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Enhancing Marketing and Sales Processes in a Colombian Energy Services Company: A Holistic Approach

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Abstract

This study introduces an innovative approach to enhance marketing and sales processes within an energy services company operating in Colombia. Through the integration of Lean Six Sigma and System Dynamics simulation, we aimed to optimize efficiency and drive impactful improvements. Lean Six Sigma principles were applied to existing marking and sales operations, identifying bottlenecks, and an improved process was proposed. System dynamics is utilized to simulate and evaluate the potential impact of the proposed process, and found that sales can be increased by 50.84%, revenue can increase by 60.19%, and closing effectiveness can increase by 70.22%. The results indicate the benefit of utilizing engineering management tools in sales environments and provides a framework for decisionmakers to adopt and further enhance business environments thus fostering sustainable practices.

Keywords
Lean Six Sigma, System Dynamics, Sales Process Optimization, Industrial Products, Simulation

1. Introduction
In a globalized and changing world, the market has evolved day by day with the inclusion of various tools that have been developed throughout history to help companies grow and improve their processes. However, when it comes to sales and marketing processes, a paradigm has been generated based on the belief that if the sales team continues to provide an acceptable profit and reasonable commercial growth, there is no need to change. This thinking has made it impossible for sales organizations to understand their true potential and achieve extraordinary results.

Due to the accelerated changes and competitiveness of the markets, today the value proposition must go beyond the delivery of a tangible good, given that the customer not only goes through the usual sales tunnel but also their needs are dynamic and diversified. This situation has posed new challenges for companies, which, in addition to delivering a product that meets the customer's needs, have also involved constant support and assistance on its use. For this reason, it is imperative to innovate so as not to stay in traditional and habitual practices that slow down processes and undermine organizations (Sancho 2013).

In various organizations, sales are considered as an independent dependency, reflecting the specialized requirements necessary in this area to operate in an increasingly competitive and demanding environment (Vaid 2020). The term sales specifically refer to the set of activities that focus on the tactical management of groups of customers (Homburg et al. 2012), with the aim of exchanging a good, product, or service for a tacit benefit for the organization.

All organizations use the implementation of methodologies and the use of tools that allow them to improve their systems and thus achieve greater competitiveness. An objective of utmost importance for organizations is primarily based on two approaches: implementing sales technology and redesigning the sales force structure (Barber and Tietje 2013), which implies the implementation of improvement and reengineering processes in order to find the activities that generate value and those that do not.

In an extensive part of the existing literature, discussions and notes of experiences have been presented that have failed to provide practical tools to improve the sales management process (e.g., Mantrala et al. 2008; Geiger and Guenzi 2009). Barber and Tietje (2008) delved into the idea of using Lean Management principles to carefully map, diagnose, and reconfigure the sales process between a company and a potential customer around activities that improve the chances of success in a particular sales project.

Multiple studies in the literature have shown that the "Lean" philosophy is one of the tools for generating and developing competitiveness, especially in the manufacturing industry, and more recently applied in the service industry (Cavdur et al. 2019). With the Lean philosophy, companies can increase efficiency, reduce costs, and provide more flexible and standardized products or services in shorter periods of time (delivery times) (Ferdousi and Ahmed 2009).

1.1 Objectives

In this work, a model based on the System Dynamics methodology has been built, which has allowed us to represent the sales process of a company in Colombia that markets thermal insulation and refractory products and services for various industrial sectors. For the construction of the model, it began with the conceptualization of the main variables of the system that are to be intervened with sales optimization decisions or strategies, the initial causal diagram showed a linear structure of the sales process, which with the improvement strategies, feedback structures were identified that led to improvement in the dynamics of the process. The differential equations model that shows the sales process with the implementation of improvement strategies was obtained. It was possible to simulate different scenarios, from Business as Usual, to those generated by the implementation of the formulated strategies, which allows having in a controlled simulation environment making different decisions for the optimization of the sales process.

2. Literature Review

Although studies have been carried out in which the properties, implementation methods and evaluation criteria of the Lean philosophy in the services sector have been defined, even new works that allow a greater impact of application are in progress (Arbós, 2002; Syltevik et al. 2018). It is possible to identify various Lean applications in service organizations in the literature. As a first approach, the Lean Service philosophy was applied mainly in the health sector (Waldhausen et al. 2010). In many cases, the Lean concept is applied in the manufacturing process in the service sector, government/public (Di Pietro et al. 2013; Radnor and Johnston 2013), finance (Leyer and Moormann 2014; Gong and Janssen 2015), tourism (Vlachos and Bogdanovic 2013) and marketing (Piercy and Rich 2009).

Although the scope of the term "Lean" has been extended over time, the essence of the concept remains the same. As in the manufacturing sector, Lean Service seeks to eliminate process waste in order to improve customer value (Shamsuzzaman et al. 2018; Hadid et al. 2016).

In order to implement a lean service and achieve its objectives, some principles and practices have been developed. Womack and Jones (1996) provided five general principles that practitioners can use as a roadmap: (i) value: focuses on identifying what customers perceive as valuable, (ii) value stream: requires identification of all activities to produce/deliver products/services, (iii) flow – focuses on removing bottlenecks so that value-added activities flow seamlessly, (iv) pull – work can only start when a customer places an order, (v) perfection: continually question current processes and look for ways to improve them. To put the five lean principles into practice, various practices are used (for example, 5S, value streaming Mapping, Group Technology, Workload Balancing, etc.), all of which focus on identifying and eliminating wasteful activities (Shamsuzzaman et al. 2018; Tezel et al. 2018).

Brown et al. (2014) carried out a Value streaming Sustainable mapping by identifying the appropriate metrics and methods to visualize them, focusing not only on the environmental and economic impact but also on the social dimension; all this with the aim of developing better strategies for sustainable production (Paredes-Rodriguez 2017). The authors Azizi and Manoharan (2015) designed a Value streaming Mapping to improve productivity in small and

medium-sized companies through the elimination of activities that do not add value to the product. The authors use a case applied to a company that produces electronic equipment, which had high production times and costs.

At the end of the study, with the application of the tool, it is possible to reduce waste and improve quality. In other studies, the inclusion of Lean concepts is carried out Tyagi et al. (2015) explore Lean thinking concepts with the purpose of managing, improving and developing products more quickly while maintaining the same level of performance and quality. For this purpose, the authors apply the Value tool streaming Mapping in the research and development unit of a company, for which it is possible to reduce the design time of new products by 50% after the implementation of the plans generated through value chain mapping.

In order to understand more clearly the theoretical and conceptual bases that will support the research work, it is necessary to present the definition of Lean Six Sigma, the most widely used read tools in the reviewed literature.
Within the methodology that Six Sigma encompasses, two main methods can be identified, which are DMAIC and DMADV. The DMAIC refers to define, measure, analyze, improve and control, while DMADV refers to define, measure, analyze, design and verify, which are used to carry out process improvement. However, for the case study of this research, the DMAIC will be applied, which is oriented towards making improvements in a business process with the purpose of reducing or eliminating defects and establishes a routine by which those already established or design new. The method is widely applied in daily life as a common task in problem solving and improvement (De Mast and Lokkerbol 2012).

When a successful DMAIC implementation is carried out, it is possible to obtain the return on investment several times, greatly increasing the effectiveness of a process. A great advantage of the DMAIC cycle is that its use is not limited to a single application on the process, since companies can continuously iterate the process, identifying improvements and additional improvements in a period. In addition, structured thinking is used, and it is that the stages that the DMAIC cycle follows are systematic, which allows leaders to manage the organization quantitatively and transform the business strategy into calculated tasks (Barney 2002).

The various tools and techniques used during the analysis stage allow for the identification and elimination of problems and issues that might have been overlooked. The focus that is frequently generated broadens the vision and panorama that translate into paths of thought that must be addressed and focused to achieve it. If you want to develop a good long-term plan, the DMAIC cycle is an excellent alternative. This approach is applied in longer-term processes, so that already established or troubled companies can benefit effectively. Through the control phase of the methodology, it is guaranteed that the problems that were thought to be solved and temporarily disappeared do not recur.

Finally, it has been shown during this case study that the application of DMAIC creates an increase in profits, while reducing costs, thus leading to an increase in profitability. Six Sigma is a forward-looking methodology compared to other quality programs, as it focuses on preventing defects rather than fixing them.

3. Methods

This case study was carried out in a thermal engineering services company that optimizes energy in different industrial sectors such as cement, hydrocarbons, gas, petrochemicals, food, beverages, oils, grease, brick, lime, steel, plastic, cardboard, shipping and glass, among others, specifically focused on the company's sales process.

The methodology was developed under the case study approach in which using the Value tool streaming Mapping (VSM) it will be possible to analyze and identify the value stream within the sales process (Barber and Tietje 2008). According to Barber and Tietje (2008), the development of Lean solutions requires the following essential steps:

1. Identify the value really desired by customers. Today's customers place the following demands on their suppliers: (a) solve my problem completely; (b) don't waste my time, that is, minimize my cost of consumption; (c) provide exactly what I want; (d) deliver value where I want it; (e) provide value when you want it; and (f) reduce the number of decisions I have to make to solve my problems (Womack and Jones 2005).

2. Identify the value stream of each product and eliminate the steps that do not create value. It is in this step that VSM is used, and a current and future state map is generated to illustrate how a process can be redesigned to produce greater efficiencies.

3. Align the remaining steps in a continuous flow, thus eliminating waiting and inventory costs. A future state map is "better" than the current state map if the adjusted supply in the future state results in a solution that more closely matches the customer's preferences in terms of time and quantity. When there is a mismatch between the pace and volume of the supply and consumption process, waiting and inventory costs are generated.

4. Transition from a sales philosophy that is mainly based on the push method of selling to an approach that allows the customer to extract value from the company more effectively. This may be the most revolutionary of all Lean sales concepts. Rather than trying to convince customers to buy something that has already been produced, this Lean principle suggests that suppliers should strive to produce the amount of solution needed exactly when it is needed, and not before.

5. Repeat steps 1 to 4 in the continuous search for improvement.

Thus, considering the previous steps, a methodological plan is proposed for the development of the project in accordance with what is indicated below in Table 1:

Table 1. Methodological work plan

1. Diagnose the situation of the sales process of the company	
PHASE	**METHODOLOGY**
Characterize the sales service value process	Develop a Value Stream Map (VSM) with the company's sales team and customers to visually document the sales process. A VSM is critical in helping to see Lean waste and how it is affecting business processes and practices. Additionally, the current state of the sales process will be defined and measured through performance indicators.
EXPECTED RESULTS: Obtain the map of the current state of the sales service of the company and its performance.	
2. Propose a future state of the sale process of the company	
PHASE	**METHODOLOGY**
Optimize the future sales process	Propose a revised sales process depicted in a future state map that could achieve greater efficiencies by applying lean principles. Carry out a root cause analysis with the sales team and other process stakeholders through tools such as the fishbone diagram.
EXPECTED RESULTS: Understanding of the current state of the sales process and proposal of a map of the future state of the sales process of the company	
3. Validation of the future map of the proposed sales process	
PHASE	**METHODOLOGY**
Evaluate the effect of the future map of the sales process	It is important to document the consequences of the impact of the future service process proposed for the company, and through practical experimentation, simulation model or validation by experts.
EXPECTED RESULTS: Performance improvements and waste reduction in the sales process of the company that positively impact sales and customer satisfaction.	
4. Formulate Strategies to achieve the objectives set with their respective design of an Action Plan	

PHASE	METHODOLOGY
Proposal for controls to achieve set objectives	The control phase is the one that allows applying approaches and tools that allow verifying the progress obtained in the development of improvement strategies, in addition to making the pertinent adjustments.
EXPECTED RESULTS: Specific management indicators of the sales process and activities will be obtained for the fulfillment of the strategic objectives and thus generate a positive change in the organization.	

The development of the research objectives is presented, according to the findings of the field work, to guide in this way a commercial management strategy through the Lean Six Sigma methodology to improve the customer service process, marketing and sales in the company, which is a structured and systematic process that involves four well-defined and sequential stages, define, measure, analyze and improve.

3.1 Define

At this stage, it is key to characterize the company's sales process and identify aspects of the organization that allow for the recognition of specific problems. Based on these problems, it is important to define goals that help guide the development of concrete solutions to improve the sales process. It is important to identify the different positions that are involved in the development of sales processes within the organization.

There are 12 people involved in the process of 20. There is only one sales engineer (general manager) directly in charge of large-scale projects and the commercial manager oversees medium-sized projects. The administrative manager is in charge of coordinating minor sales. Then there are 6 sales engineers, who oversee small and medium projects, materials and small projects, and refractory projects. The project coordinator has to be aware of all projects regardless of their magnitude, the business advisor and the person in charge of digital marketing strategies.

The next step is to analyze the company’s process flow, and through this analysis, 5 key processes are identified, and these are: reception, telemarketing, commercial assistant, sales engineer, offer analyst and preparer.

The process begins with the reception and at this point two things can happen, that the client requests a specific engineer or that he does not. If the customer requests an engineer, communication is immediately possible. If not, move on to the business support process. However, it should be borne in mind that the process can also start through telemarketing, which implies that the company is the one that communicates with customers thanks to the information they obtain from social networks and the website.

The first contact with the customer, in the commercial assistance process, involves recording the type of potential customer entry, whether by phone, networks or e-mail. Subsequently, the customer information is analyzed. If it is new, it is necessary to analyze the type of project, since in the event that the project is larger, it is immediately passed to an engineer specialized in the subject. If it is not a large project, both for new clients and old clients, the client's information is passed to a sales engineer, who must contact the client, present the proposal, including quote, time, scope and costs. In addition, you must make the macro proposal and pass the proposal to a document analyst.

At this point, the analyst intervenes in the process, who must review and prepare the final offer. Subsequently, the document is sent to the client. In case it is accepted, it passes the document to the administrative chief. If the proposal is not accepted, it is archived in database.

To identify the customers and services of the company, sales information from the last 6 months of 2021 is collected and analyzed. The company has the following types of clients: cement, energy, hydrocarbon, gas, petrochemical, food, beverage, oil, grease, brick, lime, steel, plastic, cardboard, shipping, and glass. Next, the sales metrics need to be defined, and currently the company only looks at the revenue generated through each salesperson’s annual sales. Currently, monthly metrics are not applied within the company, and this does not allow for the identification of various factors that can aid in developing better strategies in the sales area. It is important to implement sales evaluation metrics to improve the analysis of results and the orientation of improvement strategies. For this, the following indicators are proposed, which are developed in the improvement phase: number of sales per sales person, average

sales cycle, conversion rates, reasons for customer loss, revenue per sales person, average revenue per salesperson, and training time for new sales people.

3.2 Measure

During this phase, it is important to identify the underlying causes of the current problems in the company that have been affecting marketings and sales services. The process begins by conducting interviews with commercial and general managers, commercial advisers, and conducting customer satisfaction surveys. The objective is to gain a greater understanding of the various processes within the company, as well as insights into the responsibilities of each role. Based on the interviews, and customer satisfaction surveys, it is evident that the current issues are based on the lack of standardization of processes within the company, and this impacts after-sales and resale services. Introducing standardization, and evaluation metrics can allow for the evaluation of strategic components, and introducing training initiatives for advisors can enhance response times and post-sales services. To achieve improvements at the company, standardized sales processes can be introduced for advisors and engineers, in a way that there is a clear process according to each client's requirements, along with designing and applying evaluation metrics to the sales process. Creating accessible and standardized inventories will aid in creating a more efficient process.

3.3 Analyze

In this phase of the DMAIC methodology, it is key to analyze the causes of the problems that have been identified in the previous phases. The causes of the problems are related to the following key elements: metrics, problems in direct sales, after sales, training, standardization, inventories. A relationship matrix was utilized to understand and determine the importance of issues that arise in the company and their effect on fostering positive customer relationships, and to determine which processes need improvements to address customer preferences and needs effectively. Analyzing the developed relationship matrix informs us that the biggest issue with meeting customer requirements is the lack of standardization of processes, followed by the lack of inventory control. Additionally, customer service is related to each of the problems identified at the company.

3.4 Improve: System Dynamics Model

In the 'Improve' phase of the DMAIC methodology, possible solutions are generated to solve the identified problems at the company. System dynamics is a modeling approach that analyzes the interactions of the components of complex socioeconomic systems and studies their behavior over time. The main objective is to understand how different variables of a system connect with each other, and their impact on the trends of the system's behavior. A system dynamics model is built that allows us to represent and study the sales process at the company. Sales are classified into products and services of thermal and refractory insulation for various sectors. The system dynamics model allows us to simulate four scenarios: business as usual, retrieval of applications, follow-up to unsold, improvement of marketing strategies, and allows for the simulation of different strategies in order to optimize the sales process. Before building the system dynamics model, it is important to map out the sales process in order to gain an understanding of what processes need to be included (Figure 1).

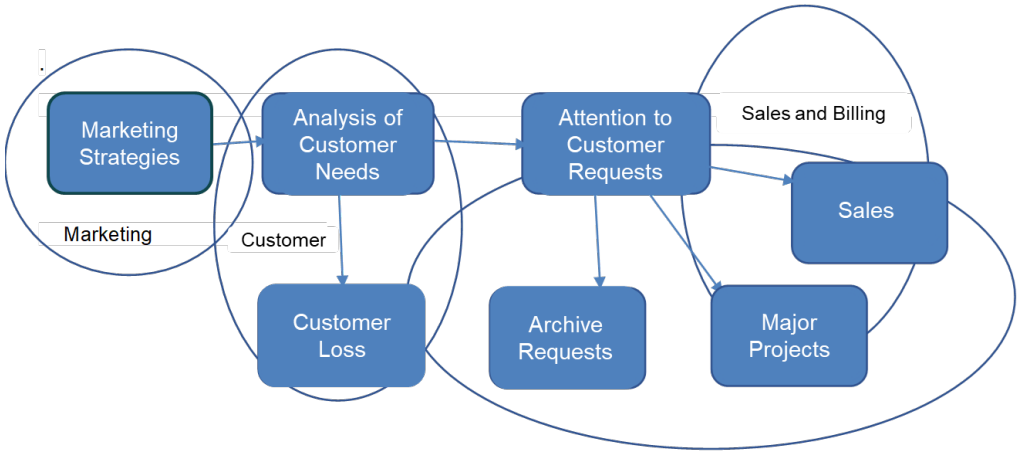

Figure 1. Sales Process

The first step in developing the model is to use a causal diagram in order to illustrate the sales process, and this allows for the visualization of variables in the system, and how they are interrelated (Figure 2). The main variables from different stages of the sales process were used (marketing, customer, sales and billing), and this is based on the sales process illustrated in Figure 1. The initial process in the causal diagram is a linear representation with small loops that do not generate feedback (Figure 2). Feedback structures were later identified and introduced and these included recovery strategies for abandoned services and follow-up on unsold requests. The idea behind feedback structures is that they would increase the possibility of increasing requests in attention that would be converted into sales.

The sales process begins with marketing and telemarketing strategies that bring face-to-face or virtual communication and these strategies increase the number of incoming customer requests. Next, after establishing contact with a customer, the commercial assistance process begins, which involves registering the type of potential customer entry and analyzes the customer's information (Requests Under Analysis). At this step, there are two options in the process, the customer request is delt with (Attention to Requests) or there is a risk of the customer losing interest (Loss of Requests). Two balance loops are introduced, B1 and B2, where B1 demonstrates that when loss of requests increase, the requests under analysis decrease. B2 shows that when customer requests are being processed (Attention to Requests), then requests under analysis would decrease. Next, a customer request is moved from 'Attention to Requests' to 'Requests in Progress'. At the requests in progress stage of the sales process, there are two possible paths, 'Major Project' and 'Sales'. This is shown by the creation of balance loops B3 and B4. Major project indicates that the request is for a large project and is passed to an engineer who has expertise in the scope of the project. If a project is not large and does not require any expertise, then it is moved to 'Sales' where a sales engineer will handle the request. The sales engineer contacts the customer and presents a proposal for the customer's request that includes a quote, time, scope, and costs, and attempts to complete the sale. If a sale is completed, this leads to increased revenue for the company showed by the process flow to 'Sales Revenue'. If a sale is not completed, then the process flows to 'Unsold Requests are Archived'.

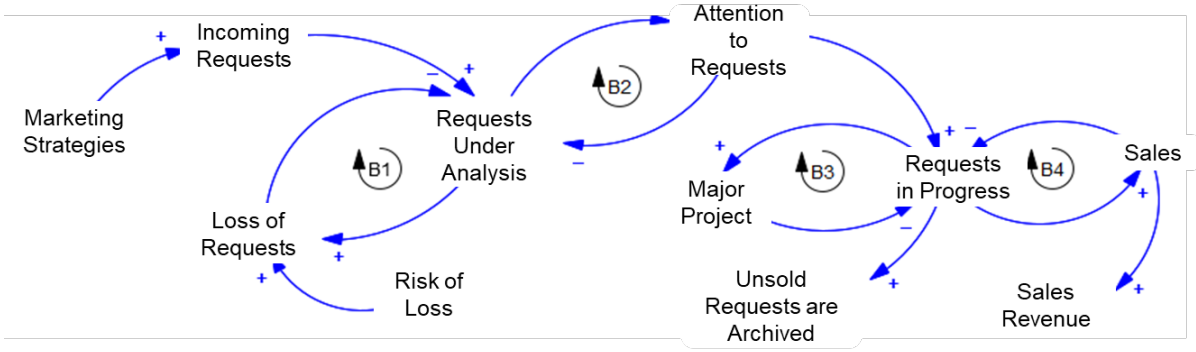

Figure 2. Initial Causal Diagram

The previous causal diagram (Figure 2) did not illustrate what occurs in the sales process to unsold requests that are archived or to lost requests in the initial sales process. A causal diagram with sales process optimization strategies is presented in Figure 3. Two strategies are proposed to follow-up on the lost requests and unsold requests, and these are request recovery and follow-up of unsold requests. Request recovery refers to a follow-up that is made to requests that are lost after the initial analysis stage. Usually, the company operates under the assumption that the customer will contact the company again, thus restarting the sales process, however this may not always be the case. The purpose of implementing this strategy is to increase sales, and this strategy begins by contacting customers whose initial requests were sent to the 'Loss of Requests' phase of the sales process, thus enabling requests to re-enter the sales process and into 'Requests Under Analysis', and this creates the positive feedback loop R1 (Figure 3). The second strategy that is implemented to follow-up on unsold requests that are archived leads to the creation of the positive feedback loop R2, and this indicates that some archived requests can be recovered, and they can re-enter the 'requests under analysis' stage, enabling a new analysis, and the possibility for the request to continue along the sales process. The main objective of introducing strategies in the sales process is to increase sales revenue, and to meet this objective, there needs to be a higher number of requests that enter and flow through the sales process at the company. A third strategy is employed in the sales process as depicted in Figure 3, and this is 'Investment in Improvement Strategies'. This

strategy aims to allocate a portion of generated revenue from sales as an investment into improvement strategies., and the more revenue the company generates as a result of the sales process, the greater the investment. This leads to the creation of a third positive feedback loop, R3, as depicted in Figure 3.

3.5 Model Validation

After formulating the system dynamics model, which encompasses the sales process, and associated flows and equations mirroring the company's real-world operations, improvement strategies are also integrated into the model. The next step is validation, to establish confidence in the robustness and usefulness of the model. System dynamics models must have both structure validation and behavioral validation, to ensure that the simulation accurately represents the real system that is studied (Barlas 1996). The structure verification test compares the model structure with that of a real system, in this case, the sales process at the company. The validation of the structure was carried out with the help of personnel at the company, as well as with the collection of actual process data and information on arrival of applications, number of sales, annual revenue and marketing budget. The behavior validation was conducted by adjusting simulation parameters to eliminate any parameter sets causing computational errors within the model, and the parameters that yield significant changes were also verified. This was in the form of a sensitivity test, and this was a variation in application abandonment recovery, unsold application recovery, marketing investment percentage and sales success rate. The approach of validating both the structure and behavior of the developed system dynamics model helps to confirm the reliability of the model in simulating the sales process at the company along with the implementation of various improvement strategies.

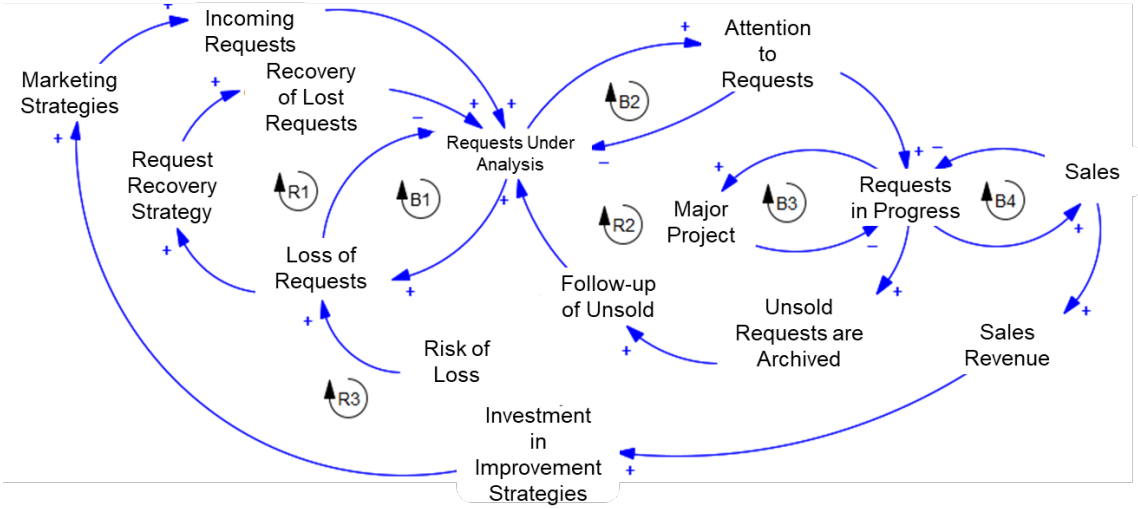

Figure 3. Causal Diagram with Strategies

4. Results and Discussion

4.1 Baseline: Business as Usual (BAU)

A baseline scenario was developed and used as the initial scenario and is referred to as Business as Usual (BAU). This scenario simulates the current sales process at the company without any interventions.

Figure 4 shows the behavior in the Business As Usual scenario, of the variables Requests under analysis, Requests in service and the variable Sales income. The time horizon for the simulations was 12 months with monthly average values. The numerical integration method used was Runge- Kutta 4, and the step size was 0.0625. The requests under analysis are a function of the change over time and for this scenario, the arrival of requests depends on the currently existing marketing. Requests for attention on average reach the maximum installed capacity for monthly attention, based on the number of people attended, which is equal to seven, and the average number of requests that each person attends, which is 4. Income is expressed in million pesos, thus, sales revenue exceeds 2,000 million between month 5 and month 9. A summary of the business as usual scenario are presented in Table 2.

Table 2. Business as Usual (BAU) Results

Indicator	BAU
Annual Requests	325
Number of Sales Engineers Responding	7
Mean of Serviced Requests/person	4
Annual Sales	$ 6,300 MM COP
Business	12 meses
Numerical Method	Runge-Kutta 4
Clock Period/Integration	0.0625

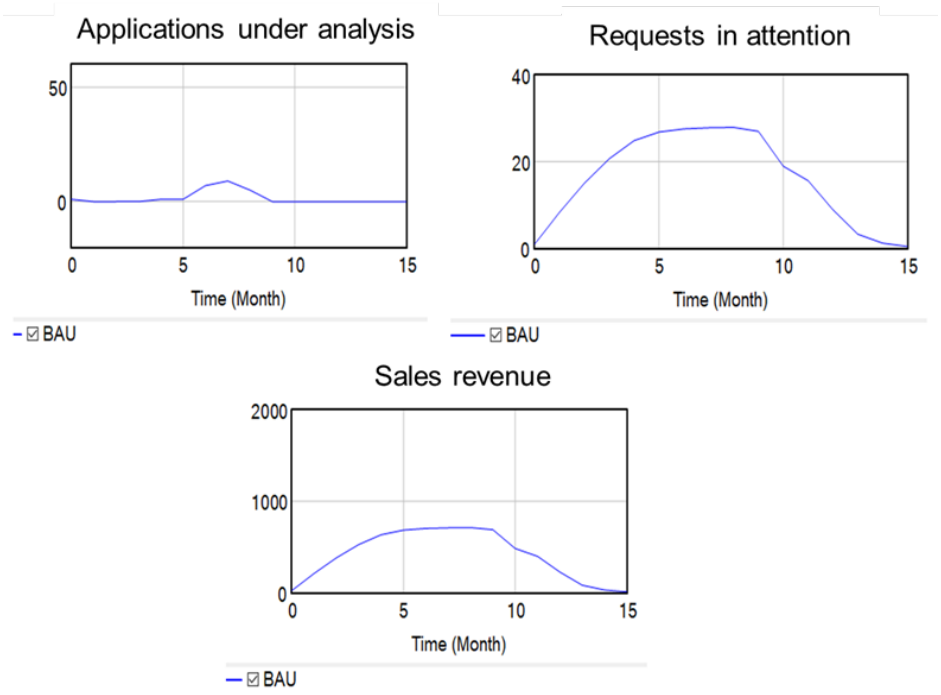

Figure 4. Business as Usual Scenario

4.2 Scenario Analysis

After conducting the simulation, adjustments were proposed for variables and parameters to construct three additional scenarios that are to be compared with the base scenario, business as usual. Table 3 presents the details of the parameter configurations for the proposed scenarios. The second scenario is the retrieval of applications, and the objective here is to recover 80% of abandoned applications in the sales process. The third scenario is the follow-up to unsold, and the objective here is to recover 90% of unsold customer requests. The fourth scenario is the improvement of marketing strategies, and the objective here is that 10% of the sales revenue be reinvested back into the company and used to improve marketing and sales strategies. In addition, the 10% of revenue investment should lead to increased sales, by transforming customer requests into sales, and increasing the success rate of this process from 20% to 30%.

Table 3. Scenarios and Parameter Arrangements

Scenario	Scenario Name	Variable Arrangement	Strategy goal	Scenario value (Dimensionless)
1	**Business As Usual**	Strategies	0	0
2	**Retrieval of Applications**	Abandonment of applications	(80 % of recovery goal for abandoned applications)	0.8
3	**Follow-up to unsold**	Follow-up to unsold	(90% of recovery goal as a result of follow-up to unsold)	0.9
4	**Improvement of marketing strategies**	Percentage of investment Requests transformed into sales	(10 % of revenues are used to improve marketing and sales strategies) (From a success rate of 20% to 30%)	0.1 0.3

The results of the four studied scenarios is presented in Table 4. This table lists the scenario, the number of customer arrival requests, applications under analysis, requests in process, requests transformed into sales, and sales revenue. When investigating the different scenarios, increases or decreases in these metrics is shown in the table. Scenario 4 is the only scenario that led to an increased number of customer arrival requests, with a 30% increase. Scenarios 2 and 4, led to an increase in applications under analysis, with a 95% increase and a 1270% increase respectively. Scenario 3 led to a 686% decrease in applications under analysis. In terms of requests in process, all scenarios led to an increase in this metric when compared to the base case, with scenario 4 having the largest increase (43% increase). The metric requests transformed into sales is investigating the conversion rate of requests, and in the base case, this is a 15.37% conversion rate. All of the studied scenarios have an increased conversion rate when compared to the base case, and scenario 4 has the highest conversion rate (25.34%). In terms of sales revenue, all scenarios led to increased sales revenue, with scenario 4 having the largest increase at 114%. The results indicate that scenario 4, improvement of marketing strategies, is the best strategy for the company to implement to lead to higher sales revenue and conversion rates. The results are also visualized in Figure 5 to showcase the change in these metrics over time. The increased number of the arrival of customer requests by 30%, is shown in Figure 6.

Table 4. Scenario Results

Scenario	Scenario Name	Arrivals Customer Requests	Applications Under Analysis	Requests in Process	Requests Transformed into Sales	Sales Revenue [MM $ COP]
1	**Business As Usual**	325	23	250	50/325 (15.37%)	6,379
2	**Retrieval of Applications**	325	45 (95% increase)	293 (17% increase)	59/325 (18.05%)	7,492 (17% increase)
3	**Follow-up to unsold**	325	-135 (decrease of 686%)	299 (20% increase)	60/325 (18.38%)	7,628 (20% increase)
4	**Improvement of marketing strategies**	423 (30% increase)	316 (1270% increase)	357 (43% increase)	107/423 (25.34%)	13,673 (114% increase)

Figure 5. Results of the Four Scenarios

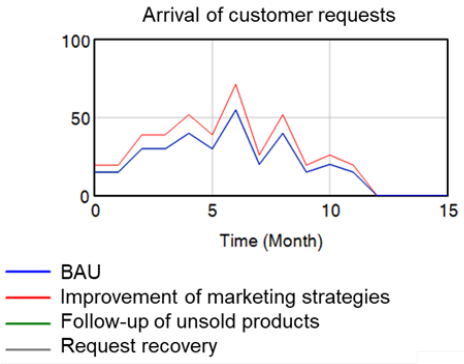

Figure 6. Scenario Analysis: Arrival of Customer Requests Comparison

5. Conclusion

This paper presented a hybrid model, combining Lean Six Sigma's DMAIC methodology and System Dynamics, as a tool to solve the problems identified in company's sales process. The proposed improvements focused on the recovery of requests, the follow-up of failed sales and the improvement of marketing strategies. Then, through the System Dynamics simulation model, it was possible to validate these improvements and their impact on the company. The model can be replicated by other service companies interested in making strategic decisions around continuous improvement processes. The simulation results indicated that the best improvement strategy is to implement all three strategies that were proposed as they will lead to increased revenue and increased number of customer requests. To construct an effective model, it is important that the model accurately represents the characteristics of the studied system and that the model remains simple so that it is manageable.

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