Application of SLP and SW in an Alternative Financial Service Company: A Case Study

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Scientific research in services is limited and even more so when it comes to a financial services company. This research proposes a model using Systematic Layout Planning (SLP) and Standard Work (SW) with the objective of increasing the level of service, which in the company is low compared to the sector. This model applies a tool for the distribution of warehouses within an organization and another for the development of a correct flow of activities to reduce waste. The main problem identified was the high variation in the time of the pawn process due to the inadequate distribution of resources in the company. While the second problem is the reprocessing of attention due to operator errors during the pawn process. The identification of these problems was carried out through the analysis of company records, time studies and visits to the workplace, and activities that complement the analysis of the problems. The objective of this paper is to show how the identification of the problems was carried out with the existing bibliography and to propose a model that solves the problems.

Keywords: Systematic Layout Planning, Standardized work, Service Level.

I. Introduction

The financial services sector contributes to the country's global economy by providing services, capital, credit and investments for companies, individuals, and Small and Medium-sized enterprises (SMEs) [1].

On the other hand, according to World Bank data corresponding to 2022, financial services represented 13.6% of global Gross Domestic Product (GDP) in that year. Furthermore, this sector exhibits a constant annual growth of 3.5% and is projected to reach the figure of 22.7 trillion dollars by the year 2027. In 2022, emerging markets contributed 25% to the global

financial services sector, in contrast to 15% registered in 2000. Additionally, the report "The Global Financial Services Industry" by Mc Kinsey and Company forecasts sustained growth of the sector at a compound annual rate of 4% between 2020 and 2030.

The analysis of the reviewed studies reveals a recurring pattern in the improvement of services, especially in relation to the number of orders. This factor plays a crucial role in determining the success of financial services [2]. It is relevant to highlight that there is a notable lack of research related to the application of Lean in the financial sector [3]. For example, in a previous study [3], the time-taking tool was used to analyze and propose improvements in reducing the time necessary for the disbursement process in a financial institution. As a result of these improvements, the time required was reduced by an impressive 32.5% compared to the initial time.

Furthermore, in another study [4], a model based on Lean techniques and the Business Process Management (BPM) cycle was applied in a service management process of a banking entity. After a detailed analysis, a problem related to service quality and productivity was identified, which was generating economic losses. The study implemented improvements that led to a significant improvement in staff productivity and a reduction in wait time, decreasing wait time from 61 minutes to 38 minutes.

The intention of applying the model based on SLP and standardized work is to increase the service level to 95% and reduce the economic impact.

The structure of the report is composed as follows. Initially, the problems identified by other authors related to our problems are introduced in Section II. Subsequently, we proceed to explain the methodology applied to find the problems within the company in Section III. Next, the production process, the problems and their root causes are analyzed for a better understanding of the context in which the company finds itself in Section IV. Then, Section V presents the proposed solution model and details its steps, which will be detailed in the article. Finally, Section VI presents the conclusions and considerations for future studies.

II. Literature Review

2.1. Service Level

Firstly, the study [5] focused on solving the problem of low service level in the supply chain of a pharmaceutical company. Their approach included the implementation of a periodic and continuous review model, which led to a notable improvement in service level, reaching a service level of 98%, developing a model with the purpose of improving the service level index of various sectors.

On the other hand, [6] focused on spare parts management in the automotive industry, a critical area due to uncertainty in demand. Their research was based on the application of Lean practices that resulted in the reduction of out-of-stocks, savings in purchases and a significant increase in sales of 22.49%.

2.1.1. Standardized work (SW)

The application of SW in the processes or production lines of a company meets the objective of reducing waste or eliminating activities that generate delays in the process [7]. SW is supported by other tools such as the study of time and movements which is used for describe

a process [8]. For example, a study [9] focuses on SW procedures to expedite the cleaning of operating rooms after surgery, performed data collection, and VSM; to identify the causes of delays, and a root cause analysis to identify the reasons behind the prolonged times. Once the problems were identified, the study created a procedure that could meet the objective, obtaining a reduction in cleaning time from 14 to 10.2 minutes.

2.1.2. Systematic Layout Planning (SLP)

Studies [10] highlight the application of plant design as a highly effective way to reduce maintenance and productivity expenses. On the other hand, [11] proposes solutions to optimize the performance of automated or manual processes. For example, in a Peruvian footwear company, it was proposed to apply Lean Manufacturing, SLP and Andon with the aim of increasing productivity and optimizing the process. Obtaining as a result a decrease in defective products from 6.22% to 3.13% and a decrease in production time from 15.94 to 15 minutes.

Another study [12], focused on the design of discrete production plants using FlexSim simulation to be able to replicate the original production design. Achieving optimal plant layout, reducing downtime, and improving production in simulation

2.1.3. Customer satisfaction based on service time

Customer satisfaction is a broad and highly complex concept. Several elements directly affect customer satisfaction and customer loyalty throughout the life cycle of the relationship. To ensure satisfaction, organizations must consider a number of factors and focus on customer service activities, such as managing queries and complaints, meeting expectations, and optimizing response time [13]. According to [14], the primary indicator for financial institutions is closely linked to customer satisfaction and their degree of loyalty. This satisfaction can be broken down into various components, with service quality being the most prominent according to the literature review.

III. Methodology

To understand the problem, an exhaustive analysis was carried out on the various records provided by the company such as: records of fulfilled and lost orders, corresponding to the year of study. The objective was to identify the primary problems that affected the company. From this assessment, they focused on the problem that had the greatest economic impact for further analysis. The most relevant process was identified with the ABC analysis tool, presenting that the pawn process accounts for 60% of the company's income. Next, a Westinghouse time study was carried out on the company's three processes: pawn process, renewal, and cancellation.

According to the time study, of the three processes and the activities of each one, the process that takes the longest is the pawn process, resulting in an observed time of 31.54 minutes. The pawn process is divided into 8 macro activities presented in Table I.

TABLE I OBSERVED TIME IN THE PAWN PROCESS

N°	Concept	Normal Time (Min)
1	Customer waiting	4.55
2	Information provided by the client	1.15
3	Product delivery	1.97

4	External evaluation	5.52
5	Internal evaluation	4.63
6	Price and interest agreement	2.21
7	Additional Info. and signing of contract	9.08
8	Dispatch in box	2.43
Total		31.54

A Pareto Diagram of the problems in the pawn process was generated allowing identification of items with the greatest impact: Inadequate location of resources in the company, data error for disbursement and error in price estimation which have a cumulative percentage of 76% as shown in the Figure 1.

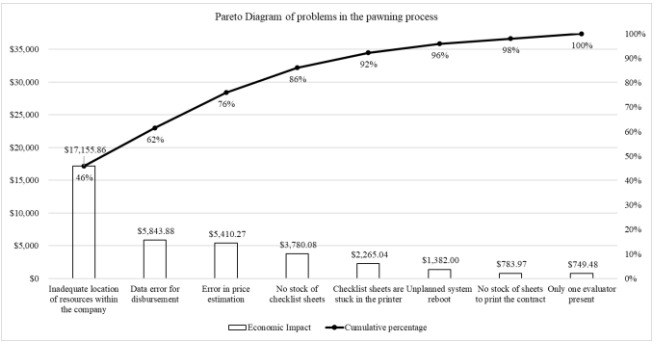

Fig. 1 Pareto Diagram of problems in the pawning process

IV. Problem Analysis

4.1. Productive Process

As discussed in the previous section, the pawn process is our process under study. This process is divided into 8 macro activities presented in Table 1. In addition, the pawn process represents almost 60% of the company's turnover, so the most relevant process for the company has been chosen. This process aims to satisfy the customer's monetary need by pawning household appliances, technological devices, or jewelry. We consider the pawn order an entity because it calculates the level of service, which will be analyzed in more detail in the next section. The client is the entity that enters the system and who brings with it this order. It should be noted that this process can only be carried out in person. The appraiser is the one who directs the client and the order throughout the process. And the cashier is the one who ends up disbursing the amount agreed upon with the appraiser.

4.2. The problem

The identification of the problem was carried out by reviewing records of pawn orders fulfilled and lost in one year. It was found that the service level in the company is 73% completion. This means that of all the orders initiated, only 73% were placed. Furthermore, it is known that the service level in the sector is 95% [15], with a gap of 22%.

The problems with the pawn process were recorded so identification was quick. The main problem was the high variation in the pawn time processing. The specific problems will be

studied in more detail in the next section.

4.3. Root-cause analysis

To better understand the low level of service, several possible causes of the problem were examined, based on the company's operating records. The investigation focused on aspects directly linked to the processes involved that generate the low level of service, as well as the amount of damage that the product suffers at different stages. In this way, it was determined that the company annually faces economic losses equivalent to 56% due to the high variation in service time, reprocessing in service equivalent to 37%, and other problems represent 7%. These problems have an economic impact of 12% within the organization, this being a considerable percentage.

The high variation in service time is due to the inadequate location of the company's resources, that is, the inadequate distribution of materials, work areas, and tools within the company. This cause is observed when the appraiser has to interrupt the natural flow of the pawn process to perform an activity that does not add value. On the other hand, the causes of reprocessing are errors in the price estimate and in the data for the disbursement. The errors in the price estimate are evident when finding out about the price of products on websites, social networks, marketplace, among others. This generates repeat of the initial search. This search process can be carried out again before the contract is signed, generating disagreements, and causing the client to withdraw. The second cause refers to having to redo the contract due to issues of incorrect typing or information provided by the client about himself or herself with bad intentions. Figure 2 summarizes the root cause analysis.

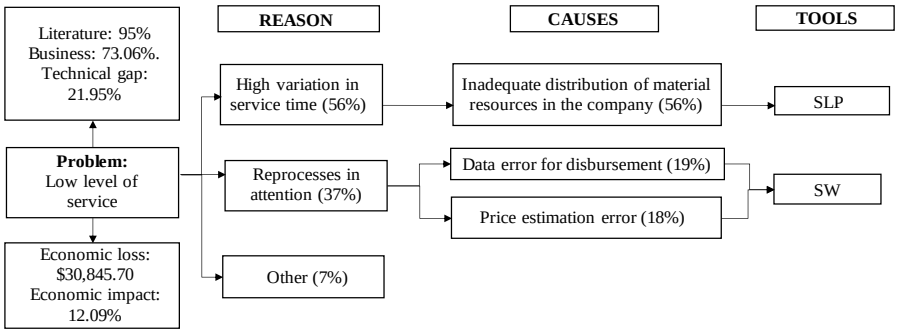

Fig. 2 Root Cause Analysis

V. Proposal

5.1. Fundamentals

On the one hand, Systematic Layout Planning (SLP) is a Lean approach tool used to analyze various types of movements and displacements within a plant, which can be a factory, an office or a building that offers services [16]. The purpose is to find the optimal layout of said plant, minimizing travel routes, reducing disorder in the process and, in some cases, solving problems related to the design of the plant layout [17]. [12] carried out a study on the

planning of the design of the facilities, this is proposed under the Petri net models and simulated with Flexim software to, first, simulate the current situation of the company and then simulate the improvement with the SLP. In this simulation he managed to solve the problems: poorly distributed plant, inefficient logistics and the unbalance of the production line, which generated blockages and inactivity in the production flow. The results of the implementation were a 0% downtime rate in 15 of 17 pieces of equipment and a reduction of blockages to 0%. Our model proposes the application of the SLP in the offices of a company, but not in a warehouse. We will do this by following the regular SLP planning procedure with respect to the work areas that exist in the office.

On the other hand, Standardized Work contributes to improving the quality of a company's services structure of the processes in the companies [18]. Likewise, SLP is also used to maintain uniform production or service provision and reduce waste that can cause delays in the process [19]. [20] points out that the implementation of standardized work, in combination with worker participation, can raise the level of processes and facilitate continuous improvement of both workers and the process itself. [21] uses standardization as a last step by creating report cards to follow up on the improvements proposed with the 5S tool. While the present study proposes solutions to standardize the pawning process. However, standardization after the process will also be performed.

5.2. Solution model

The name of the present model is the Torres Model. The model is divided into the development of the SLP and Standardized Work tools separately, but with the same objective, which is to increase the level of service. The model was adapted from [22]. Figure 3 summarizes the model used for the analysis. In the model the inputs and outputs that we must obtain after implementation are shown.

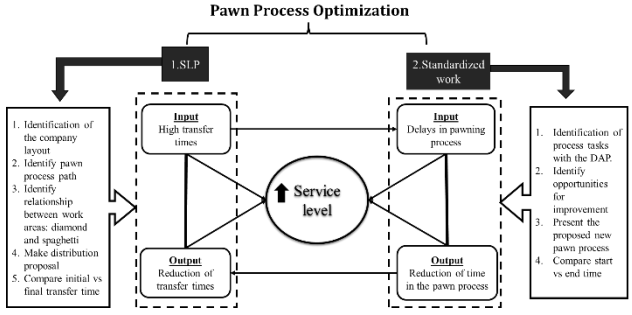

Figure 3: Torres Model

5.2.1 SLP

In the SLP we use five phases:

1. The company plan will be modeled with the information on the measurements of the structure provided by the company. In the current layout, we locate and distribute the areas of the company according to our observation and the routes they take during the pawn process.

2. With the areas identified in the plan, a From-To Chart is prepared to observe and analyze the personnel transfer route during the commitment processes and the time it took to complete the process.
3. Once the route is established, the sequence of activities between each area will be analyzed with the diamond diagram and spaghetti relationships, using the "Proximity value" and "List of reasons" tables.
4. In this step, the previous relationship diagrams will be analyzed and an alternative distribution proposal will be prepared to reduce the transfer time and total time in the pawn process.
5. The initial plan of the company will be analyzed versus the proposed plan to observe if there was a decrease in the travel distance and time of the pawn process.

5.2.2 Standardized Work (SW)

In the SW we use four phases:

1. Deployment of the pawning process: the activities of the pawning process are decomposed. For this, we use the Process Activity Diagram (PAD). Here we describe each activity and record the time spent on each activity.
2. Opportunities for improvement: the bottlenecks in the PAD are identified and analyzed. Subsequently, we propose improvements that will allow the optimization of resources. Finally, each improvement proposal is developed.
3. New pawning process: the flow chart of the new pawning process is drawn up with the improvement opportunities implemented. This could involve the elimination or merging of some activities of the pawning process.
4. Measurement of improvement: a new pawn process time is performed and compared with the previous pawn process time.

5.3 Model Indicators

Improvements will be measured with specific indicators that will make it easier to visualize the improvement. There are three main indicators; first, the service level, then the evaluation time, and the reprocesses of attention. The details of the formulas are shown in Table II. In addition, the indicator target is shown, which represents the best value that the indicator can reach.

TABLE II RESEARCH INDICATORS

Indicator	Description	Unit	Actual	Objective	Formula
Service Level	Percentage of orders delivered out of total orders	%	73.06	95	Orders delivered / Total orders
Evaluation time	Percentage of evaluation time over total pawning time	%	32	27	Evaluation Time / Total Time
Reprocesses of attention	Percentage of pawn orders reprocessed	%	13.65	3	No. Reprocesses / Total orders

VI. Conclusions and Future Work

The present model uses the Torres model, which uses the SLP and SW tools to increase the level of service in a financial service company. These tools have been validated by the literature that they work for the solution of the problems of inefficiency in the distribution of work areas and the reduction of reprocesses.

The successful application of the proposed model is expected to result in a significant increase in the level of service in the pawn service. This increase would not only benefit financial companies by retaining more customers and generating higher revenues but would also improve the customer experience by reducing the number of lost orders, which would ultimately strengthen the positioning of the financial industry in the Peruvian market.

The results of this research confirm the effectiveness of the proposed engineering tools to address the problem of lost orders in the pawn service. The application of these strategies has led to an overall decrease in losses, which could have a positive impact on both customer satisfaction and the profitability of companies in the sector. The solution process will be detailed in the full paper. In addition, the literature used to identify the problems will be further explored. The budgeting and validation of the model will also be detailed. In the present study, only the pawning process is analyzed. However, the company also offers renewal and cancellation services. For future research, these remaining processes can be studied to complement the research and improve the pawnshop's operations.

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