Istanbul Gelisim Univ J Soc Sci 2025:12(1);39-63
DOI: 10.17336/igusbd.1329590

ORIGINAL ARTICLE / ÖZGÜN ARAŞTIRMA

Improvement of Sales Processes with Lean Six Sigma Methodology in The Automotive Industry

Otomotiv Sektöründe Yalın Altı Sigma Metodolojisi ile Satış Süreçlerinin İyileştirilmesi

[1]İlkay SARAÇOĞLU
[2]Kenan ÖZDEN
[3]Selin CANCA
[4]Elif ULUSOY

Abstract

Aim: In this study, the improvement of the sales processes of an automotive company with the Lean Six Sigma (LSS) management philosophy is included. The company, whose history in the automotive sector dates to the 1980s, has a wide product range that is at the top of this sector of Türkiye, which is based on intense competition. Within the scope of this study, improvements that will form the basis of digitalization in sales processes are aimed in line with the main purpose of maintaining and increasing customer satisfaction.

Method: The application was carried out with the DMAIC (Define-Measure-Analyze-Improve-Control) method to improve the processes that cause customer dissatisfaction and to create an integrated system by using LSS tools. Improvements were made in line with the purpose by applying the method step by step. Various surveys were conducted with customers, brainstorming activities were carried out with employees involved in sales processes, and process improvements were made by analyzing the data obtained from these activities.

Results: All stages of the sales processes were addressed using the LSS approach, and it was observed that the customer satisfaction rate, which was 88% before the study began, increased to 95% after the study.

Conclusion: In this study, the sales process of a company operating in Türkiye and selling prestigious automobiles is discussed. This review provides a clear view of how LSS projects can be implemented in the sales organization. It also contributes to the enrichment of literature to facilitate the LSS application.

Keywords

Lean Six Sigma, DMAIC, automotive sales processes, process improvement, customer satisfaction.

[1]PhD, Haliç University, Department of Industrial Engineering, Istanbul, Türkiye.
✉ ilkaysaracoglu@halic.edu.tr

[2]Prof., PhD, Istanbul Gelisim University, Department of Industrial Engineering, Istanbul, Türkiye.
✉ kozden@gelisim.edu.tr

[3]Graduated Ind. Eng., Istanbul Gelisim University, Department of Industrial Engineering, Istanbul, Türkiye.
✉ selincanca@hotmail.com

[4]Graduated Ind Eng, Istanbul Gelisim University, Department of Industrial Engineering, Istanbul, Türkiye.
✉ elif_ulsoy@hotmail.com

Geliş/Received: 21.07.2023
Kabul/Accepted: 12.11.2024

İlkay Saraçoğlu, Kenan Özden, Selin Canca, Elif Ulusoy, "Improvement of Sales Processes with Lean Six Sigma Methodology in The Automotive Industry", Istanbul Gelisim University Journal of Social Sciences, 12 (1), April 2025, pp. 39-63.

Öz

Amaç: Bu çalışmada, bir otomotiv firmasının satış süreçlerinin Yalın Altı sigma (LSS) yönetim felsefesi ile iyileştirilmesi ele alınmıştır. Otomotiv sektöründeki geçmişi 1980'lere dayanan firma, bugün Türkiye'nin yoğun rekabete dayalı bu sektörde özellikle üst segmentte yer alan geniş bir ürün gamına sahiptir. Bu çalışma kapsamında, müşteri memnuniyetinin korunması ve artırılması amacı doğrultusunda, satış süreçlerinde dijitalleşmeye yönelik iyileştirmeler hedeflenmiştir.

Yöntem: Uygulama, müşteri memnuniyetsizliğine neden olan süreçlerin iyileştirilmesi ve bütünleşmiş bir sistem oluşturulması amacıyla LSS araçlarından DMAIC (Tanımlama, Ölçme, Analiz, İyileştirme ve Kontrol) yöntemi ile yürütülmüştür. Yöntem adım adım uygulanarak amaç doğrultusunda iyileştirmeler yapılmıştır. Bu çerçevede müşterilerle çeşitli anketler yapılmış, satış süreçlerinde yer alan çalışanlarla beyin fırtınası çalışmaları gerçekleştirilmiş ve bunların sonucunda elde edilen veriler değerlendirilerek süreç iyileştirmesine gidilmiştir.

Bulgular: Satış süreçlerinin tüm aşamaları LSS yaklaşımı ile ele alınmış ve çalışmaya başlamadan önce %88 olan müşteri memnuniyet oranının çalışma sonrasında %95'e çıktığı gözlemlenmiştir.

Sonuç: Bu çalışmada Türkiye'de faaliyet gösteren prestijli otomobil satışı gerçekleştiren bir firmanın satış süreci ele alınmıştır. Bu inceleme, satış organizasyonunda LSS projelerinin nasıl uygulanabileceği hakkında net bir görüş sunmaktadır. Çalışma, LSS uygulamasını kolaylaştırmak için literatürün zenginleşmesine de katkı sağlamaktadır.

Anahtar Kelimeler

Yalın Altı Sigma, DMAIC, otomotiv satış süreçleri, süreç iyileştirme, müşteri memnuniyeti

Introduction

Under the conditions of increasing competition with globalization, companies have to fulfill their products and service offerings in the desired quality and in a sustainable way (Lizarelli and Alliprandini, 2020). Providing quality and sustainable products and/or services means creating leaner companies that are highly competitive and more profitable, with satisfied customers. The philosophy of continuous improvement (CI) contributes to higher quality, operational efficiency and improved performance by reducing waste and product variability in processes (Assarlind *et al.*, 2012; Thomas *et al.*, 2009). Therefore, the concept of CI implemented with the lean six sigma (LSS) approach gained popularity in the 2000s (Timans *et al.*, 2012). LSS methodology is a way to implement CI faster in an organization (Albliwi *et al.*, 2015). Both Lean and six sigma have their roots back in the 1980s, when pressures on quality and speed in production. In 1987, Six Sigma approach was developed by Motorola with the addition of statistics along with total quality management (Aboelmaged, 2010). Interest in Six Sigma grew rapidly after General Electric recognized Six Sigma as its leading quality improvement program (Eckes, 2000; Henderson and Evans, 2000). Lean production and lean thinking concepts, which came to the fore in the book "The Machine That Changed the World" written by James P. Womack, inspired by the Toyota Production System in the 1990s; known with Motorola and General Electric, the concept of 6 Sigma came together in the 2000s and revealed the most talked about "Lean Six Sigma" approach of recent times (Albliwi *et al.*, 2015; Womack *et al.*, 1990).

LSS is an integrated method that comes from combining Lean and Six Sigma principles. Lean emerged as a method for optimizing automotive production. Six Sigma developed as a quality initiative to eliminate defects by reducing process variability in the semiconductor industry. The earliest service applications of Lean and Six Sigma are emerged in the service support functions of production organizations such as GE Capital, Caterpillar Finance, ITT, Lockheed Martin, etc. (George, 2003a). Six sigma is closely linked to eliminating defects and variations in quality, while Lean is linked to speed, efficiency and elimination of waste. Lean aims to speed up any process by reducing all forms of waste (Gijo and Antony, 2019).

In 1987, Six Sigma approach was developed by Motorola with the addition of statistics along with total quality management (Aboelmaged, 2010). Sigma (σ) is a letter from the ancient Greek alphabet,

but it denotes the standard deviation, which is a measure of variability in statistics. Similarly, sigma is a parameter that expresses the standard deviation of the normal distribution in relation to the population (Singh and Rathi, 2019). The main factors that cause variability in businesses can be counted as suppliers, inputs, processes and environmental effects. Our aim is to reduce variability as much as possible by working on the factors we have mentioned and to ensure stability in businesses. Ensuring stability is possible by measuring the variability and focusing on the solutions of the mistakes and flaws in the processes that create it. Six sigma, which aims to completely eliminate errors by solving problems in businesses, is a proven project management approach created to design quality new products and processes. Six sigma is a statistical measurement of process capability, which means worldwide quality and aims for a long-term error rate of 3.4 parts per million (Behara *et al.*, 1995; Vendrame Takao *et al.*, 2017). This approach ensures that quality improvements are prioritized by working with a customer focus. The concept of "sigma" in the Six Sigma expression is used as a measure of change in statistics. When this variability is kept under control, zero error can be achieved in the processes. It increases the efficiency and effectiveness of the processes by reducing the costs of waste and poor quality in the processes. Six sigma improves the process rather than the product (Chen and Lyu, 2009; Gupta *et al.*, 2020).

Customers give importance to speed, quality and price criteria in product or service. Especially with the widespread use of the internet in the 2000s, companies need to shorten the cycle times of their products or services, reduce error rates, and reduce costs in order to meet these expectations (Aboelmaged, 2010). Many aspects of the job, such as customer service, product or service delivery, product quality, affect satisfaction. Therefore, customer satisfaction is not a one-stage process, but a multi-stage process (Singh and Rathi, 2019). The Six Sigma approach was first applied in the field of production, but later spread to other functional areas such as marketing, sales, engineering and supply chain. The supply chain is a process that starts with the formation of demand (Wei *et al.*, 2010). Marketing activities and sales activities, which are directly communicated with the customer, are among the important factors in the formation of the demand. The six sigma approach is also of great importance for marketing studies (Das *et al.*, 2006). There are many books and journals written on six sigma in the literature, and important publications that have been written in recent years and that have received many references are also striking (Antony, 2006; George, 2003b; Noake, 2002; Poormoaied and Atan, 2020; Pyzdek, 2002; Shokri, 2017; Singh and Rathi, 2019).

The LSS approach has been widely used by many businesses in the service sector, especially in the industry. In this article, the sales and marketing processes of a company, which is one of the most prestigious automobile manufacturers in the world, in Türkiye are discussed. The aim of the study is to maintain and increase customer satisfaction by applying LSS methodology in the processes carried out in automotive sales and marketing, and to realize improvements in digitalization in sales processes.

The sections of this study are organized as follows: In Section 2, a literature review on the use of LSS methodology in service systems is included. In the third section, the LSS methodology is defined. In Section 4, a case study is included. Finally, comments and suggestions for future work are given.

Literature Review

Organizations are continually challenged by the need to attract and retain customers, putting their revenue and profitability at potential risk. To mitigate this risk, enhancing customer satisfaction and overall customer value by optimizing sales and marketing strategies is essential (Ganatra et al., 2022). The concept of process efficiency as a driver of customer satisfaction is well-documented. According to Deming's theory, continuous improvement in processes leads to fewer defects and higher quality, which directly impacts customer satisfaction (Deming, 1986). Additionally, in the context of Lean Six Sigma, process improvement initiatives focus on reducing waste and variability, which enhances the overall customer experience (George, 2003b). Studies have shown that continuous improvement efforts, such as Total Quality Management (TQM) and Lean, are essential for enhancing product and service quality, which in turn increases customer satisfaction (Dale, 1999). For instance, a study by Zu *et al.* (2008) found that Six Sigma practices significantly improve quality outcomes, which are strongly

correlated with higher customer satisfaction. Continuous improvement methodologies emphasize the importance of customer feedback in refining processes. For example, the Plan-Do-Check-Act (PDCA) cycle encourages organizations to adjust their processes based on customer input, leading to better alignment with customer expectations and increased satisfaction (Imai, 1986). Porter (1985) discusses how firms that excel in both customer satisfaction and continuous improvement can achieve a sustainable competitive advantage. This advantage is built on the ability to consistently deliver high-quality products and services that meet customer needs. A study by Prajogo and Sohal (2006) highlights the role of continuous improvement in fostering innovation and adaptability. They argue that a strong focus on process improvement not only enhances customer satisfaction but also drives organizational innovation, allowing firms to better respond to market changes. The DMAIC methodology in LSS is designed to improve processes and outcomes in a way that directly impacts customer satisfaction. Research by Antony *et al.* (2007) shows that organizations using LSS see significant improvements in process efficiency and customer satisfaction, reinforcing the importance of continuous improvement.

Six Sigma is particularly effective in supporting these efforts, as it focuses on identifying problems, improving processes, and prioritizing customer-centric solutions. By leveraging LSS in the reengineering of sales and marketing operations, organizations can boost customer satisfaction through increased speed, quality, and efficiency of their services (Madhani, 2017). Wang *et al.* (2016) highlights the critical role of service quality in traditional markets, an aspect often overlooked by many practitioners who may not have recognized that enhancing service can lead to increased product sales. The research establishes a vital connection between customer service and traditional market management, emphasizing that service quality, customer satisfaction, and customer equity are essential factors for boosting marketing performance in these markets.

Lean six sigma is a methodology that has been widely used in the production and service sector and carries the philosophy of continuous improvement. After the 2000s, there are many research articles and literature review studies written on this subject. LSS methodology can be applied in almost all sectors and all processes, from telecommunications, defense industry, production, finance, to the health sector (Panayiotou and Stergiou, 2021). As a recent literature review on the manufacturing sector Shokri *et al.* (2021) are found. Although Six Sigma has been successfully applied in many manufacturing industries, significant attention has been paid to Six Sigma in the service industry in recent years (Bhat *et al.*, 2014; Pakdil *et al.*, 2020).

Since this study covers the improvement of processes by applying LSS methodology in service systems, a literature review is mainly focused on the applications of LSS methodology in service systems. Antony (2006) gave information about how the Six sigma approach was applied in service systems and presented examples from companies that applied this approach. He noted that many service organizations have observed significant benefits through the application of key tools of six sigma (e.g. Pareto analysis, root cause analysis or cause-effect analysis, process mapping or process flowchart, etc.). Delgado *et al.* (2010) have implemented LSS to provide excellent service in the financial sector. Gijo and Antony (2019) did a real-world case study of how the LSS DMAIC methodology helps reduce complaint resolution time.

It is seen that one of the most used areas of LSS application in the Service sector is the Telecom sector. In the telecom sector, they used LSS methodology in order to shorten the order fulfillment times (Shamsuzzaman *et al.*, 2018). Madhani (2017) emphasized that Six Sigma implementation brought a valuable process discipline and performance measurement to sales and marketing activities. It provides various tools and frameworks for the successful deployment of Six Sigma in sales and marketing and highlights the importance of promoting Six Sigma in sales and marketing. Madhani (2020) applied the LSS methodology to achieve performance optimization in their retail operations.

There is an important literature review study, which is one of the latest studies and includes LSS applications in European organizations (Panayiotou and Stergiou, 2021). In this study, the summaries of the articles based on country and sector, and the tools used in the studies are included. The study covers the period from 2008 to mid-2019. In the review covering the years 1992 to 2013, while the number of studies in the manufacturing sector is higher, it is seen that the service sector is equal to

the production sector in the studies conducted after 2008 (Shokri, 2017). It is seen that the most work in the service sector is in the field of healthcare, followed by finance. Shokri (2017) in his study, he found that the most publications on LSS methodology worldwide were from USA and UK countries. In Panayiotou and Stergiou's (2021) study, only European countries were looked at and it was seen that the UK and the Netherlands had the most studies. As a study from Türkiye, the study of Sagnak and Kazancoglu (2016) is included. The studies can be found as studies conducted in Türkiye since 2017 using the LSS methodology (Dursun *et al.*, 2020; Inal *et al.*, 2018).

There are also studies on increasing the production quality by using the LSS approach in LSS Automotive companies. Singh and Rathi (2019) scanned the studies on LSS between 2000-2018. They showed that 14% of these studies are related to improving the assembly line in the automotive industry. For example, Chen et al. (2005), in an automotive industry in Taiwan, they used the six-sigma method to increase customer satisfaction and showed that design, manufacturing and service quality should be increased in order to increase customer satisfaction in their studies. However, while the application of LSS in production and manufacturing processes is well-documented, there is a notable gap in its application within sales and marketing organizations. Despite the critical role that sales and marketing play in driving revenue and customer engagement, comprehensive studies exploring the use of LSS to streamline these processes and eliminate inefficiencies are scarce. This lack of research represents a significant gap in the existing literature, particularly given the potential for LSS to enhance operational efficiency, reduce waste, and ultimately increase customer satisfaction in these functions (Antony, 2006; Chen *et al.*, 2005; Singh and Rathi, 2019).

This study aims to address this gap by applying LSS methodology to sales and marketing processes, offering valuable insights into how organizations can leverage LSS to optimize these critical areas. By focusing on the underexplored application of LSS in sales and marketing, this research contributes to the broader understanding of how LSS can be effectively used beyond traditional production environments, providing a framework for organizations to enhance their marketing performance and customer value through systematic process improvement.

Methodology

Objectives of the Case Study

In this study, efforts to improve the sales processes of an automotive company with Six sigma management philosophy are included. The company, whose history in the automotive sector dates back to the 1980s, has a wide range of products, especially in the upper tab, in this intensely competitive sector of Türkiye today. Responsible for both sales and marketing activities and strategies, he manages four brands to create maximum brand value and achieve commercial success. The company makes use of the latest developments in technology and all the possibilities of human resources to provide the highest customer satisfaction. Due to this approach, its authorized dealers and services have gained a reputation as one of the organizations that provide the best sales and after-sales services in the Turkish automotive industry. Highly qualified authorized dealers and authorized services are one of the main factors of the company's success.

Within the scope of this study, it is aimed to make improvements in sales processes to form a basis for digitalization in line with the main purpose of maintaining and increasing customer satisfaction. In this context, various surveys were conducted with customers, brainstorming activities were carried out with employees involved in sales processes, and process improvement was made by evaluating the data obtained as a result of these. The application was carried out using the DMAIC (Define, Measure, Analyze, Improve and Control) method in order to improve the processes that cause customer dissatisfaction and to create an integrated system using LSS tools. Improvements were made in line with the purpose by applying the method step by step.

Lean Six Sigma Methodology

LSS is a management style that aims to meet customer demands with high quality and error-free processes, process excellence and reduce the number of errors, and is a cultural change involving everyone in the organization (George, 2003b). Six Sigma is basically an approach that analyzes the

root causes of business problems, finds solutions to them, and increases employee performance with the solutions found. With this approach, business outputs and market requirements are directly related. Therefore, the purpose of Six Sigma is to increase customer satisfaction and business performance. For this purpose, what needs to be done is to identify and implement changes that will positively affect customer satisfaction and business performance within the system and processes. However, these changes should be based on research, data, and knowledge. Undoubtedly, all these processes must be done using scientific methods. There are certain principles that must be followed in order to apply the six-sigma methodology correctly. These are "customer and process oriented", "data-driven and proactive management", "unlimited collaboration", "aiming for excellence" and "tolerance for failure". In organizations where Six-Sigma is applied, the "Define, Measure, Analyze, Improve and Control" (DMAIC - Define-Measure-Analyze-Improve-Control) model is used. DMAIC is a structured problem-solving methodology widely used in business. The DMAIC techniques are the most significant part of the Six-Sigma approach for enhancing sales performance (Pyzdek, 2002; Voehl *et al.*, 2013). The stages of DMAIC are shown in Figure 1 and explained shortly below.

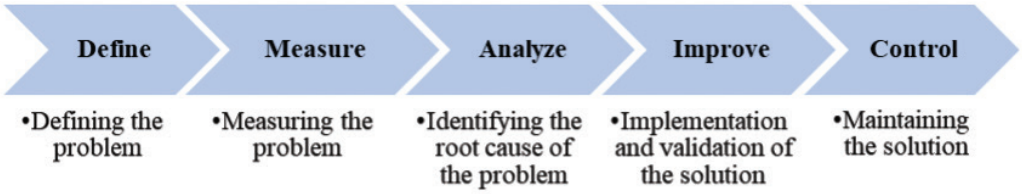

Figure 1. Phase of the DMAIC

1. **Define:** The identification phase is crucial to getting started right. In the definition phase, the project team is formed, customers and their needs and expectations are identified and validated, and finally a high-level map of the current process is created.
2. **Measure:** The main purpose in the measurement phase is to collect data about the scope of the project and to measure the problem with these data. At this stage, various tools such as histogram, Pareto chart, ANOVA analysis and process sigma are used for measurement. By measuring the effectiveness of the current situation, it is determined which data can be obtained from which sources. Since it is impossible to control without measurement, the measurement phase is very important in data collection. The three main tasks at this stage are: 1. Creating a detailed process map, 2. Gathering baseline data, and 3. Summarizing the data and providing a basis for analysis. For the data collection process, it is undoubtedly important to determine the data types and their expansion.
3. **Analyze:** Statistical studies of the problem are carried out in the analysis phase. The definition phase identifies the problem, the measurement phase compiles the data and uses it to measure performance. The focus of this phase is to identify and resolve the root cause or causes of the problem. The analysis and evaluation phase of the data helps to reveal the current state of the business.
4. **Improve:** The recovery phase is the final planning phase to achieve results successfully. The reasons for the variability of all the factors that affect the efficiency of the processes, their interactions with each other and the effect levels on the processes are revealed. This stage ensures that the things that need to be done for the business to reach the determined goal are revealed and put into effect.
5. **Control:** The purpose of the control phase is to evaluate the improvement plan implemented and the results obtained from the implementation, and to reveal what needs to be done to maintain and increase the gains achieved. To ensure that improvement is achieved, the accuracy of the measurement system is verified, and the process capability is reassessed. The main purpose is to ensure that the improvements are permanent and continuous at the six-sigma level. In addition, at this stage, the documentation of the new process is made for the success to be permanent. Furthermore, additional potential solutions are generated for future work.

Tools used in six-sigma projects; Voice of the Customer (VOC), Affinity diagrams, process maps, SIPOC (Supplier, Input, Process, Output and Customer) diagrams, brainstorming, Pareto analysis, cause and effect diagram, histogram, Gage R&R measurement analysis, hypothesis testing and analysis of variance (ANOVA), Design of Experiments (DOE), regression analysis, benchmarking, Failure Modes and Effects Analysis-FMEA (Madhani, 2017).

Case Study

The application was carried out with the DMAIC method to improve the processes that cause customer dissatisfaction and to create an integrated system using LSS methodology. It is aimed to make the right improvements by applying the method step by step.

Defining Phase: Project, Purpose and Goals, Team, and Method

In the definition phase, first the project statement was published, and the project was summarized in general terms. The sales process to be improved was detailed with the process map to ensure that all team members had a solid knowledge of the process. The task distribution of the people involved in the study was made over the current sales processes. After the decision to build the project, the "project statement" was created. In this statement, there are reasons for implementation, project goals and achievements, scope, limitations and assumptions, team members and time schedule. This prepared paper is a document that guides the process of the project. According to the project statement, the project process was planned as 6 months in total. The main goal is to increase customer satisfaction by improving sales processes and to improve processes to become more effective and efficient. For this purpose, it is aimed to determine the processes that will form the basis of digitalization and make necessary improvements. Team members are required to devote an average of 20% of their working time to this project. It is aimed to ensure project follow-up by organizing weekly 3-hour meetings. The project will be monitored regularly, and presentations will be made to the senior management. The time required for the senior management to monitor the project is determined as 10% of the working time. In line with these purposes, we can list the goals to be achieved as follows:

1. Creating a customer-centered sales process,
2. To simplify the sales processes by finding and eliminating the steps that do not add value to the customer,
3. Establishing a basis for digitizing the system by adapting to technology and eliminating waste of time and material in the system,
4. Developing stable and predictable processes,
5. To make production and non-production business processes measurable, analyzable, developable, and controllable,
6. Increasing the efficiency of the process,
7. To create an integrated system,
8. To provide quick and easy feedback from the improved system,
9. To ensure permanent development.

The company sells various vehicle brands. Employees work in these various brands. There are equal numbers of people from almost every brand in the team of this project. There are nine black and green belt employees, five sponsors, one project owner, one advisor academician and two trainee green belts in the team. The fact that the members of the team are responsible for different brands is very useful for better analyzing the process. Since the sales process is a wide process, the team must correctly distribute the tasks at the beginning of the project. This distribution is also very valuable in terms of carrying out the work to be done on the project more easily. Therefore, the process steps were divided into team members and task distribution was made.

First, the sales process to be improved is detailed with the process map to ensure that all team members have a solid knowledge of the process. The sub-processes and decision steps that the

customer goes through from the beginning to the end of the process are determined in detail and shown on the process flow diagram. The input, output, customer, and supplier relations of the process are given in the SIPOC diagram. Value-added and non-value-added steps of the process were determined by performing value-added analysis and shown on the process flow diagram.

Sales Process Mapping

The sales process starts with the customer's entry into the business and continues until the after-sales negotiations after the sale is made. Many sub-process sales processes need to be examined in more detail. Therefore, the process was divided into steps and the process map was created as in Figure 2.

Figure 2. Stages of the automotive sales process

The steps of the process map are explained below.

1. **Security Entry and Guidance to the Parking Area:** When the customer arrives at the company, he first enters through the security and is directed to the parking area if he has a vehicle.
2. **Showroom and Cafe:** The customer, who is taken to the showroom / exhibition hall where the vehicles are displayed at the entrance of the building, can examine the vehicles in detail in this area. In cases where the customer has to wait, there is also the opportunity to spend time in the cafe located just behind the showroom.
3. **Customer Registration, Referral to the Related Person, Vehicle Introduction**: When the customer wants to meet with the sales consultant, he/she first comes to the information desk at the entrance of the building and opens the registration. It is transferred to the sales consultant according to the vehicle model he is interested in. The sales consultant introduces the vehicle to the customer and helps by answering the customer's questions.
4. **Test Drive:** In cases where the customer wants to try the vehicle before purchasing the vehicle he is interested in; a test drive is made. Customers with a driving license for at least 2 years can drive the vehicle themselves, while customers with less than 2 years or no license can take the test with the people assigned for the test drive. After completing certain documents for driving, a test drive can be made. The test drive is held in certain areas around the firm. This step is very important for the customer to be directed to purchase the vehicle.
5. **Expertise:** When customers want to buy second-hand vehicles or exchange their existing vehicles, the vehicles must be examined by an expert. This examination is called an appraisal. The appraisal helps put the customer in a more informed position to negotiate by looking

at the various features of the vehicle. In these evaluation processes, many points such as the vehicle's mileage, past maintenance, and physical damage should be examined in detail. When this process is completed, a written review and a presentation on the subject are made to the customer.

6. **Price Offer:** Each vehicle has a specific price. In some cases, the company can offer the customer a price for the vehicle to be purchased. The customer and the seller try to reach an agreement on a certain price. In this case, the sales consultant can offer a special offer to the customer and provide a discount at certain rates. In some cases, an offer is created by providing a certain price reduction based on the appraisal report of the vehicle that the customer wants to exchange.
7. **Referral to Different Brands:** The sales consultant can direct to distinct brands within the company in cases where the customer will give up buying the brand vehicle that he/she has specified, or when he/she thinks that a different brand vehicle is more suitable for the customer due to factors such as price and comfort. Thus, loss of sales is prevented.
8. **Gift Approval Process:** While purchasing the vehicle, some customers ask the sales consultant for gifts such as key chains and mats. In these cases, consultants are required to obtain approval for the gift.
9. **Additional Sales Processes:** If the vehicle is not included in the vehicle equipment after the sale, various accessories such as vehicle mirror cover, mat, carrier bars, material box are also sold. These sales constitute additional sales.
10. **Internal Process:** Employees involved in the sales process have various internal processes such as preparing documents, entering information into the system, issuing license plates, and issuing invoices.
11. **Shipment:** After the customer purchases the vehicle, the vehicle is shipped to the branch within a few days. This shipment is made through the supplier institution that the company has agreed with.
12. **Vehicle Preparation:** After the vehicle arrives at the branch, it is cleaned at a place called a car hairdresser, the desired accessories are attached, and it is ready for customer delivery.
13. **Delivery Time:** The customer comes to the company according to the appointment created to receive his vehicle. The sales consultant who sells the vehicle meets the customer and deals with the customer until the vehicle promotion specialist is available. At the appropriate time, the consultant directs the customer to the vehicle promotion specialist. After the customer signs a few documents, he goes to the demonstration area. Here, the promotion specialist is responsible for explaining every function of the vehicle to the customer. After explaining all the features of the vehicle, if there are products given as gifts, they put them in the vehicle and deliver them to the customer.
14. **Exit from Security:** Customer exits from security after picking up his vehicle.
15. **Calls / Online Channels:** Sales consultants can create sales opportunities by calling the customers in the records in the system, who are able to sell, and informing them about the vehicles.

SIPOC Analysis

SIPOC diagram was made in order to see the process better during the definition phase. SIPOC is a tool that summarizes the inputs and outputs of one or more transactions in tabular form. In the SIPOC diagram, the initial boundary is the customer's entry from the security and the end boundary is the customer's exit from the security. In the process map, the flow followed from the arrival of the customer to the exit is shown. The SIPOC diagram defines the suppliers, inputs, outputs and customers of the system during this process (Figure 3).

Process Flow Chart and Value-Added Analysis

A process flow diagram is a picture of the sequential ordering of the individual steps of a process. A process flow diagram has been made in order to better examine the sales process from the

customer's entry to security and exit, as well as calls and online channels. The Calls sub-process includes telemarketing calls to the customer before sales or satisfaction calls made after sales. Online channels cover all activities and survey processes of the customer on the website of the business. In this diagram given in Figure 4, it is possible to see the roadmap and decision steps of customers in each sub-process.

For example, the path followed in the sub-processes may change depending on whether the customer comes to the company with his own vehicle, whether he wants a test drive, whether he is considering a trade or whether the sold vehicle is in the company's stock. Each step was examined on the process flow diagram, and it was determined whether it provided added value to the process. Value-added tasks are the operations involved in altering the nature or shape of a product or service to precisely meet the needs of the consumer. The steps in the process are defined as VA (Value-Added) if they are seen as valuable in the eyes of the customer, and NVA (Not Value-Added) if they are seen as worthless.

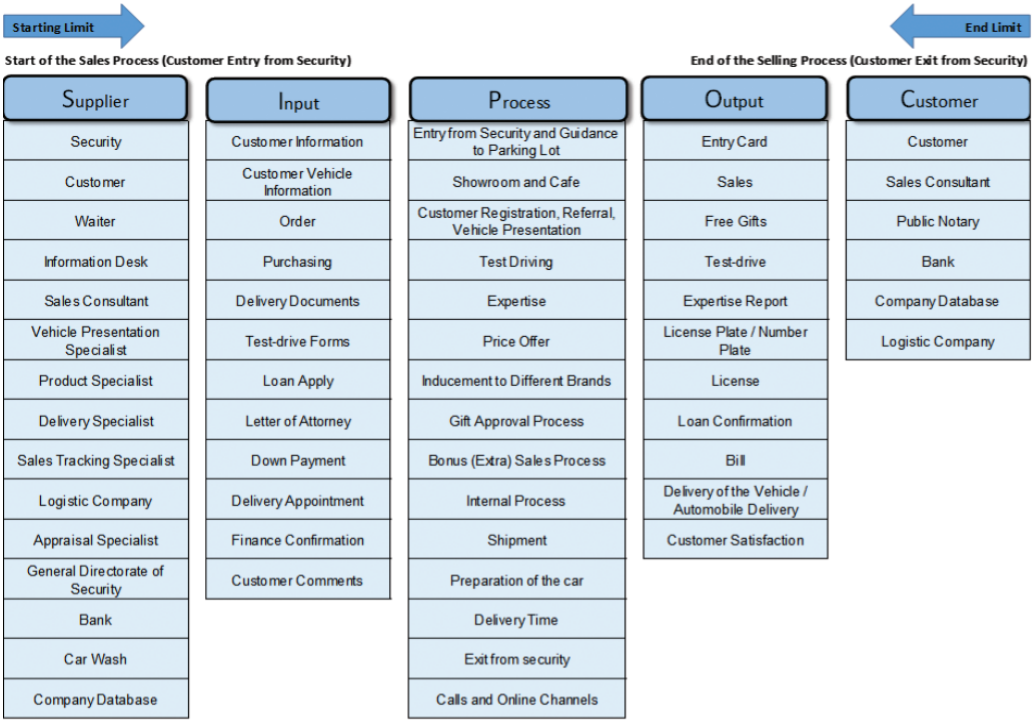

Figure 3. SIPOC model of automotive sales process

Lean Operation principles classify activities as value-added and non-value-added activities. The focus of these principles is the elimination of all non-value-added activities. There are seven forms of non-value added (or waste): overproduction waste, inventory waste, defect waste, movement waste, transaction waste, waiting waste, and transportation waste.

This flowchart will help to understand the complexity of the process and identify value-added (VA) and non-value added (NVA) activities. All steps in the process were explored to determine which added value or didn't. After examining all these details, the team identified and listed NVA activities. The decision on these NVAs was made by the team in consultation with the project champion and clients of the process. As a result of these NVAs, the process is delayed, and the timely closure of the complaint is affected. Therefore, the team decided to plan actions to study these NVAs during the refinement phase of the study. These actions can be to eliminate or minimize the impact of these NVAs affecting resolution time.

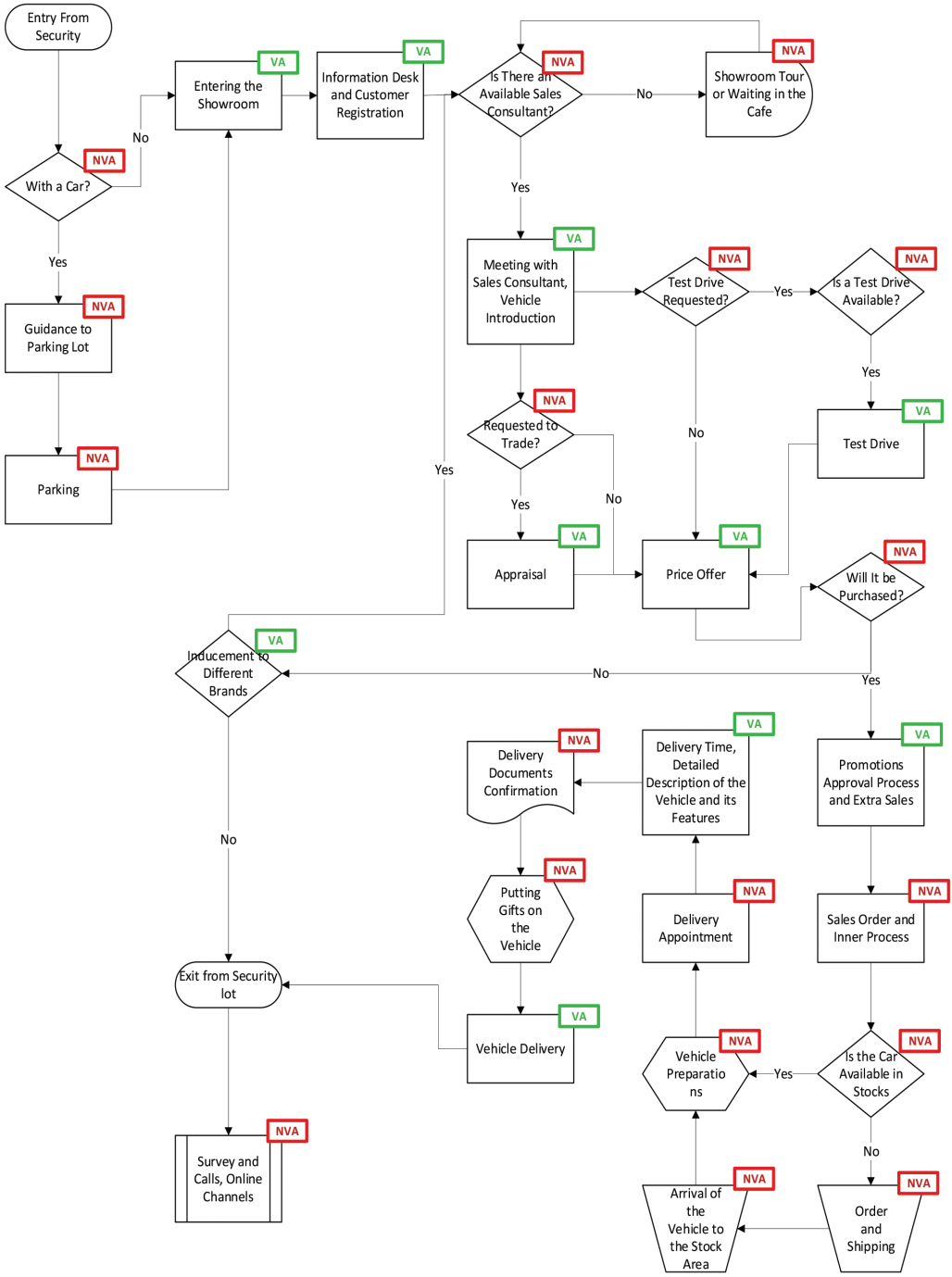

Figure 4. Process flow map

Measurement and Analysis Phases

After the defining process, it is necessary to collect and analyze data about the scope of the project. This stage is very important in terms of focusing on the right data. In this framework, firstly, the "Voice of the Customer" (VOC) was determined and analyzed according to the surveys made with the customers. Then, the data obtained as a result of the "lost sales comments" and the satisfaction surveys made immediately after the sale were analyzed. In addition, as a result of the brainstorming studies with the employees, the sound of the process and the troublesome processes were surveyed, and the process was analyzed from the eyes of the employees.

Voice of the Customer (VOC) Analysis

After a while, a survey is conducted with the customers to whom sales are made, using communication channels such as telephone and e-mail. In this survey, 20 questions were asked about the possibility of recommending the company regarding the sales process, how they were received, their ideas about the showroom appearance, their test drive experiences, the financial offer process, their satisfaction with the requests, and their satisfaction with the after-sales support. Customers answered these questions with their reasons.

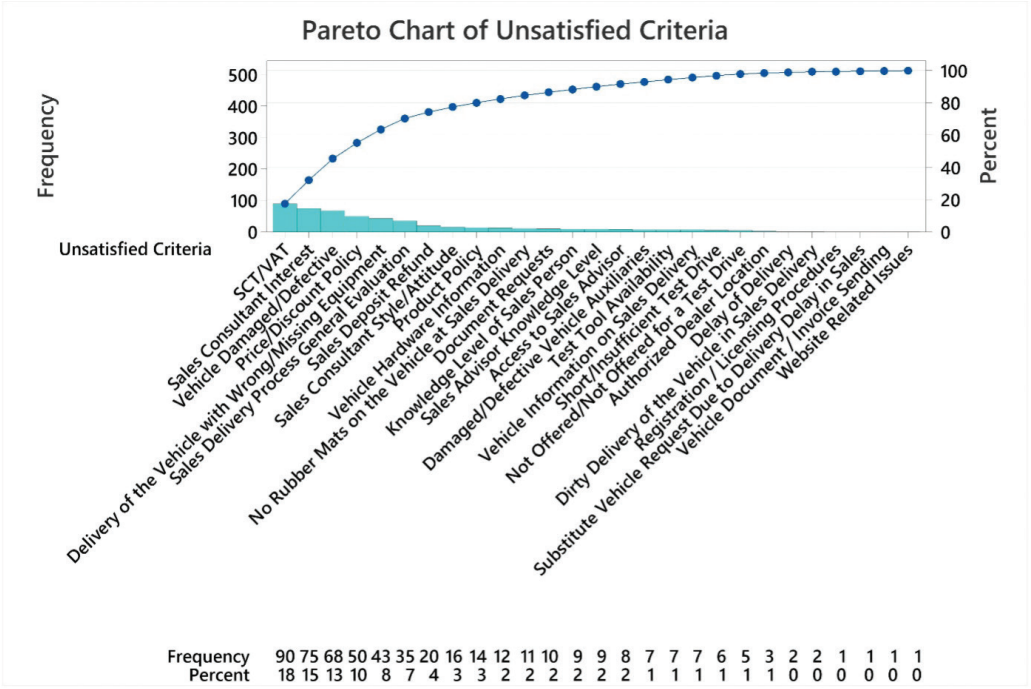

Figure 5. Pareto chart for VOC

Evaluation was made considering the last 400 surveys made with customers. In this study, which was conducted to determine the reasons for dissatisfaction, the answers given by the customers to the questions were grouped with the help of a close similarity diagram. The data was divided into 27 different reason groups in total, facilitating the analysis. Based on the repetitions of the reasons, the analysis of the sales cases VOC questionnaire was made with the Pareto Diagram tool given in Figure 5 in Minitab statistical software.

According to the Pareto diagram, 80% of the results are due to 20% of the causes. For this reason, the reasons to the left of the 80 line constitute the most important dissatisfaction factors. According to the graphic, the most important factors causing customer dissatisfaction are SCT / VAT Taxes, Sales Consultant Interest/Relevance, Damaged / Defective Vehicle, Price / Discount Policy, Delivery of the Vehicle with Wrong / Missing Equipment, General Evaluation of the Sales Delivery Process, Sales Deposit Refund, Sales Consultant Style / Attitude and Product Policy. It is clear that the company should prioritize these causes and develop solutions for them. Undoubtedly, for 80% of the causes that have 20% results but have very low frequencies, solutions should be found later on.

Lost Sales Analysis

Lost sale is the name given to the situations where the customer does not make the purchase and gives up on purchasing the product. The sales consultant enters the customer's reason for giving up in the system when the customer he is interested in gives up on purchasing the product. The 9-month lost sales data of 2019 has been examined. A total of 12 628 data were divided into 14 common cause groups using the close grouping technique. The analysis of lost sales reasons based on the repetitions of the reasons was made with the Pareto Diagram tool given in Figure 6 in Minitab software.

According to the Pareto diagram, the reasons to the left of the 80% line constitute the most important group of lost sales reasons. Accordingly, the most important causes of lost sales cases emerged as Price, Arbitrary Reasons, Unstable Markets and Product (Hardware Level). It is clear that the company should prioritize these causes and develop solutions for them. Undoubtedly, for 80% of the causes that have 20% results but have very low frequencies, solutions should be found later on.

Net Promoter Score (NPS) Analysis

It is the analysis made with the information obtained as a result of the surveys or calls made to get the satisfaction, opinions, and suggestions of the customers about the product and sales service immediately after the sale. These analyzes are called NPS results analysis. This application asks the customer "Would you recommend the product or service to your friends?" and "why?" It is done to get answers by asking questions. In this way, if there is dissatisfaction in the eyes of the customer, it is ensured that he does not express it directly but indirectly as a recommendation. Negative comments in the NPS results made between January and July 2019 were divided into 14 common reasons (criteria) by close grouping technique. NPS analysis was carried out using the Pareto Diagram tool given in Figure 7, based on the number of repetitions of the causes.

According to the Pareto diagram, the reasons to the left of the cumulative 80% line are the most important reasons for dissatisfaction. Accordingly, based on the NPS comments, the most important reasons leading to dissatisfaction are Pricing and Discount, Product Quality, Product Design, Price Quotation, and the Attitude and Behavior of the Sales Consultant, respectively. It is clear that the company should prioritize these causes and develop solutions for them. Undoubtedly, it is necessary to search for solutions in time for the causes that have 20% results but have relatively low frequencies.

Secret Customer Analysis

In order to experience the sales process from the perspective of the customer, the company was visited as a secret customer. In order to measure the steps that create dissatisfaction in the sales process, measurements were made by going to 2 different brands at different times. In the observations made, each stage in the sales process from the security at the entrance to the exit was examined in detail. In this process, various criteria such as the interest and relevance of the employees, product knowledge, sales performance, service evaluation, environment and space arrangement were examined.

In the first observation, brand A was chosen, and the sales process was generally positive. In another observation, the measurement was made by going to the B brand. The interest and relevance of the sales consultant in the secret customer experience of the B brand was found to be insufficient. In the third observation, brand B was used again. Since the vehicle for which information was requested was not available, no information was given, and when information was requested about another vehicle, no attention was paid. In the third observation, the interest of the consultant was found to be insufficient. In the three-secret customer analyzes, it was concluded that employees of brand A are more interested in customers, while employees of brand B see customers as sales-oriented.

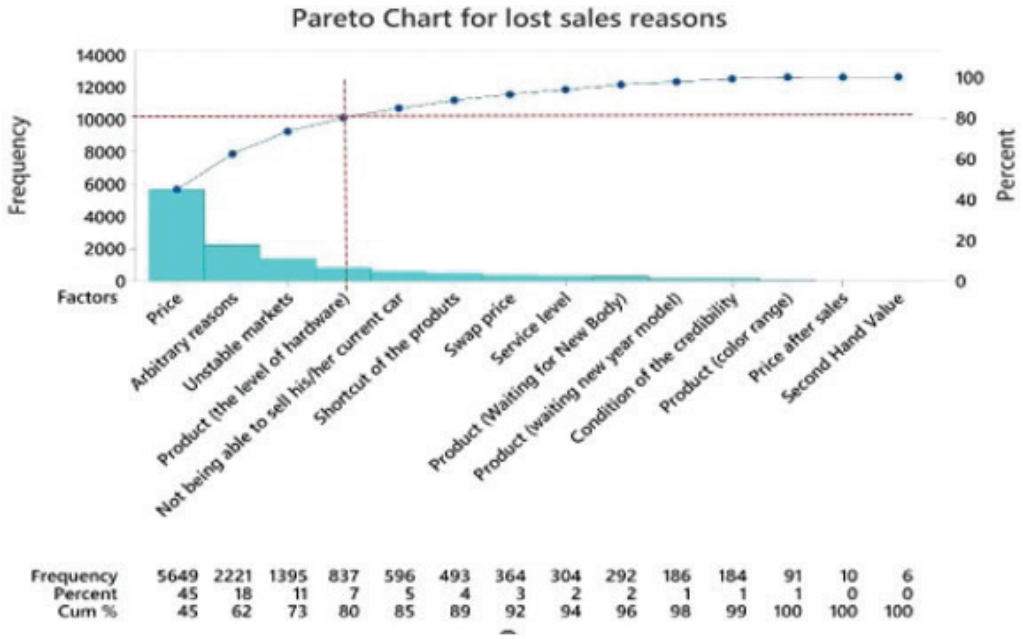

Figure 6. Pareto chart for the lost sales reasons

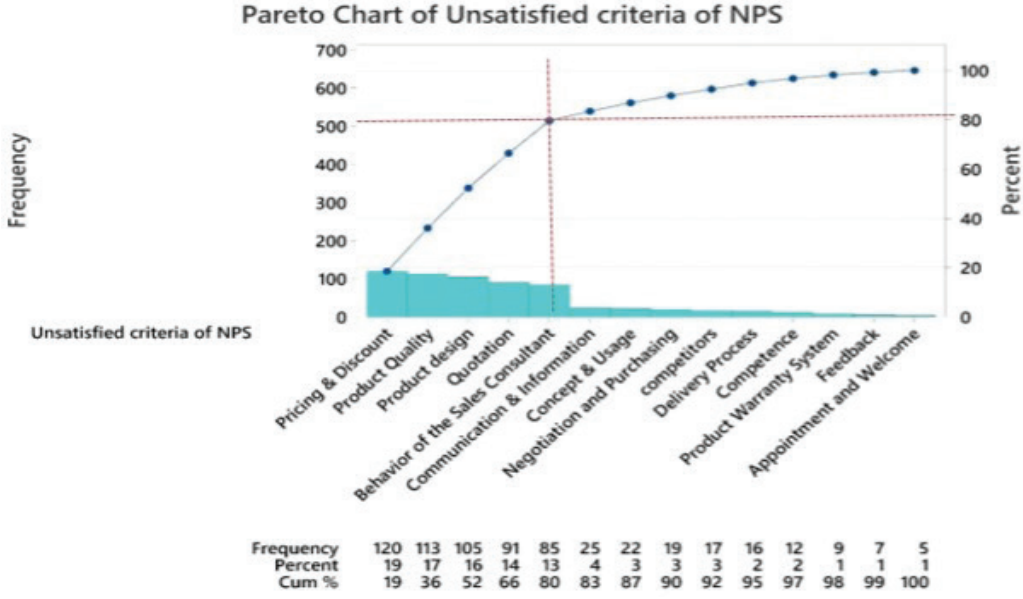

Figure 7. Pareto chart of unsatisfied NPS results

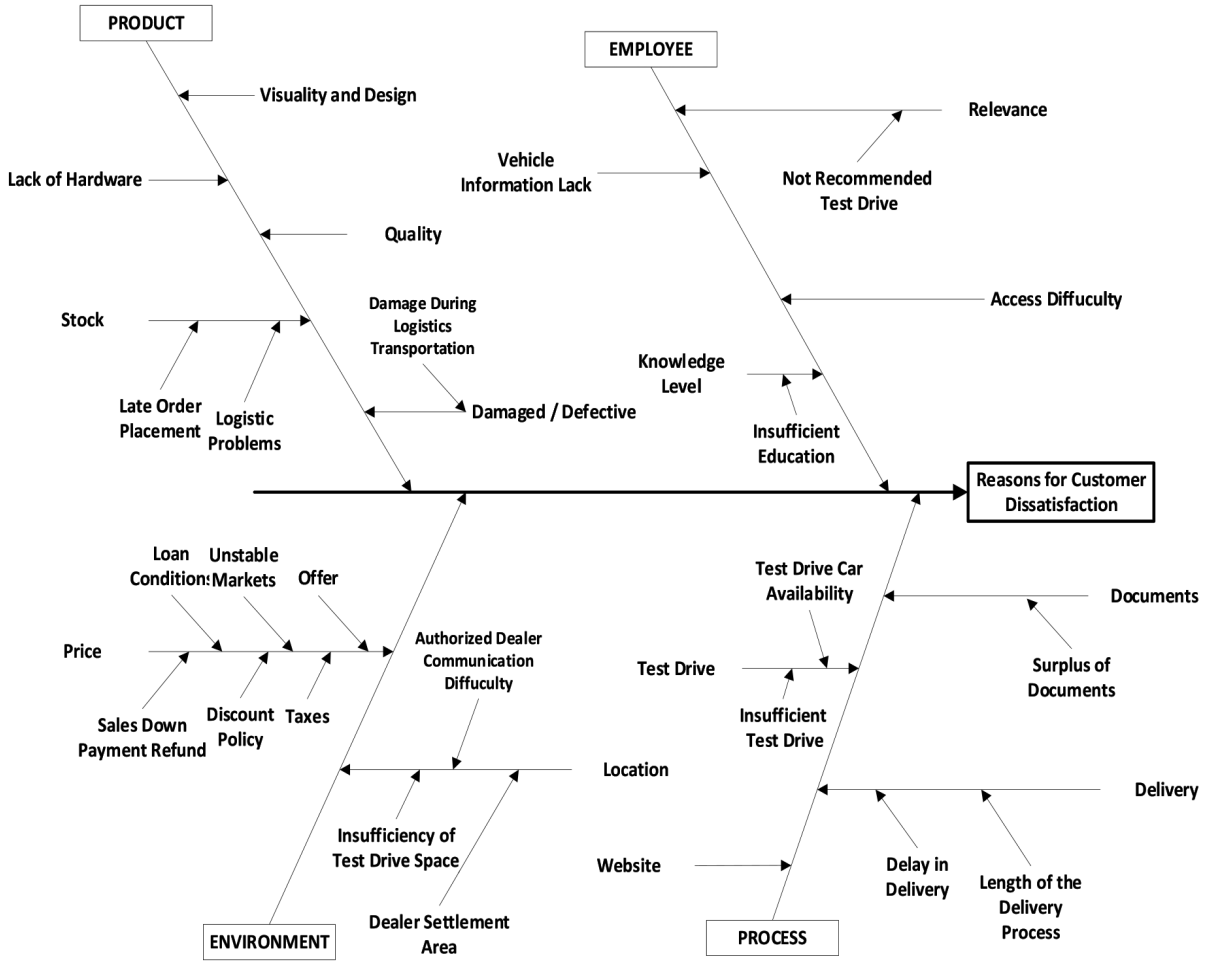

Figure 8. Cause and effect diagram for unsatisfied customer

Cause and Effect Analysis

A fishbone study was conducted to find possible root causes of customer dissatisfaction. As a result of various measurements made while creating the fish bone, the reasons leading to dissatisfaction were gathered under 4 main headings. These; Product, Employee, Environment and Process. The details of possible root causes for these 4 groups of causes are given in the fishbone diagram in Figure 8 with dark horizontal lines and texts on it.

Brainstorming Techniques

Project measurements and analyzes continued with brainstorming studies carried out in various branches of the company. 18 people took part in the brainstorming in the A branch. 9 sales consultants, 3 sales follow-up specialists, 2 sales customer representatives, 1 product consultant, 1 product promotion specialist, 1 delivery specialist and 1 customer activation unit manager participated in the study. In order to obtain accurate data, it is of great importance that the participants are selected as people from different positions of the company.

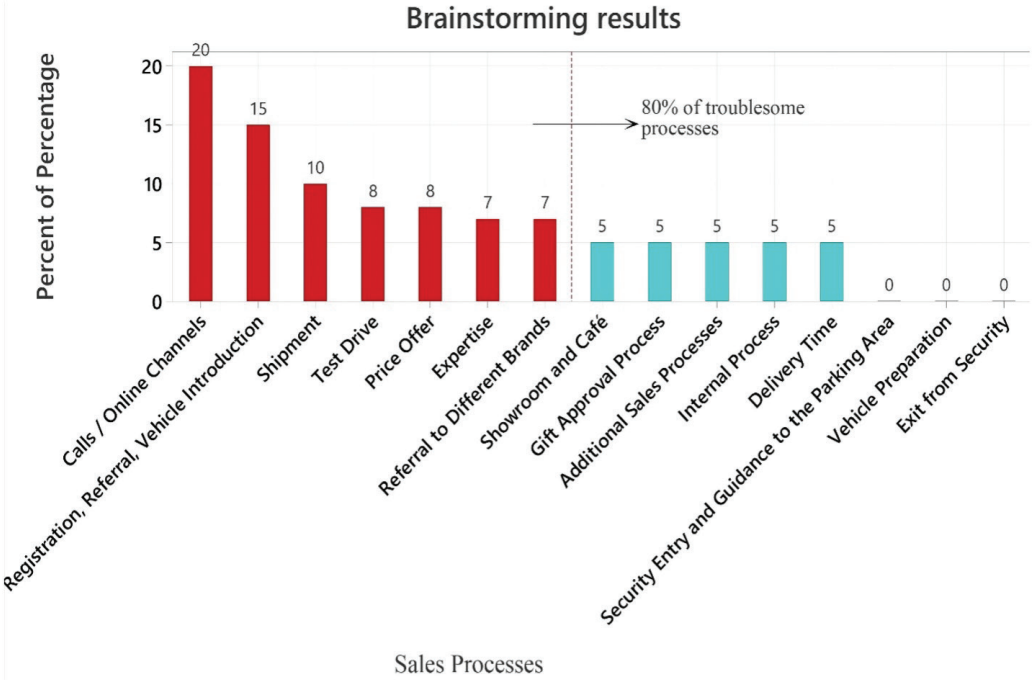

Figure 9. ABC Analysis diagram of problem situations with first brainstorming

1. First Brainstorming Study: An online questionnaire about the sales process was sent to the participants. In this survey, considering all the steps of the sales process, they were asked to mark the 3 most problematic areas. In the survey, all process steps from security entrance to security exit were asked separately and the most difficult process steps were tried to be determined. The analysis of troubled processes, based on the number of repetitions of problematic situations, was made with the Pareto Diagram tool given in Figure 9. According to the data obtained from the online questionnaire made to the employees, the processes that they think are the most important group A are 'Calls', 'Customer Registration, Referral to the Related Person and Vehicle Introduction', 'Shipment', 'Test Drive', 'Price Offer', 'Expertise'. and 'Referral to Different Brands' steps.

2. Second Brainstorming Study: Employees were asked to indicate the reasons for the difficulties they experienced during the sales processes and to stick them under the relevant process with colored adhesive papers. In this way, brainstorming work was made fun and it was ensured that the employees were included in the work more willingly and efficiently without getting bored. Employees of different brands stated the processes in which they had problems. According to the data obtained in the study

(Table 1), the process in which various brand employees in the company have the most problems is the Test Drive step. Subsequent processes are Calls/Online Channels, Customer Registration, Referral and Vehicle Introduction, Showroom and Cafe, Price Offer, Gift Approval Process, Internal Processes, Vehicle Preparation, Expertise, Security Entry and Parking Area, Additional Sales, Delivery Time, Referral to Different Brands, Shipment and Exit Security.

Table 1. Troubled processes according to the second brainstorming study

Process Steps	Brand A	Brand B	Brand C	Brand D	Total
Test Driving	1	8	7	3	19
Calls and Online Channels	3	6	7	0	16
Registration, Referral, Vehicle Introduction	1	10	4	0	15
Showroom and Cafe	1	7	4	0	12
Price Offer	2	6	1	0	9
Gift Approval Process	1	4	4	0	9
Internal Process	2	7	0	0	9
Preparation of the Car	2	1	5	1	9
Expertise	1	4	2	0	7
Entry from Security and Guidance to Parking Lot	1	3	2	0	6
Additional Sales Process	2	4	0	0	6
Delivery Time	3	1	2	0	6
Referral to Different Brands	1	3	0	1	5
Shipment	3	1	0	1	5
Exit from Security	1	3	0	0	4

3. Third and Fourth Brainstorming Studies: The 3rd Brainstorming Study, which was conducted with a 16-question survey to determine the 'areas of success' and 'development areas' of the company in terms of development or digitization, and finally, the 4th Brainstorming on 'analysis of worthless steps from the eyes of the employees' in terms of time wasting and digitization. It is not necessary to give the details of this work here for the purpose of the paper.

4. Results of The Brainstorming Study for All Branches: The brainstorming studies given above were carried out in 6 different branches of the company. Brainstorming studies were conducted with a total of 89 participants, 20 in the A branch of the company, 15 in the B branch, 21 in the C branch, 11 in the D branch, 10 in the E branch and 12 in the F branch. According to the results of the brainstorming conducted in all branches, the percentages of the data obtained regarding the problematic process steps are given in Figure 10. According to the data, the most problematic step of the sales process for employees is the "Shipment" step with 15.2%. This is followed by "Calls" with 10.8% and other steps with close percentages "Customer Registration, Referral and Vehicle Introduction", "Test Drive" and "Expertise".

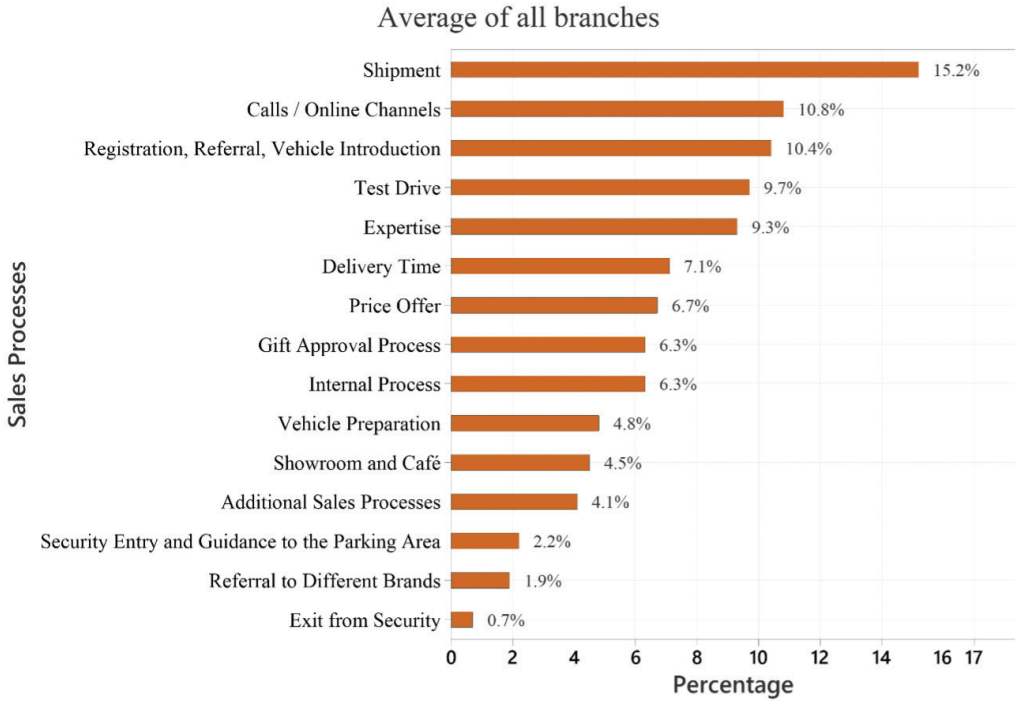

Figure 10. Percentages of problem areas by brainstorm analysis for all branches

Measurement and Analysis Stage Results

In accordance with the measurements and analyzes made with the 5 methods described above, excluding the fish bone, the most problematic process or process steps are summarized in Table 2 comparatively. Methods are given in the column headings, and the problematic steps according to each method are given below in order. There is no doubt that these data will be taken into account when making improvement suggestions and that the most problematic processes should be focused on first.

Table 2. Measurement and Analysis studies comparative problematic results table

Measurement and Analysis Methods							
VOC	**Lost Sales Reasons**	**NPS**	**Mystery Shopper**	**Brainstorming Work 1**	**Brainstorming Work 2**	**Brainstorming Work 3**	**Brainstorming Average**
Special Consumption Tax (SCT) / Value Added Tax (VAT)	Price	Pricing & Discount	Relevance of Sales Consultant	Calls	Test Driving	Employee Education	Shipment
Relevance of Sales Consultant	Discretional Reasons	Product Quality	Test Driving	Customer Registration, Referral, Vehicle Introduction	Calls Online	Employee Authorizations	Calls
Damaged / Defective Vehicle	Unstable Markets	Product Design	Calls	Shipment	Customer Registration, Referral, Vehicle Introduction	Teamwork and Cooperation	Customer Registration, Referral, Vehicle Introduction
Price / Discount Policy	Product (Equipment Level)	Price Offer		Test Driving	Showroom and Cafe		Test Driving
Delivery of the Vehicle with Wrong / Missing Equipment		Attitude and Behavior of the Sales Consultant		Price Offer	Price Offer		Expertise
Delivery Time				Expertise	Gift Approval Process		Delivery Time
Return of the Sales Deposit				Referral to Different Brands	Internal Process		Price Offer
Attitude of the Sales Consultant					Preparation of the car		Gift Approval Process
Product Policy					Expertise		Internal Process

Improve Phase

The outputs obtained from the voice of the customer (VOC) surveys, lost sales reason analysis, NPS results analysis, secret customer study, fishbone analysis and brainstorming conducted during the measurement and analysis phase, and suggestions for improvement are given below. According to all analysis results, a total of 28 results and suggestions are summarized as follows:

1. It has been analyzed that the most problematic process step is 'Shipment'. The following process steps in order of importance; Calls, Customer Registration Referrals and Vehicle Demonstration, Test Drive, Expertise, Delivery Time, Quote, Gift Approval Process, Internal Process, and other sub-processes. First of all, improvement suggestions were made by taking this order into consideration.
2. It has been determined that the biggest problem in shipment originates from the logistics company. It has been observed that vehicle shipments are delayed. The improvement proposal made for this is in the direction of changing the logistics company. At the same time, regular monthly meetings should be held with the company and the shipment process should be kept under control.
3. It has been determined that the shipment planning is insufficient. For this, distributor and branch stocks should be followed up, and necessary training should be given on the subject.
4. It has been observed that the stock area of ready-to-deliver vehicles is insufficient. For this, a good capacity planning should be done.
5. Tele-marketing calls and high traffic of customers increase the workload of Sales Customer Representatives and Sales Consultants. To completely eliminate this problem, a contact center can be set up where all calls are handled from one place.
6. It has been determined that telemarketing calls are not efficient. There are two main reasons for this. These are the inability to adequately meet the needs and expectations of the customers sought, and the calls made to the wrong customer group. Tele-marketing calls should be made by the last consultant who dealt with the client, since the consultant who spoke with the client last knew more about the client's needs and expectations.
7. It has been determined that there is not enough awareness about telemarketing and online sales opportunities. In order to change this perception, sales consultants should be trained on telemarketing search methods, and this should be followed up with shadow customers or role plays.
8. It has been determined that Sales Customer Representatives and Vehicle Delivery Specialists do not have sufficient information about the vehicles offered for sale. To eliminate this, Sales Account Representatives and Vehicle Delivery Specialists should be included in product trainings. In addition, these employees and product experts should hold sharing meetings periodically and this should be added to the performance targets.
9. It has been observed that the workload has increased due to the diversity of the records kept by the Sales Account Representatives. These records can be kept more easily in the Salesforce system. This will facilitate the reporting process.
10. It has been determined that there is a waste of time and paper in filling out the documents. In order to eliminate this, it should be ensured that the document approvals are received with the confirmation message to be sent to the customer's phone. In this way, the digital storage of approvals will also be ensured.
11. Customers who want to go for a test drive should come to the showroom and get a test drive appointment from the sales consultant. This causes unnecessary waiting. At the same time, it was determined that there was a lot of paper wastage in the process. A test drive appointment for the solution of these should be available on the website. Thus, the digitalization of test drive forms will be ensured, and time loss will be eliminated.
12. It has been determined that appraisal experts do the pricing procedures manually and this creates a surplus of documents. A system should be established in which appraisal experts can progress quickly and from a single application.

13. It has been determined that the appraisal specialists take a long time to price second-hand vehicles and the customer complains about this wait. To eliminate this, a cross-selling opportunity can be opened from Salesforce to Appraisal experts (for example, for 1 hour) and added to this bonus system.
14. It has been determined that the delivery appointment follow-up is not planned enough, and the employees cannot follow this process. In order to eliminate this, the delivery appointment areas in the SAP system should be actively used by all brands and branches. This can be supported by a premium.
15. It has been observed that the customer, who was excited at the time of delivery, skipped many things while introducing the vehicle and asked many questions about the vehicle to the sales consultant or delivery specialist after the delivery. To eliminate this, a detailed vehicle introduction video can be taken to be sent to the customer after delivery. This should be standardized for every vehicle offered for sale.
16. It has been determined that credit options are not communicated to sales consultants on a regular basis. For this, the loan options offer form should be revised regularly.
17. It has been observed that the invoice process of the sold car cannot be started immediately because the vehicle information in stock is updated late. The reason for this is that a wholesale invoice is issued for the vehicles that are in stock. In order not to interrupt the sales process, a new system should be created so that stock status can be seen, and plans can be made accordingly, even if there is no invoicing.
18. It has been determined that there is a lack of information and communication in the internal processes. For effective communication, all employees in the sales department should be informed via the same e-mail group.
19. It has been determined that the sales consultants could not reach the necessary information about the motor insurance and traffic process. The entire process (document, communication with the customer, etc.) for motor insurance and traffic transactions should be managed by consultants.
20. It has been determined that the archive system is irregular because the employees do not use uniform documents. Therefore, information should be given about the importance of standardization of documents.
21. It has been observed that when customers agree to be directed to a different brand, there is no specific employee to deal with them. A customer-specific employee (could be a sales account representative) is required to turn the opportunity into a sale by performing all cross-brand referrals.
22. It has been observed that there is no program in which sales consultants can sell additional equipment, and it is necessary to contact the service every time. It is necessary to install an accessory hardware (for example, chassis-based hardware) program that can be sold additionally.
23. It has been determined that the information on the vehicle labels is confusing for the customer and that there is no information on the package details of the vehicle on the label. The label design should be simplified, and the package detail information of the vehicle offered for sale should be included in these labels. In addition, QR codes should be added to the labels so that the customer can see the vehicle's features and package details on the website. A detailed promotional video of the vehicle should be taken and added to the website.
24. It has been observed that the customer does not have anything to evaluate the time they wait due to the intensity. Therefore, QR codes should be placed in the areas where customers wait (showroom, information desk, cafe, etc.) for routing purposes. By using these QR codes, customers can see the vehicle prices and examine the online site if they wish. In addition, informative articles about why this company should be preferred can be added to this code.

25. It has been observed that when there are no sales consultants and product specialists available, customers are waiting for the vehicle presentation. At the same time, it has been determined that customers may want to receive information about more than one vehicle. For this, narration can be provided through headphones, as in museums. Every vehicle offered for sale should be explained in detail by product experts and customer experience should be increased. These recorded narrations can be accessed by QR code.
26. It was determined that the sales consultants did not have sufficient information about the online site and could not provide the necessary guidance to the customers. A user manual for the online site should be prepared and distributed to sales units.
27. It was determined that incoming customers and guests could not easily find the parking place or the building of the brand they wanted. It is necessary to increase the direction signs inside and outside the company.
28. It has been determined that the entrance cards look sloppy. Logos on cards should be removed and spelling mistakes should be corrected.

Control Phase

At this stage, the feedbacks obtained from the improvement and development studies carried out during the project are evaluated and new processes created or improved are observed in detail. In fact, the purpose of the checking phase is to monitor whether the improvements made work as time goes on. Therefore, it is the most extensive phase. Studies continue in line with the suggestions made, and it has been determined that customer satisfaction and efficiency in internal processes have increased as a result of the improvements made according to the feedback received from the company so far.

Conclusions

In this study, the sales processes of an automotive company were examined, and improvements were made in the processes by applying the LSS management philosophy steps. Within the scope of detailed research about the company and LSS studies carried out with the company, many suggestions were made specifically for each process for the works that cause dissatisfaction and loss of time in the processes. Detailed findings regarding the processes and suggestions for these processes are given in the section on improvements above, according to the comments received from customers and employees in the survey, analysis, and brainstorming studies. The details of these comments cannot be shared due to information privacy. It was obtained from company feedback that customer satisfaction rates related to the sales process increased from 88% to 95% as a result of improvements made through the lean six sigma implementation. Considering the process management approach as well as the improvement step of the DMAIC process, the results obtained in the process with this study are summarized below:

1. Considering the whole process, it was concluded that the processes were not simple enough, and the processes were made simpler by eliminating the non-value-added steps.
2. It has been concluded that the paperwork in the processes causes a lot of time and paper waste, and suggestions for digitization are given.
3. The points that cause dissatisfaction with the customers were decreased and the customer satisfaction was increased.
4. Unnecessary workload in the sales process has been eliminated and process efficiency has been increased.
5. With the digitization made in insufficient areas within the framework of the recommendations, the deficiencies that caused time and information loss in the process were eliminated and the control of the process was facilitated.
6. An integrated system was created by strengthening the communication between employees and between the employee and the manager, and by increasing the relationship between the sales processes of the company in different brands.

References

ABOELMAGED, M. G. (2010), "Six Sigma quality: a structured review and implications for future research", *International Journal of Quality & Reliability Management*, Vol. 27 No. 3, pp. 268–317.

ALBLIWI, S. A., ANTONY, J. AND LIM, S. A. H. (2015), "A systematic review of Lean Six Sigma for the manufacturing industry", *Business Process Management Journal*, Vol. 21 No. 3, pp. 665–691.

ANTONY, J. (2006), "Six sigma for service processes", *Business Process Management Journal*, Vol. 12 No. 2, pp. 234–248.

ASSARLIND, M., GREMYR, I. AND BÄCKMAN, K. (2012), "Multi-faceted views on a Lean Six Sigma application", *International Journal of Quality and Reliability Management*, Vol. 29 No. 1, pp. 21–30.

BEHARA, R.S., GRESHAM, A. AND FONTENOT, G. F. (1995), "Customer satisfaction measurement and analysis using six sigma", *International Journal of Quality & Reliability Management*, Vol. 12 No. 3, pp. 9–18.

BHAT, S., GIJO, E. V. AND JNANESH, N. A. (2014), "Application of Lean Six Sigma methodology in the registration process of a hospital", *International Journal of Productivity and Performance Management*, Vol. 63 No. 5, pp. 613–643.

CHEN, S. C., CHEN, K. S. AND HSIA, T. C. (2005), "Promoting Customer Satisfactions by Applying Six Sigma: An Example from the Automobile Industry", *Quality Management Journal*, Vol. 12 No. 4, pp. 21–33.

CHEN, M. AND LYU, J. (2009), "A Lean Six-Sigma approach to touch panel quality improvement", *Production Planning and Control*, Vol. 20 No. 5, pp. 445–454.

DALE, B. G. (1999). *Managing Quality*. Blackwell Publishers.

DAS, N., GAURI, S. K. AND DAS, P. (2006), "Six Sigma principles in marketing: An Application", *International Journal of Six Sigma and Competitive Advantage*, Vol. 2 No. 3, pp. 243–262.

DELGADO, C., FERREIRA, M. AND BRANCO, M.C. (2010), "The implementation of lean Six Sigma in financial services organizations", *Journal of Manufacturing Technology Management*, Vol. 21 No. 4, pp. 512–523.

DEMING, W. E. (1986). *Out of the Crisis*. MIT Press.

DURSUN, M., GOKER, N. AND MUTLU, H. (2020), An Intuitionistic Fuzzy Cognitive Map Approach to Evaluate Success Factors of Lean Six Sigma Project Management Methodology, Advances in Intelligent Systems and Computing, Vol. 1029, Springer International Publishing, available at:https://doi.org/10.1007/978-3-030-23756-1_134.

ECKES, G. (2002). The Six Sigma revolution: How General Electric and others turned process into profits. John Wiley & Sons.

GANATRA, V., ARYANI, D. N., ABD. RAHMAN, N. I. BINTI, KEE, D. M. H., FADZIL, N. F. D. BINTI, HASSAN, N.I.A. BINTI, ESA, N.K. BINTI, MAMTANI, M. (2022), "A Study on Consumer Satisfaction with Respect to Samsung Gadgets", *International Journal of Tourism and Hospitality in Asia Pasific*, Vol. 5 No. 1, pp. 87–99.

GEORGE, M. L. (2003A), Lean Six Sigma for Service : How to Use Lean Speed and Six Sigma Quality to Improve Services and Transactions, *McGraw-Hill Companies*, available at:https://doi.org/10.1036/0071436359.

GEORGE, M. L. (2003b), Lean Six Sigma for Service : How to Use Lean Speed and Six Sigma Quality to Improve Services and Transactions, Group, available at:https://doi.org/10.1036/0071436359.

GIJO, E. V. AND ANTONY, J. (2019), "Application of Lean Six Sigma in IT support services – a case study", *TQM Journal*, Vol. 31 No. 3, pp. 417–435.

GUPTA, S., MODGIL, S. AND GUNASEKARAN, A. (2020), "Big data in lean six sigma: a review and further research directions", *International Journal of Production Research*, Taylor & Francis, Vol. 58 No. 3, pp. 947–969.

HENDERSON, K. M., & EVANS, J. R. (2000). Successful implementation of Six Sigma: benchmarking general electric company. *Benchmarking: an international journal*, *7*(4), 260-282.

IMAI, M. (1986). *Kaizen: The Key to Japan's Competitive Success*. McGraw-Hill.

INAL, T.C., GORUROGLU OZTURK, O., KIBAR, F., CETINER, S., MATYAR, S., DAGLIOGLU, G. AND YAMAN, A. (2018), "Lean six sigma methodologies improve clinical laboratory efficiency and reduce turnaround times", *Journal of Clinical Laboratory Analysis*, Vol. 32 No. 1, pp. 1–5.

JIJU ANTONY, F., KUMAR, M. AND CHO, B. R. (2007), "Six sigma in service organisations: Benefits, challenges and difficulties, common myths, empirical observations and success factors", *International Journal of Quality and Reliability Management*, Vol. 24 No. 3, pp. 294–311.

LIZARELLI, F. L. AND ALLIPRANDINI, D. H. (2020), "Comparative analysis of Lean and Six Sigma improvement projects: performance, changes, investment, time and complexity", *Total Quality Management and Business Excellence*, Taylor & Francis, Vol. 31 No. 3–4, pp. 407–428.

MADHANI, P. M. (2017), "Six Sigma Deployment in Sales and Marketing: Enhancing Competitive Advantages.", *IUP Journal of Business Strategy*, Vol. 14 No. 2, pp. 40–63.

MADHANI, P. M. (2020), "Performance Optimisation of Retail Industry: Lean Six Sigma Approach.", *ASBM Journal of Management*, Vol. 13 No. 1/2, pp. 74–91.

NOAKE, R. (2002), "The Six Sigma Handbook", *Quality Progress*.

PAKDIL, F., TOKTAŞ, P. AND CAN, G. F. (2020), "Six sigma project prioritization and selection: a multi-criteria decision making approach in healthcare industry", *International Journal of Lean Six Sigma*, Vol. 12 No. 3, pp. 553–578.

PANAYIOTOU, N. A. AND STERGIOU, K. E. (2021), "A systematic literature review of lean six sigma adoption in European organizations", *International Journal of Lean Six Sigma*, Vol. 12 No. 2, pp. 264–292.

POORMOAIED, S. AND ATAN, Z. (2020), "A continuous review policy for two complementary products with interrelated demand", *Computers and Industrial Engineering*, Elsevier Ltd, Vol. 150 No. June 2019, p. 106980.

PORTER, M. E. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*. Free Press.

PRAJOGO, D. I. AND SOHAL, A. S. (2006), "The integration of TQM and technology/R&D management in determining quality and innovation performance", *Omega*, Vol. 34 No. 3, pp. 296–312.

PYZDEK, T. (2002), *The Six Sigma Revolution*, *Technometrics*, Vol. 44, available at:https://doi.org/10.1198/tech.2002.s727.

SAGNAK, M. AND KAZANCOGLU, Y. (2016), "Integration of green lean approach with six sigma: an application for flue gas emissions", *Journal of Cleaner Production*, Elsevier Ltd, Vol. 127, pp. 112–118.

SHAMSUZZAMAN, M., ALZERAIF, M., ALSYOUF, I. AND KHOO, M.B.C. (2018), "Using Lean Six Sigma to improve mobile order fulfilment process in a telecom service sector", *Production Planning and Control*, Taylor & Francis, Vol. 29 No. 4, pp. 301–314.

SHOKRI, A. (2017), "Quantitative analysis of Six Sigma, Lean and Lean Six Sigma research publications in last two decades", *International Journal of Quality and Reliability Management*, Vol. 34 No. 5, pp. 598–625.

SHOKRI, A., ANTONY, J., GARZA-REYES, J. A. AND UPTON, M. (2021), "Scoping review of the readiness for sustainable implementation of Lean Six Sigma projects in the manufacturing sector", *International Journal of Quality and Reliability Management*, Vol. 38 No. 8, pp. 1747–1770.

SINGH, M. AND RATHI, R. (2019), *A Structured Review of Lean Six Sigma in Various Industrial Sectors*, *International Journal of Lean Six Sigma*, Vol. 10, available at:https://doi.org/10.1108/IJLSS-03-2018-0018.

THOMAS, A., BARTON, R. AND CHUKE-OKAFOR, C. (2009), "Applying lean six sigma in a small engineering company - A model for change", *Journal of Manufacturing Technology Management*, Vol. 20 No. 1, pp. 113–129.

TIMANS, W., ANTONY, J., AHAUS, K. AND SOLINGEN, R. (2012), "Implementation of Lean Six Sigma in small- and medium-sized manufacturing enterprises in the Netherlands", *Journal of the Operational Research Society*, Vol. 63, pp. 339–353.

VENDRAME TAKAO, M. R., WOLDT, J. AND DA SILVA, I. B. (2017), "Six Sigma methodology advantages for small- and medium-sized enterprises: A case study in the plumbing industry in the United States", *Advances in Mechanical Engineering*, Vol. 9 No. 10, pp. 1–10.

VOEHL, F., HARRINGTON, H. J., MIGNOSA, C. AND CHARRON, R. (2013), *The Lean Six Sigma Black Belt Handbook: Tools and Methods for Process Acceleration*, *The Lean Six Sigma Black Belt Handbook: Tools and Methods for Process Acceleration*, available at:https://doi.org/10.1201/b15163.

WANG, H., KIM, K. H., KO, E. AND LIU, H. (2016), "Relationship between service quality and customer equity in traditional markets", *Journal of Business Research*, Elsevier Inc., Vol. 69 No. 9, pp. 3827–3834.

WEI, C. C., SHEEN, G. J., TAI, C. T. AND LEE, K. L. (2010), "Using Six Sigma to improve replenishment process in a direct selling company", *Supply Chain Management: An International Journal*, Vol. 15 No. 1, pp. 3–9.

WOMACK, J. P., JONES, D. T. AND ROOS, D. (1990), *The Machine That Changed the World*, Rawson Associates/Macmillan Publishing Company, New York, NY.

ZU, X., FREDENDALL, L. D. AND DOUGLAS, T.J. (2008), "The evolving theory of quality management: The role of Six Sigma", *Journal of Operations Management*, Vol. 26 No. 5, pp. 630–650.

Özet

Bu çalışmada, bir otomotiv firmasının satış süreçlerinin Yalın Altı sigma (LSS) yönetim felsefesi ile iyileştirilmesi ele alınmıştır. Otomotiv sektöründeki geçmişi 1980'lere dayanan firma, bugün Türkiye'nin yoğun rekabete dayalı bu sektörde özellikle üst segmentte yer alan geniş bir ürün gamına sahiptir. Bu çalışma kapsamında, müşteri memnuniyetinin korunması ve artırılması amacı doğrultusunda, satış süreçlerinde dijitalleşmeye yönelik iyileştirmeler hedeflenmiştir. Uygulama, müşteri memnuniyetsizliğine neden olan süreçlerin iyileştirilmesi ve bütünleşmiş bir sistem oluşturulması amacıyla LSS araçlarından DMAIC (Tanımlama, Ölçme, Analiz, İyileştirme ve Kontrol) yöntemi ile yürütülmüştür. Yöntem adım adım uygulanarak amaç doğrultusunda iyileştirmeler yapılmıştır. Bu çerçevede müşterilerle çeşitli anketler yapılmış, satış süreçlerinde yer alan çalışanlarla beyin fırtınası çalışmaları gerçekleştirilmiş ve bunların sonucunda elde edilen veriler değerlendirilerek süreç iyileştirmesine gidilmiştir. Satış süreçlerinin tüm aşamaları LSS yaklaşımı ile ele alınmış ve çalışmaya başlamadan önce %88 olan müşteri memnuniyet oranının çalışma sonrasında %95'e çıktığı gözlemlenmiştir. Bu çalışmada Türkiye'de faaliyet gösteren prestijli otomobil satışı gerçekleştiren bir firmanın satış süreci ele alınmıştır. Bu inceleme, satış organizasyonunda LSS projelerinin nasıl uygulanabileceği hakkında net bir görüş sunmaktadır. Çalışma, LSS uygulamasını kolaylaştırmak için literatürün zenginleşmesine de katkı sağlamaktadır.