2. Result diagram

5. Results and Discussion

5.1 Numerical Results

For the present case, the implementation of a pilot test with a period of one month has been tested, in which the 5S processes, standardization of processes for trucks and TQM were analyzed. By performing these tests, the proposed indicators have been deliberated, generating results. The following table will show the indicators, showing the metrics and results obtained at the end of the application.

Table 1. Comparison of results

Indicators	Actual	Objective	Improved
% of damaged products	4.35%	2.00%	2.25%
% of wrong products in quantity and presentation	3.55%	2.25%	2.32%
Average picking list time	1.24%	0.55%	0.83%
Returned orders	7%	5%	5.32%

5.2 Graphical Results

To see the impact of the returned orders indicator, the simulation of the model was carried out in the Arena software, which can be seen in figure 3. This model includes the picking, packing and delivery processes of products to customers. Likewise, in figure 4, the improved model is shown. As can be seen, this model has not had changes in terms of its structure, since the changes have been internal, and the data used in the model was collected from the pilot tests that were carried out for the 5S and work standardization. In addition, in the initial model, all the operations take a time of 15 hours and 9 minutes, while in the improved model there is a reduction in time to 12 hours and 59 minutes.

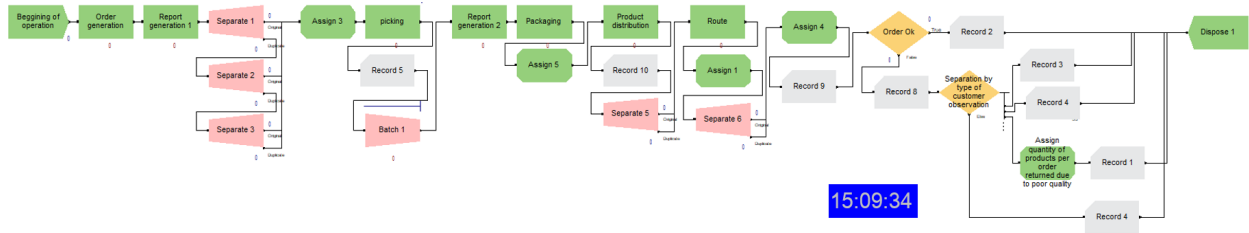


Figure 3. Initial model

On the other hand, with the implementation of the 5S in the warehouse, it was possible to improve order, establish a cleaning plan and eliminate unnecessary products. In this way, it was possible to reduce the time it took to carry out picking and reduce errors in orders, which were mainly due to disorder and lack of standardization in the warehouse.

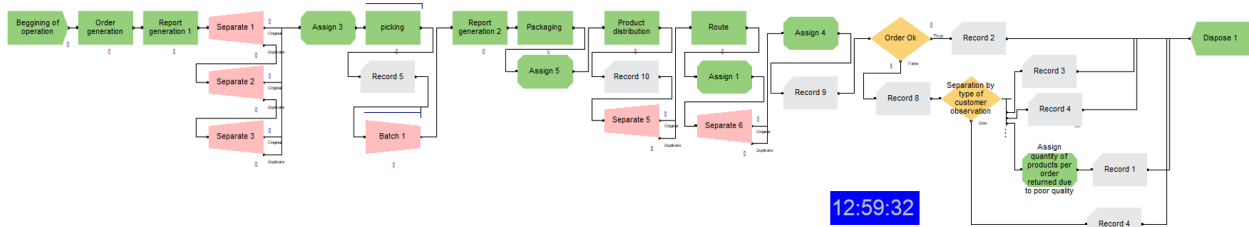


Figure 4. Improved model

Likewise, before and after the implementation, 2 audits were carried out to measure the impact of the tool and the result of which can be seen in Figure 5. In this way, it is observed that there was a considerable improvement after the implementation of the 5S.

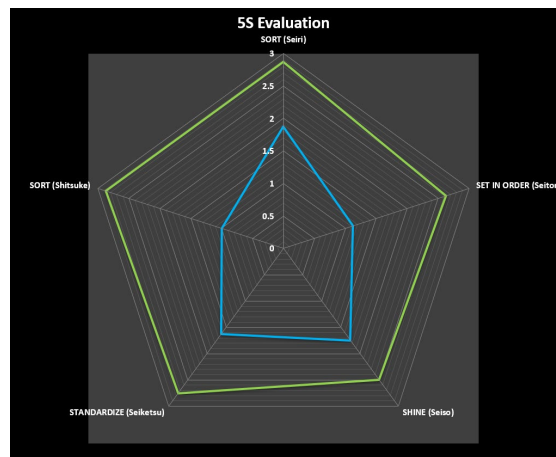


Figure 5. 5S Audit

5.3 Proposed Improvements

For the improvement implementations in this case, the 5S tools, work standardization, and the TQM methodology were used to reduce the number of returned orders in a distribution company. Next, the results obtained in each of the proposed indicators will be analyzed to validate if there was an improvement.

For the percentage of damaged products indicator, work standardization and TQM were used to reduce this indicator. The result obtained was a 48% reduction, which has a great impact on the overall indicator, since this problem is the

one that occurs most frequently and has the greatest impact on returned orders. Nevertheless, we were not able to reach the target of 2%, which was initially proposed, remaining 0.25 percentage points short.

The 5S tool was used to improve the quantity and presentation of incorrect products. In this case, an improvement of 34.6% was obtained compared to the initial situation. Although the proposed objective was not reached exactly, the percentage obtained is very close to it, so it is considered that the improvement of this indicator was achieved correctly.

In the case of the average picking time per list, this indicator measures whether the implementation of the 5S meant an improvement in the company. From the data obtained from the warehouse, an improvement in picking time can be seen, which is reflected in this indicator. Thus, a 33% decrease in the indicator is observed, so it can be validated that the implementation of the 5S meant a reduction in the time spent by this activity and, therefore, a benefit for the company.

5.4 Validation

This article focuses on reducing the number of products rejected by customers. This problem is evident in the high percentage of returns that the company obtained in 2022, which was 7%, exceeding the return policy of leading companies, which is 5% (Bonilla et al. 2019). In addition, the lost sales of these products represented an economic impact of S/. 1,420,056.46, an amount that is equivalent to 7.84% of the gross income of the company. In this way, with the application of the Lean and TQM tools, it has been possible to lower this percentage to 5.32% and obtain improvements in each of the indicators that can be observed in table 1. With the application of the 5S it was possible to reduce the number of errors that occurred when assembling orders, and with the application of work standardization and TQM it was possible to reduce the number of defective products that were delivered to customers.

For the correct application of the tools and to maintain the results over time, it is very important to train the workers and explain the tools so that they can understand the reason for their implementation and its importance to achieve the results. In this way, placing the methodology through panels or posters, it will seek to motivate the workers and that the tools are present in their day to day.

6. Conclusion

Through the research presented, it has been concluded that the use of the Lean Service method gives positive results in the reduction of losses in a company in the mass consumption sector. Likewise, an improvement has been observed in all the indicators proposed for the case of the company.

By using the 5S tool for the entire picking area, it has been possible to reduce the number of hours for this process, in addition to having a more orderly space with greater viability of the products. On the other hand, by applying the process standardization tool, a better organization of the products in the trucks has been achieved to reduce the number of damaged products and, by applying the TQM methodology, an improvement in the quality of processes and products delivered to the customer has been seen,

Finally, the simulation model has been validated in the Arena software with 122 runs and the results obtained were beneficial and considerable for the companies in this area.

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Biography

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