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Lean Healthcare: Implementation of a Lean System in a
community pharmacy – Case study

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Resumo

Lean é uma metodologia orientada para a melhoria de processos, que se foca na eficiência e na eliminação de desperdício, levando a um aumento do valor entregue ao cliente e retorno para a organização. Considerando a conjuntura atual, torna-se ainda mais relevante a implementação de uma metodologia de gestão que aumente a sua eficiência, especialmente em pequenas e médias empresas. Atualmente, existe uma lacuna na literatura, sendo que a maioria dos casos estudados na área da saúde são referentes a hospitais. Este estudo de caso foi realizado numa farmácia comunitária que já tem em curso um projeto piloto o para implementar a metodologia Lean, permitindo identificar as dificuldades sentidas pela equipa nesse processo. Esta análise leva à sugestão de um projecto de implementação, que permita à farmácia melhorar o seu desempenho, através da sugestão de ferramentas adequadas para usar de acordo com as necessidades identificadas. A recolha e análise de dados foram feitas com recurso a um *focus group*, observação directa, análise de documentos e estatística descritiva. Este projeto de implementação permite, por um lado, contribuir para a biblioteca de estudos de caso neste sector e, por outro, gerar resultados operacionais na farmácia em questão, reduzindo os seus desperdícios e aumentando o valor para o cliente e para a organização.

Palavras-chave: Lean management; Farmácia comunitária; Eficiência; Valor.

JEL Classification System: I19 – Health Other; M10 - Business Administration General.

Abstract

Lean is a process improvement-oriented methodology that focuses on efficiency and waste elimination, leading to increased value delivered to the customer and return for the organization. Considering the current conjuncture, it becomes even more relevant to implement a management methodology that increases efficiency, especially in small and medium-sized enterprises. Currently, there is a gap in the literature, with most of the cases studied in the healthcare sector referring to hospitals. This case study was carried out in a community pharmacy that already has a pilot project underway to implement the Lean methodology, allowing the identification of the difficulties experienced by the team in this process. This analysis leads to the suggestion of an implementation project, which will allow the pharmacy to improve its performance, through the suggestion of appropriate tools to use according to the identified needs. Data collection and analysis were carried out through a focus group, direct observation, document analysis, and descriptive statistics. This implementation project allows, on the one hand, to contribute to the database of case studies in this sector and, on the other hand, to generate operational results in the pharmacy in question, reducing its waste and increasing value for the customer and the organization.

Keywords: Lean Management; Community pharmacy; Efficiency; Value.

JEL Classification System: I19 – Health Other; M10 - Business Administration General.

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Introduction

Community pharmacies are present all over the country, even in desertified areas, being a close contact for the user with health care that often the National Health System (NHS) cannot provide, and many times the only contact, saving the other services unnecessary activity. Besides their classic function of dispensing medicines, nowadays they also offer a wide range of services that make the user's life easier and improves their quality of life, such as pharmaceutical counseling, measurement of parameters, individualized preparation of medication, administration of vaccines and injectables, preparation of manipulated medicines (Decreto-Lei n.º 75/2016;2018) and, recently, they have acquired an indispensable role in screening and preventing the spread of Covid-19 through antigen testing. The role of community pharmacies in health promotion and disease prevention thus becomes obvious and it's increasingly being recognized by governments and society.

Even though community pharmacies are usually small and medium enterprises, the operation and organization of a community pharmacy requires a great logistical capacity due to its great complexity, since they have such broad activity, as seen in the preceding paragraph. Due to lack of time and management training, it is difficult for pharmacy leaders, usually pharmacists, to optimize the processes and achieve the team's and businesses' maximum potential. To ensure its success, it is necessary to work on this problem by helping leaders implementing tools that will be useful in solving the issues found, for their own benefit but also for the benefit of the users. It is therefore necessary to implement a management methodology such as Lean Healthcare (Lean Thinking adapted to the healthcare sector).

Lean Thinking is one of those methodologies, being a quality and operations improvement system oriented towards process improvement. Many others exist like Japanese Total Quality Control, Total Quality Management and Six Sigma (Chiarini, 2011, p. 332) but Lean Thinking has been one of the most recognized by its positive results, compared to the others (Chiarini, 2011, p. 349). This management methodology, by improving process efficiency and eliminating waste (Silva, 2012, p. 5), allows continuous improvement of organizations, increasing the value delivered to the customer/user, and the return to the company or organization, in terms of time and money.

Considering the potential of this methodology in improving the pharmacy's performance, it is extremely important to understand the best way to proceed. However, literature shows that this implementation isn't context free, which means that not all organizations can proceed the

same way and reach the same results. Considering the specifics of the business, there are numerous barriers that may force the change of the implementation plan, adapting the tools to achieve the defined objective.

The factors that influence the success of the implementation may be leadership, management, culture of the organization (Achanga et al., 2006, p. 11), standardization, discipline and control, continuous training and learning, team participation and empowerment, multi-skilling and adaptability, communication, work methods and reward system to support Lean (Bhamu et al., 2014, p. 917). Literature also shows that most barriers are people-related, which reinforces the importance of working and involving the team in the project.

Having to consider context to define the plan, it would be useful to analyse similar cases but, although there are numerous researchers of Lean methodology and authors who publish their studies in the area, reporting implementations in other business sectors, the truth is that the literature on the implementation of Lean Healthcare in community pharmacies specifically, is scarce, if not null. This means that several topics need to be further explored, hence the proposition of a implementation plan.

The purpose of this case study is to contribute to the knowledge of the application of this methodology in the healthcare area, by addressing the research gap, investigating the implementation in a community pharmacy. The process starts with a diagnosis, which will focus on assessing the maturity of the pharmacy in terms of implementation, based on direct observation, groups discussion, and document analysis. With the result of this diagnosis, an implementation proposal will be prepared, considering the specific characteristics of the organization and all the tools suggested by the methodology and its principles. Thus, the project suggested intends to understand and propose a way to implement the best practices recommended, considering the specificities of the organization in question.

Considering the referred aim, the following objectives were defined:

- Identify the needs/difficulties of the chosen pharmacy in implementing the Lean system;
- Identify the positive points of the implementation already carried out;
- Identify which tools are best suited to cover the needs detected;
- Define an implementation strategy that allows the pharmacy to achieve its goals and improve its performance, knowing that it is impossible to achieve perfection but always seeking continuous improvement.

Considering the methodology, the focus groups, direct observation, analysis of documents and descriptive statistics (analysis of responses to questionnaires) will allow accomplishment

of the first three objectives, constituting the diagnostic phase. Considering the information retrieved from that analysis, the combination of that information with the literature review will allow the accomplishment of the last objective. Therefore, a combination of methods was chosen in order to accomplish the aim of this dissertation.

This dissertation comprises three main chapters. The first chapter refers to the theoretical framework. Here the Lean Thinking methodology is explained and its utility, how it stands out from other quality control methodologies, analyzes its transposition to the health sector, describes the tools it proposes, the barriers and enablers that have been reported in previous studies and how they can influence the success of the implementation. Thus, as already mentioned, this literature review is the basis of this project, supporting all the proposed objectives.

The second chapter includes the description of the selected methodology: a case study that proposes an implementation plan. It explains why this method was selected and how it can increase the performance of the pharmacy in question, how the diagnosis will be performed, ie, how the information will be collected and how it influences the process implementation proposed.

Finally, the last chapter consists of the implementation plan proposition. It considers the theoretical framework in chapter 1 and the diagnosis explained in chapter 2. According to the principles of the methodology, considering the need for continuous improvement, this is only an initial proposal, and should be adapted as the implementation goes on and difficulties arise.

Chapter 1

Theoretical framework

1.1. Lean Thinking

1.1.1. Origin of the methodology

Lean thinking is a quality and operations improvement system oriented towards process improvement. Many others exist like Japanese Total Quality Control (JTQC), Total Quality Management (TQM) and Six Sigma (Chiarini, 2011, p. 332). Bhamu et al. (2014), cited various authors (Monden, 1983; Hall, 1983; Schonberger, 1982; Ohno, 1979) and concluded that Lean practices were implemented based on several ideologies that appeared prior to it such as Just-In-Time (JIT), Zero Inventories, Japanese Manufacturing Techniques, and Toyota Production System (TPS). Currently, the different methodologies serve different purposes. JTQC focuses primarily on quality control, TQM and Six Sigma focus on prevention, evaluation, and reducing costs, and the Lean methodology focuses on reducing waste and non-value-adding activities to increase productivity (Chiarini, 2011, p. 344). Chiarini (2011, p. 344) states that it also differentiates itself by presenting specialized tools to reduce waste and guarantee the activities flow.

The Lean concept originated in Japan after the second world war when Japanese manufacturers realized that they could not afford the investment required to rebuild their facilities (Bhamu et al., 2014, p. 876). According to Chiarini (2011, p. 333), initially, it was known as Toyota Production System (TPS). This innovative methodology, that later became known as Lean methodology after being referenced in “The machine that changed the world” and “Lean Thinking” (Alkhoraif et al., 2019, p. 2), allowed Toyota to produce automobiles with lesser inventory, human effort, investment, and defects and introduced a greater and ever-growing variety of products (Bhamu et al., 2014, p. 876).

Lean became a concept designed to describe the multiple activities carried out by Japanese companies that explained their heightened competitiveness advantages at that time. (Alkhoraif et al., 2019, p. 2). This means that Lean Management or Lean Enterprise is an umbrella term for several key practices, which aim at preserving value in business with less work (McIntosh et al., 2014, p. 484).

As cited by Radnor et al. (2007, p. 3), Holweg (2007) considered Lean to be a radical alternative to the traditional method of mass production and batching principles for maximizing operational efficiency, quality, speed, and cost, that the western world was following.

Starting in the early 2000s, the methodology of Lean extended from the manufacturing industry towards service industries such as healthcare (Liker & Meier, 2006, p. 4), moving from cost and waste reduction in manufacturing industries to an approach that continually sought to enhance customer value (Hines et al., 2004, p. 997).

As cited by Santos (n/d), Melton (2005) defined Lean Thinking as the goal of reducing or eliminating wastes throughout the value chain of a company, focusing only on the company's activities that create value for the customer (Santos, n/d, p. 2).

The term "Lean" comes from the production method which requires half the human effort, half the manufacturing space, half the investment and half the engineering hours to develop a new product in half the time. The author also stated that this is not a philosophy or technique only applicable to the automotive industry (Melton, 2005, p. 663), as mentioned before.

The Lean system implementation implies two main phases: the first phase is defining the baseline gaps and opportunities (diagnosis of the organization current state), defining knowledge sharing practices, teamwork and common vision, so that the organization develops internal competencies to be able to maintain continuous improvement (implementation plan). The second phase or development phase in which the team must become capable of maintaining the continuous improvement programs and projects, evaluating the results achieved, recording the knowledge acquired and reviewing the outputs, while standardizing the best practices. Hopefully, at this point, the company is no longer focused on eliminating waste and identifying and solving problems, but on creating value for stakeholders (Pinto, 2014, pp. 288-293).

Elimination of waste (everything that does not add value) is the most fundamental principle of Lean, which is something the customer is not willing to pay for and should therefore be eliminated (Karlsson & Åhlström, 1996, p. 27). In Japanese, according to Kaizen Institute (2013), as cited by Santos (n/d, p. 1), it is called muda. According to Masaaki Imai (2012, p. 61), there are seven types of waste: movement of people; movement of material/information; people standing; material stopped; overproduction; reprocessing and defects that cause rework. Continuous improvement comes second. The system is being constantly improved being perfection the goal. The constant strive for perfection also has its own word in Japanese – Kaizen (Karlsson & Åhlström, 1996, p. 29).

According to the Kaizen Institute (2013), as cited by Santos (n/d, p. 1), there are five fundamental principles: creating customer value; mapping the value chain to make a survey of the opportunities for improvement; creating flow; involvement of all people and continuous improvement. Applying these principles implies the reduction of muda processes.

An accurate way to assess customer value is bifurcating the flow into value and non-value adding activities, being that value-adding activities transform materials and information into something the customer wants, whereas the non-value-adding activities consume resources and do not directly contribute to the end result desired by the customer. Lean optimizes value adding activities which can have a dramatic effect on productivity, cost and quality (Hussain & Malik, 2016, p. 460).

Besides customer value and customer satisfaction, Lean also focuses on employee involvement (Ballé & Regnier, 2007, p. 33). Involving everyone in the work of improvement is often accomplished through quality circles, where employees gather in groups to come up with suggestions on possible improvements, associated with a scheme for implementing suggestions, rewarding employees, and feeding back information on the status of the suggestions. The Japanese system is considered beneficial compared to the traditional “suggestion-box system” and is often measured by looking at the number of suggestions per employee per year and the percentage of suggestions which were implemented, as a measure of the quality of the suggestions and the interest shown by employees (Karlsson & Åhlström, 1996, p. 29).

To sum up, the Lean culture differs from the traditional culture of organizations by preferring multidisciplinary teams, seeing managers as mentors and leaders and not just as someone who dictates the rules, continuously seeking better service, analyzing the root-cause of problems, group sharing of rewards and information, seeing the supplier as an ally and by keeping the focus on the customer and on process improvement (Silva, 2017, p. 38). It also differs from other methodologies by having the employees at the center of the organization's evolution and not just as players that allow the processes to be carried out (Silva, 2012, p. 8).

The focus on measurements and continuous improvement is expected to promote implementation and sustainability (Andersen et al., 2014, p. 1). To measure and evolve, a set of tools must be used. However, experience shows that the interpretation of Lean concepts and tools outside of the automotive industry is a critical challenge and its success largely rests on understanding first that Lean is a system, not simply a toolbox, and second that this system must be constructed by the employees themselves. Ultimately, it is all about people, and processes improve when individual employees learn to do the same job better (Ballé & Régnier, 2007, p. 33).

1.1.2. Tools

Lean aims to identify and remove physical and intangible barriers that affect the processes' flow with specific tools (Marsilio & Pisarra, 2021, p. 2) applied in conjunction to achieve the best results possible, as stated by Bhamu et al. (2014, p. 918).

These tools are helpful in all the phases of the process: assessment, improvement and monitoring (Radnor, 2008, p. 12). To assess the processes at organizational level, Value Stream Mapping and Process Mapping (PM) are advised (Radnor, 2008, p. 12). To implement and support improvement, one may use the following tools: 3 Cs (Radnor, 2008, p. 16), Rapid Improvement Events (RIEs), 5S (Radnor, 2008, p. 12), Poka-Yoke (Lazarevic et al., 2019, p.1), Heijunka (Santos, n/d, p. 4), Standard Work (Oliveira, 2017, p. 1085) and PDCA cycle (Wani, 2019, p. 2). To measure and monitor the impact of the processes and their improvement, Radnor (2008, p. 12), suggests Kanban, Control charts with KPIs (Key performance Indicators) to measure quality, time, costs and satisfaction levels, visual management, benchmarking and workplace audits.

Value Stream Mapping (VSM) means mapping a companies' value chain with the aim of getting the general view of a process and recognize where specific problem solving can be focused to improve the process. Works as a starting point for continuous improvement projects (Jimmerson et al. 2005, pp. 7-8). After establishing the problem, the mapping of flows (VSM) takes place in order to find opportunities for improvement (Santos, n/d, p. 4).

The 3C's process has 3 steps: concern, which means defining the problem clearly; cause which attempts to understand the root cause of the problem, rather than just dealing with the symptoms; countermeasures which includes suggestions to fix the problem or to mitigate the impact on the customer (Radnor, 2008, p. 16). This analysis should be performed with the whole team involved, if possible.

The 5 Why's is one of the most well-known approaches to root cause analysis (RCA) in healthcare which consists of asking "why?" five times whenever a problem is found in order to make the nature of the problem as well as its solution clear (Card, 2016, p. 671).

RIEs or Kaizen Blitz provide a faster return for effort, are more visible and do not challenge existing management controls. Many times, it is favoured by the staff as they feel engaged in an improvement process that quickly demonstrates potential results where they had some input (Radnor et al., 2012, p. 10). However, these provide short term gains and lost and repeated results due to no sustainability, which leads to improvement levelled off and eventually stopped,

hence the importance of a “true” Lean implementation (Radnor, 2008, p. 11) and monitorization to maintain the improvements.

As cited by Santos (n/d, p. 3), Imai (2012) and Melton (2005) consider the 5’S work to be a checklist that aims to create work habits to provide better organization, cleanliness and discipline in the workplace. The 5S’s mean, traducing from Japanese, sort and eliminate, straighten, shine, standardize and sustain, which is traditionally considered a good starting point for Kaizen activities. Although some progress can be achieved with basic 5S, it is a fact that, in many cases, the inventory or other materials needed to hold, overflows in the available space (Ballé & Régnier, 2007, p. 34).

Poka-Yoke is an error-proofing technique or methodology that can affect errors and defects in a process (Lazarevic et al., 2019, p. 1). It has to be cost effective, placed close to sources of errors (Lazarevic et al., 2019, p. 4). It can be guide pins, alarms, limit switches, counters and checklists (Lazarevic et al., 2019, p. 6).

As described by Santos (n/d, p. 4), leveling the system is also a priority. Many times the variability of the stock comes from purchasing based on a set of forecasts, which makes it almost impossible to eliminate the variability. Most practices serve to help controlling the excess of stock or reducing variability of a system by, for example, daily shopping thereby reducing the time scale of the predictions. The Lean tool that encompasses all these practices leveling and reducing variability is called Heijunka. Its purpose is to remove unevenness or variation in volume. From the staff perspective, it creates a predictable flow so that they can work at a safe and reasonable pace. In the long term, it enables the identification of waste and creates the basis for continuous improvement, ultimately benefiting the client (Connors et al., 2021, p. 64).

According to Santos (n/d, p. 3), as mentioned by Melton (2005) visual management involves placing a board on a highly visible area of the gemba (place where value is created), showing the graphics with the most important indicators to evaluate the problem under analysis, information on process flows and standard operating procedures (SOPs) (Radnor et al., 2012, p. 4), named Kaizen board. To reach the strategic goals, good communication is essential. According to Wheelwright (1985), cited by Ahlstrom (2004, p. 549), making employees aware of operating objectives requires an information system that is real-time, problem identifying, and problem solving orientated.

Standard Work means writing step-by-step procedures, aiming to eliminate the variation and inconsistency of results by instructing workers to execute activities following these clearly defined procedures (Oliveira, 2017).

According to Wani (2019), PDCA cycle helps scheduling and monitoring tasks and ultimately improvement projects. PDCA means plan (highlight the main purpose of the project), do (process implementation), check (monitoring and reflection of the improvement to detect any possible refinement) and act (assurance that the workers are following the implementation made).

The movement of materials is controlled by kanbans, created to level the stock, control production and supply of components and in some cases, raw material (Santos, n/d, p. 4). It consists of a visual signal to support flow by pulling product through the process as required by the customer (Melton, 2005, p. 662).

Benchmarking can be used for both self-assessment and comparison. It allows improving of the performance of product/service, process or an organization as a whole by continuously identifying, understanding, and adapting best practices that are found either inside or outside the organization (Gurumurthy & Kodali, 2009, p. 275).

Once implemented, the organization needs to show that the Lean approach is continuing to provide benefits. A practical approach is to develop and implement a workplace audit that can measure and track the success to increase operational performance (Taggart & Kienhofer, 2013, p. 141).

According to Ballé & Régnier (2007, p. 39), it's better to implement imperfect techniques systematically than perfect ones applied sporadically. Difficult problems will not be solved overnight, but progress continues.

Implementing a Lean System, even with the right tools, is a complex task, which means any improvement activity can easily shift the burden to another element of the system, which will then collapse, often cancelling the initial positive results. In Lean, basic stability is absolutely essential to create the proper learning environment where employees can see clearly the impact of their actions and then learn through the Kaizen activities, not simply make the problems go away (Ballé & Régnier, 2007, p. 35).

1.1.3. Lean system utility

The perception that a business process is already efficient is too often an illusion. Functionally, many business processes may appear very efficient, however the application of Lean Thinking forces us to review the whole chain in which the business process sits, and this frequently reveals many inefficiencies (Melton, 2005, p. 663).

According to Pinto (2014, p. 287), the presence of one or more of the following signs means that the organization should trigger intervention actions, such as the implementation of a Lean system: reduction in sales (can be caused by several factors, including the presence of new players in the market), reduction in margins (margin decreases due to cost price increase, which makes stricter waste management necessary), increase in stakeholder dissatisfaction, accumulation of stocks or products without consumption (which translates into waste), lack of team involvement, and inefficiency of previously identified improvement attempts and actions.

The benefits are reported in different ways including cost reduction, process improvements, time savings, investment savings, reduction in waste (Leite et al., 2019, p. 2), decreased lead times for customers, reduced inventories, improved knowledge management and more robust processes (less errors and therefore less rework) (Melton, 2005, p. 663). There are also benefits more focused on clients, such as increase in satisfaction, as mentioned by Leite et al. (2019, p. 2).

1.2. Lean Healthcare

1.2.1. The need for better management

In the current global economic climate, it's important to look for ways to contain or reduce healthcare spending, while simultaneously assuring levels of service. Policy makers and leaders are therefore attracted to management philosophies that, for other industries, have proven to offer more productive and cost-effective ways of organizing and delivering services (Waring & Bishop, 2010, p. 1).

In 2005, a study was requested by the Competition Authority to assess the competitive situation in the pharmacy sector and, if necessary, to propose changes to it. This study resulted in a set of recommendations that have since been implemented by successive governments, including a change in the legislation in force. These changes, rather than increasing competition in the sector, have been causing economic and financial problems in pharmacies (Costa, 2014, p. 10). Besides, a few months into Ukraine's war and, as stated by FourPrinciples (2021), still dealing with the covid-19 pandemic, organizations across all sectors must cope with greater uncertainty due to unpredictability in consumer demand (decrease in the number of customer visits or purchase of medicines only, which lowers the average sale and, consequently, the sales of the pharmacy) and fluctuations in supplier costs (increase in the price of medicines and other products, medicines sold out because the co-payment does not compensate for the production and increase in the cost of transport). Therefore, it is crucial to find low-cost solutions that, at

the same time, generate more value for the customer and thus for the organization (Waring and Bishop, 2010, p. 1).

According to the Kaizen methodology, as mentioned by Bardhan and Thouin (2013) and cited by Santos (n/d, p. 1) in order to achieve sustained growth of earnings and sales, one must improve quality, cost, level of services rendered and motivation of employees.

Lean thinking has been introduced in healthcare during the latest decades as a quality-improvement method (Andersen et al., 2014, p.1). There is conflicting evidence on the outcomes of Lean Thinking in this sector, with quantitative and qualitative studies often contradicting each other (Andersen et al., 2014, p. 1). Uniqueness of each patient, complexity of the healthcare sector and the vast amount of variety of medical situations, set healthcare naturally apart from manufacturing, perhaps from all other service sectors (Young & McClean, 2008, p. 384). Robinson et al. (2012) points out that facilities like hospitals, pharmacies, clinics among others, are structures with a set of very complex operations, as stated by Santos (n/d, p. 3).

In general, literature demonstrates that Lean Thinking has already been implemented in various contexts in this sector, including community pharmacies, allowing to reduce errors, increase service efficiency, reduce costs, increase employee engagement and customer satisfaction (Hlubocky et al., 2013, p. 845).

1.2.2. Best practices in Lean implementation

To date, there are no studies related to the implementation of a Lean system in community pharmacies but there are many cases of implementation (or attempts) in healthcare units, such as hospitals.

Many studies show the benefits to patient care and resource utilization, but research also suggests the implementation of Lean is not without its problems.

While Lean's impact in industry is evaluated against mass production, there is not a universally accepted view in healthcare against which performance can be benchmarked (McIntosh et al., 2014, p. 7). Many of the reported results have been in tangible outputs (reduced wait times, reduced errors, reduced costs) but have also been reported in intangible outputs, such as employee motivation and customer satisfaction (Radnor et al., 2012, p. 364), through the completion of satisfaction surveys (Malmbrandt & Åhlström, 2013, p. 1160).

The results presented by Martin et al. (2013, p. 5) show that the new supply logic in the radiology service offers a higher quality for the patient simultaneously with high levels of employee satisfaction after implementing a Lean system.

In Radnor's study (2012, p. 7), the participants stated that the system reduced waiting times, improved services for the patient, provided clearer understanding of the care pathways, removed duplicated processes, tidied up of areas through the use of tools like 5S's, enhanced staff motivation and gave better understanding of the roles and relationship with other departments. Even though Radnor and her investigation team recognize that Lean is a powerful methodology to improve processes, the findings show Lean is context-dependent, meaning that the greater challenge comes from adapting Lean to a public context (favoring implementation in private enterprises), especially in the healthcare sector (Radnor et al., 2012, p. 16).

Among the rationales for Lean Thinking in healthcare, Young et al. (2004, p. 162) pointed to its capacity to eliminate waste by reducing delays, repeat encounters, errors, and inappropriate procedures. Joosten et al. (2009, p. 346) supports the possibilities Lean Thinking offers to improve healthcare and Poksinska (2010, pp. 16-17) stated that Lean is mostly used in healthcare as a process improvement approach, defining value from the patient point of view, mapping value streams and eliminating waste in an attempt to create continuous flow.

As mentioned above, there is growing evidence of its potential impact on quality, costs, time, and satisfaction of both employees and customers.

1.2.3. Main barriers and enabling factors

Barriers are defined as any technical, organizational, or social issue that compromises the efficiency and effectiveness of that process (Marodin & Saurin, 2014, p. 3948).

As stated by Bhasin (2012, p. 439), the literature dictates that nine of the top ten barriers to change are quoted as being people-related. Bhasin (2012, p. 440) reinforces that ultimately the best people to deliver any cultural change are the internal staff, although the lack of support from top management is usually cited as a major barrier (Marodin & Saurin, 2014, 3947). Lack of adequate funding denies many small and medium organizations the opportunity to hire their ideal management team which prevents them from implementing good productivity improvement strategies (Achanga et al., 2006, p. 15).

According to Stapersma (2018, p. 3), change readiness, described as the extent to which an individual and group is cognitively and affectively willing to accept and adopt a change project

which ultimately results in employees being invested and engaged in the change and are expected to overcome obstacles and setbacks, is another key aspect of Lean.

Marsilio & Pisarra (2021, p. 6) refer that only defining short-term goals could also represent a barrier, since long-term organizational policies and strategic planning are considered essential requirements.

Below is a table that summarizes the main barriers affecting the sustainability of the implementation:

Table 1. Barriers that affect the sustainability of the Lean implementation.

Barrier	Source
Desmotivation over time	Marodin & Saurin (2014)
Lack of attitude and commitment	Leite et al. (2019); Andersen et al. (2014)
Lack of communication	Leite et al. (2019); Andersen et al. (2014); Marodin & Saurin (2014)
Lack of investment/resources	Leite et al. (2019); Andersen et al. (2014); Rich et al. (2003)
Lack of leadership support	Leite et al. (2019); Andersen et al. (2014); Rich et al. (2003); Marodin & Saurin (2014)
Lack of monitorization	Andersen et al. (2014)
Lack of strategy	Leite et al. (2019); Andersen et al. (2014); Rich et al. (2003); Marsilio & Pisarra (2021).
Lack of training/knowledge	Leite et al. (2019); Andersen et al. (2014); Rich et al. (2003); Marodin & Saurin (2014)
Lack of understanding of the methodology	Leite et al. (2019)
Organizational Culture	Leite et al. (2019); Andersen et al. (2014); Rich et al. (2003)
Resistance to change	Leite et al. (2019); Rich et al. (2003)

Author's own creation.

As mentioned by Bhasin (2012, p. 440), an explicit pre-requisite for a successful implementation is the need to have a consistent vision. An organization is required to know where it wants to go (the objective) and how it intends to get there (the plan).

Besides strategy, there are critical factors essential to a successful Lean implementation: leadership, management and culture of the recipient organization (Achanga et al., 2006, p. 11), standardization, discipline and control, continuous training and learning, team-based organization, participation and empowerment, multi-skilling and adaptability, common values,

communication, work methods and reward system to support Lean implementation that may be a productivity bonus and quality bonus or time accuracy bonus (Bhamu et al., 2014, p. 917).

1.2.4. Difference between implementing Lean in public and private organizations

In the health sector, one of the greatest difficulties experienced in the implementation of a Lean system is the adaptation to the public sector and this is what many of the studies in the area are dedicated to.

The inherent bureaucracies of public sector and the management's focus on budget control have been identified as the limiting factors to influence demand or to reuse resources. However, some researchers report Lean to be equally successful in both public and private healthcare delivery systems (Hussain & Malik, 2016, p. 462).

This idea is opposed by some authors, including Radnor as previously mentioned. The findings indicate that in the private sector the customer and commissioner are the same, which is critical in determining customer value. It also appears that public healthcare is largely more capacity-led and budget-focused. Understanding and managing demand and capacity, private organizations are able to reallocate resources by growing the existing business, or by expanding into new sectors (Radnor et al., 2012, p. 1).

In this specific case, there's interest in analyzing the literature on implementation in the health sector. However, it is important to consider that many of the reported cases of failure concern the public sector, due to the mentioned difficulties, and the case study is a private organization, less susceptible to such barriers.

1.2.5. Lean in small and medium enterprises vs. large companies

Besides private or public sector, one must consider the organizations' size. According to Alkhoraif et al. (2019, p. 1), Lean is not limited to one type or size of organization, but rather all types, sizes and industries that strive to increase their competitive advantages, operations and profits.

For many small organizations, the application of Lean could be one important step to be more competitive on the market (Matt & Rauch, 2013, p. 421). Recognizing the continuing competitive pressures, small organizations are becoming increasingly proactive in improving their business operations, which is a good starting point for introducing Lean methods. On the other hand, most of these companies fear that implementing Lean is costly and time consuming

(Matt & Rauch, 2013, p. 421). Compared to larger organizations, these have fewer resources and often less access to capital, resulting in lower levels of adoption of cost intensive packages (Matt & Rauch, 2013, pp. 421-422). However, these have the advantage to be more flexible and can often bring change more quickly because they have less bureaucracy, have shorter communication lines and are less bound by tradition. Therefore, the informal nature of smaller organizations and leadership of owner/managers can make implementation of programs easier in small firms than in large (Matt & Rauch, 2013, p. 422). They are also better able to present personalized services, which they can use as a competitive advantage and the employees are usually younger with a more fluid organizational structure who may be more inclined to try innovative ideas and take risks (Alkhoraif et al., 2019, p. 4). Seitz (2003, p. 31) considers them better able to become Lean due to centralization of power, empowering of the workforce, simplification of interactions, organized communication, fast-decision-making process, transparent plan for the future and willingness to deliberate every idea and every employee's opinion.

But there are barriers to consider. Most times, the majority of the team is taken up with day-to-day operations which makes changes to these operations difficult, insufficient management time, lack of adequate supervisory Lean processes skills and, many times, inadequate senior management specialized skills in the field (Alkhoraif et al., 2019, p. 11).

Failure may come from using the wrong tools, using one tool to solve all the problems, lack of understanding or poor decision-making environment. External support from government, suppliers, customers, and outside consultants could enhance the successful implementation of Lean in smaller organizations (Bhamu et al., 2014, p. 914).

To sum up, the literature would seem to suggest that the size of the organization matters when implementing this management strategy, highlighting several aspects that are of actual advantage when applying Lean in smaller organizations, recognizing that it's still difficult.

1.3. Lean System implementation in community pharmacies

Community pharmacies are easily accessible and provide a less formal environment for those who cannot or do not want to use other types of health services (Fajemisin, 2013, p. 1), aiming to improve the health of the general population but also the maintenance of those who already have diseases (Fajemesin, 2013, p. 7). Having a wide territorial coverage, in a country of great inequalities of access, they often become, besides the first contact with health care, the only access point within a reasonable distance, as cited by LisbonPH (2019).

Business Portugal Magazine (2021) acknowledges that, with the evolution of the health system and the increasing appreciation of the role of the pharmacist, they are no longer dedicated only to dispensing medicines and counseling, although this is still one of their greatest strengths, but they also provide a set of services such as the individualized preparation of medication, administration of injectables, follow-up consultations for chronically ill patients, conducting screenings and biochemical tests. Portugal is often referred in political and scientific circles as one of the European countries with a greater range of services provided in pharmacies (Ordem dos Farmacêuticos, n/d). Ordem dos Farmacêuticos (n/d) also states that pharmacists are also recognized for their determinant role in the promotion of health literacy and correct medication intake and navigation through the health system.

Every year, pharmacies generate significant savings to the national health service, avoiding unnecessary trips to hospitals and preventing the onset or development of pathologies, which would imply high costs to the state (LisbonPH, 2019). A PWC study (2016, p.1) estimates that the intervention of community pharmacies in Portugal, in current activities integrated with primary health care, lead to savings of about 880 million euros per year. These interventions are mostly unpaid, reducing unscheduled consultations, emergencies, and hospitalizations. Thus, we can see the importance of community pharmacies (Rodrigues, 2016).

However, in a context of unavoidable demands on the management of health services, community pharmacies, similarly to hospital units, are faced with critical decisions to maintain their operational sustainability, in addition to financial (Silva, 2017, p. 2).

Being a fairly complex business and existing a lack of management experience on the part of most community pharmacy leaders, there is a substantial amount of waste that has accumulated over the years (Hlubocky et al., 2013, p. 845).

Inefficiencies can be found in different aspects: waiting times (customers and employees stopped), unnecessary displacements (for example, due to lack of organization, unsuitable layout or stock errors that lead to the search for the product in different locations), excess stock, inventory not adjusted to customer needs, order processing, service provision, waste of the potential of employees, technological systems, customer time, among others (Kovacevic et al., 2016, p. 220).

A major goal of this implementation is to improve the system so that pharmacists can spend more of their time on tasks that directly improve the health of users (Hlubocky et al., 2013, p. 845), without additional costs to the pharmacy or the healthcare system (Kovacevic et al., 2016, p. 219).

In order to make the implementation of a Lean system in a hospital facility, as cited by Hussain et al. (2016, p. 459), Weintraub (2011) suggested initiating small scale projects for targeted improvements that can deliver quick and visible successes for waste reduction and quality improvement, showing that it is easier to implement such strategy in smaller organizations, such as community pharmacies, than in larger companies and that developing smaller projects first can be beneficial to a larger study on Lean implementation.

Besides being a smaller organization with consequently less inventory, less and younger employees (usually more innovation enthusiasts), easier communication and a smaller space to adjust to the process, the more personal style of leadership has greater impact and is more prominent to the line workers than the managing director role in larger and departmentalized organizations (Rich & Bateman, 2003, p. 196). Since it is widely suggested that Lean Thinking relies upon effective leadership to shape and sustain the change process (Waring & Bishop, 2010, p. 1339) (Lean healthcare: Rhetoric, ritual and resistance) this is a key advantage of being a SMEs.

When pharmacies implement Lean, they're mainly focused on efficiency incentives like decreases in stock, storage, time and the price of products, all of which, if successful, can provide huge benefits (Alkhoraif et al., 2019, p. 9).

Clearly, there is a set of waste that should be eliminated. The pharmacy, due to all the activities, carries out a high tendency to create it. According to the seven muda model in the health sector it is important to select the tools that best fit the application of Kaizen methodology (Santos, n/d, p. 3).

Marsilio & Pizarra (2021, p. 7) also refer that applying Lean may require redefinition of existing job descriptions to redistribute roles. It often requires going beyond the hierarchical barrier, changing the organizations' culture.

To reach a high level of implementation maturity, Seitz (2003, pp. 47-52) proposes a framework with the following principles, in addition to the correct application of the tools already mentioned: optimize capability and utilization of people (properly trained people are available when needed); make decisions at lowest possible level (empowerment of employees); develop relationships based on mutual trust and commitment (establish stable cooperative relationships with strategic suppliers and customers); continuously focus on the customer; challenge existing processes (root causes are sought for problems and actions are undertaken); nurture a learning environment (continuous improvement); maximize stability in a changing environment.

The maturity of the implementation should be measured periodically in order to monitor its success. The following levels can be considered:

Table 2. Levels of maturity in Lean Methodology.

Level 1	No adoption of the methodology. Root causes are not explored, and problems are explicit. There's no effort to understand what can create value to the client.
Level 2	The team and leadership are aware. Starting to use Lean tools and methods. Informal approach and different degrees of effectiveness.
Level 3	Most areas have been modified at different degrees. More tools are being explored and metrics controlled.
Level 4	Improvement gains are visible and sustained.
Level 5	Exceptional implementation, all areas and team members are involved at advanced level. Improvements are well sustained. Innovative solutions for problems are implemented.

Adapted from Malmbrandt & Åhlström (2013).

Summing up, in order to achieve and maintain a high level of maturity, in addition to using the tools correctly and in a manner adapted to the case in question, it is also essential to continuously evaluate the processes, adopt improvements when necessary, and monitor the team's performance (Santos & Balsanelli, 2021, p. 9).

Chapter 2

Methodology

This chapter aims to describe and justify the employed methodology in order to accomplish the objectives and answer the questions mentioned above. Thus, it is structured in three fundamental moments: type of study, description of the organization and techniques for collection and analysis of the data.

2.1. Type of Study

The goal is to establish a suggestion of an implementation plan based on this management methodology considering the type of organization, which is lacking in literature, in a community pharmacy context.

The research conducted will be a single case study in which the case selected is observed in its real context and analyzed mostly in a qualitative way. This phenomenon can be studied according to Meredith's (1998) checklist, since it is a phenomenon that can be studied in its real context in a meaningful way, theoretical knowledge can be generated through observation of practice, and it allows answering the questions "why?" (to implement a Lean system), "what?" (added value does it bring to the efficiency of the pharmacy) and "how?" (should this implementation be done from now on).

This research method is often criticized for its inability to meet standard scientific criteria for research, being unable to prove, from a positivist point of view, its construct, internal and external validity, and its reliability (Mariotto et al, 2014, p. 359), since controlled observations can't be done, it's not possible to extend directly the findings to different populations and other researchers can't follow the same steps and reach the same outcome (Mariotto et al, 2014, pp. 359-360).

According to Eisenhardt & Graebner (2007, p. 27) when it comes to theory building with a single case study, the added value comes from analyzing details that go unnoticed in multiple case studies since they only retain the information replicated across most cases studied. As cited by Mariotto et al. (2014), Kennedy (1979) also refers that the value of single cases should be valued specially when new paths arise for which the inference rule have not been established, which is the case for Lean Healthcare in community pharmacies.

The research will follow an ideographic approach, since it aims to provide information and data of value to an understanding of the specific case in question (Jupp, 2006, pp. 142-143).

Table 3. Idiographic study characterization

	Idiographic causal relationships
Paradigm	Interpretivist
Reasoning	Inductive
Purpose of research	Exploratory

Adapted from DeCarlo et al, 2020.

As showed in the table above, the research logic followed will be inductive, in order to be able to verify the theory by looking for facts and establishing patterns (Rashid et al, 2019, p. 5), and it will follow the interpretive model as it allows to know the context, interview participants in the implementation process and interpret according to the point of view of the respondent (Rashid et al, 2019, p. 4), who are the real beneficiaries of the implementation of a system of this nature. It also allows to explore, in more detail, the “lived experiences” of the research participants (Alase, 2017, p. 1). The research purpose is exploratory since it increases the knowledge of a topic that is little known but needs to be better known (Elman et al, 2020, p. 28).

2.2. Techniques for collection and analysis of the data

Since it is a qualitative study, the sources of information will be focus group, observation, and notes from observation. Questionnaires answered by the pharmacy’s team will also be analyzed.

The focus group, in the form of a Kaizen meeting already implemented in the pharmacy once a week, and direct observation will allow understanding of how the process is being implemented, the barriers identified, and the factors considered essential for a successful implementation, both by the pharmacy team and by the leadership. The discussion will serve as a base for this study because it means to understand the lived experience of other people and the meaning they make of that experience (Seidman, 2006, p. 9).

Key participants are those whose knowledge and opinions may provide important insights regarding the research questions (Hancock et al., 2006, p. 39). In this case, the key participants include both the pharmacy team but also leadership because they have different perspectives of the matter and because, as mentioned in the literature review, most barriers to a successful implementation are people-related.

The focus groups will be conducted in-person since in-person conversations are seen as advantageous because they provide the most natural conversational setting, the strongest foundation for building rapport, and the best opportunity to observe visual and emotional cues

(Irvine, Drew, & Sainsbury, 2013, pp. 90-91) and also produce more richly detailed (and therefore higher quality) conversations. According to Cameron (2005), as cited by Clifford et al. (2016, p. 108), usually people are chosen on the basis of their experience related to the research topic. That's why both management team and operational team will be present since they're the ones who withhold the experience with the pilot study under course. In this case, the focus group serves to confirm some unclear points from the observation and to gather the employees' perspective.

The guiding questions are mainly based on their role in the implementation so far and how they feel the implementation has been conducted, more than their role in deciding what to implement or what changes/improvements need to be done.

Direct observation of the setting by the case study researcher will provide more objective information related to the research topic (Hancock et al., 2006, p. 46), complementing the subjective information collected in the group's discussions. To make sure all the essential parameters are observed, it is important to identify beforehand what must be observed, creating an observation guide (Hancock et al., 2006, p. 46). In this case, the observation was made to assign a rating on the evaluation parameters of the assessment present in Appendix E.

The questionnaires are intended to analyze the organization's culture. The following will be passed to the team:

Table 4. Implemented questionnaires

Questionnaire	Authors	Scale	Appendix
Organizational culture	Quinn and Rohrbaugh	Constant sum scale	A
Leadership roles (Team's Perspective)	Quinn and Rohrbaugh	Likert Scale	B
Leadership roles (Self-perception)	Quinn and Rohrbaugh	Likert Scale	C
Commitment type	Meyer and Allen	Likert Scale	D

Author's own creation.

In the Lean Management methodology, as previously stated, the human assets are very important to a successful implementation, which means the organizational culture is an aspect to evaluate and consider. The application of an organizational culture questionnaire allows us

to characterize the type of organizational culture present in the pharmacy in question, which, along with the type of leadership in both the employees' and management teams' perspective (Appendix B and C) and employee motivation, translated by the type of commitment (Appendix D), will characterize the human influence on the maturity level assessed.

According to this model, there are three dimensions: flexibility/control, internal/external orientation, and means/ends. The first-dimension concerns resistance to change and the need for stability and authority. The second dimension concerns the focus of the organization, whether it is more dedicated to the well-being of employees and their development or to competitiveness and market analysis. The third dimension concerns the processes, i.e., planning and goal setting vs. final productivity.

These three dimensions give rise to four organizational models: human relations (human resource development and flexibility), open systems (growth, resource acquisition and external support and flexibility), internal processes (control, goal planning and productivity), and rational goals (stability and control).

The following axis, present in figure 2, with the description of the four models helps to understand the relationship between the various and their relative position, as well as the type of culture that we associate with each one.

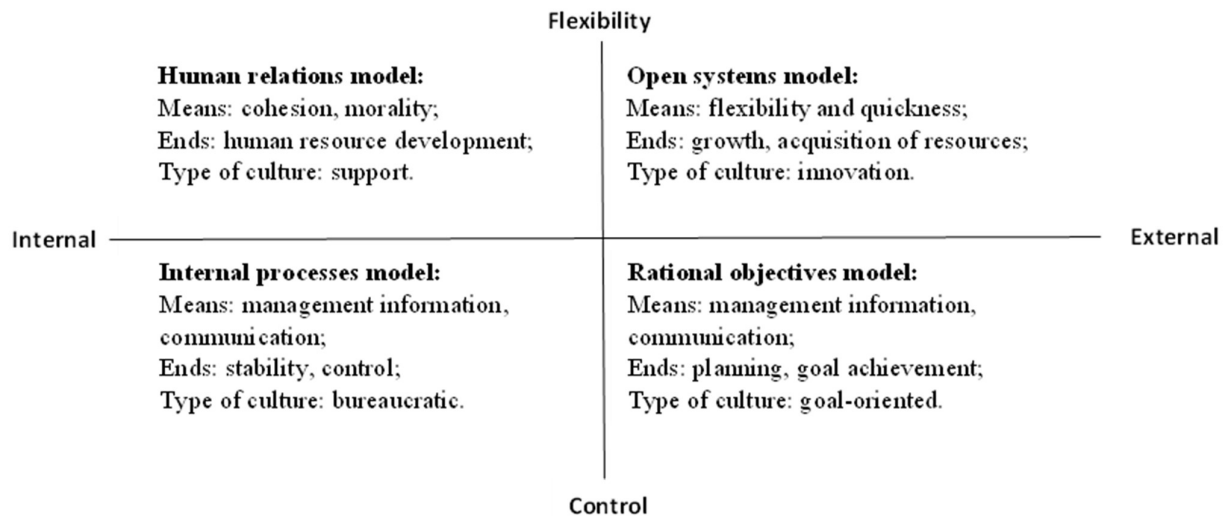


Figure 1. Quinn and Rohrbaugh model (adapted from Barbosa, 2005).

The models mentioned also relate to characteristic leadership types, which create the necessary conditions for a certain organizational culture to be established. The human relations

model is represented by the roles of mentor and facilitator; the open systems model is represented by the roles of broker and innovator; the internal processes model is represented by the roles of monitor and coordinator, and the rational goal model is represented by the roles of producer and director (Melo, 2015, p. 922). Like the organizational culture models, the leader does not have to have characteristics of only one type of leadership. He or she will only have one predominant leadership style.

According to Porter and Lawer (1965), citing Herrera (2021, p. 2), organizational commitment is the desire on the part of the employee to make high efforts for the good of the institution, desiring to remain in it and accepting its main objectives and values, hence the importance in this analysis. The more emotionally attached the employee is to the organization, the greater his or her effort to implement the Lean methodology will be.

This model considers three types of commitment: continuance, affective, and normative. The first one results of small investments that the employee has made over time and that would stop from voluntary disengagement from the organization. The second type of commitment results from the emotional connection the employee feels towards the organization, such as support or recognition. The last one focuses on the work ethic and the feeling of responsibility that the worker acquires.

To analyze the answers obtained from the various questionnaires, descriptive statistics will be used.

Since legal and ethical requirements must be taken into consideration, the anonymity of the organization and respondents in question will be maintained during and after the process and timely formal requests for permission from the gatekeeper and the participants themselves will be made.

As mentioned, assessing the present maturity of the pharmacy in terms of Lean implementation is crucial to monitor the success of the actions taken and the tools implemented. Having a notion of the status of the implementation, we can draw a realistic action plan, knowing that it will have to be constantly updated with new variables that emerge and considering unexpected events, seeking, at the limit, according to the theory of the methodology exposed above, perfection, knowing that this will never be reached. It will thus highlight opportunities for improvement in the short, medium, and long term. This diagnosis further reinforces the importance of implementation sustainability and not just short-term implementation (Machado Guimarães et al., 2014). Some key aspects may have already been in a highly mature phase and the diagnosis shows that, over time, the procedure has not been

maintained. Only with periodic monitoring can these situations be understood, and the organization redirected.

The grid that will be used to conduct the diagnosis is based on Urban's (2015) self-assessment grid and Malmbrand's et al. (2012) instrument and it's presented in Appendix E. It is divided into two topics: Lean culture and Lean practices because without the right culture and mindset the actions will not be implemented or at least there will be no sustainability but team motivation without the right tools being applied also does not allow a Lean organization to develop. Thus, it is important to assess maturity on these two topics.

The criteria for choosing the parameters in each of these topics within the ones that served as a basis was the framework in the market of the organization in question and what made sense in the concrete implementation in the pharmacy. It was based essentially on team motivation, the role of the leader, organizational culture, communication, structural elements, investment in implementation (in time and money), customer relations, and application of the tools available for problem solving and continuous improvement.

Based on the score given in each parameter, the pharmacy will place itself in one of the maturity levels presented in table 2. The following table shows the correspondence of the levels with the points assigned in the various parameters:

Table 5. Matching points with maturity levels

Levels	Description	Points
Level 1	No adoption of the methodology. Root causes are not explored, and problems are explicit. There's no effort to understand what can create value to the client.	0-10
Level 2	The team and leadership are aware. Starting to use lean tools and methods. Informal approach and different degrees of effectiveness.	15-30
Level 3	Most areas have been modified at different degrees. More tools are being explored and metrics controlled.	30-60
Level 4	Improvement gains are visible and sustained.	60-75
Level 5	Exceptional implementation, all areas and team members are involved at advanced level. Improvements are well sustained. Innovative solutions for problems are implemented.	75-85

Author's own creation.

Chapter 3

Diagnosis

3.1. Company characterization

Community pharmacies are present all over the country, summing a total of 2921, according to PORDATA (2021), being a close contact for the user with health care that often the National Health System (NHS) cannot provide, and many times the only contact, saving the other services unnecessary activity.

Besides their classic function of dispensing medicines, nowadays they also offer a wide range of services that make the user's life easier and improves their quality of life, such as pharmaceutical counseling, measurement of parameters, individualized preparation of medication, administration of vaccines and injectables, preparation of manipulated medicines, etc (Decreto-Lei n.º 75/2016;2018) and, recently, antigen testing to help screening and preventing the spread of Covid-19.

Community pharmacies are usually small and medium enterprises. In this specific pharmacy, people are divided into an operational team with seven employees and a management team with four. Considering the sector, it can be considered a numerous team.

In order to safeguard the anonymity of the pharmacy, its name and precise location will not be mentioned. It is located in a metropolitan area, with a population between 25 and 64 years old and with mostly secondary and post-secondary education, according to the provisional results of the 2021 census, as shown in the following figure:

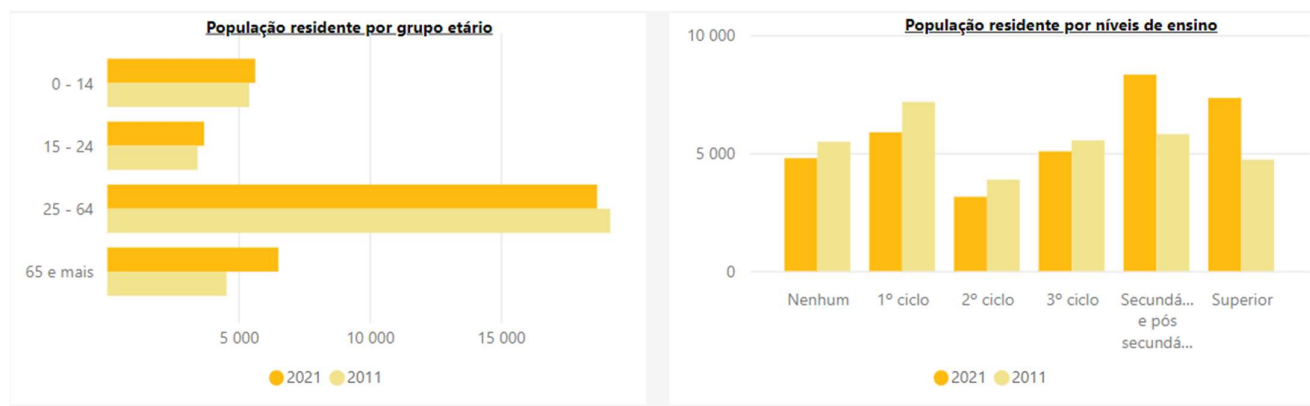


Figure 2. Provisional results of census 2021

When considering the organizations' identity, it only has a written and defined the mission statement: "We are stronger together". Having been defined by the team, it already demonstrates a culture that values teamwork, denouncing values such as collaboration, respect, transparency and concern for the well-being of employees.

Considering the types of organizational structure proposed by Mintzberg (1972), mainly due to its small size, the organization in question presents a simple structure: it has as its key part the strategic apex, since all important decisions tend to be centralized, uses direct supervision, and employs vertical and horizontal centralization (Lunenburg, 2012, p. 4). The author explains that this means that the organization has a top management and some employees in the operative core, who perform varied and overlapping tasks. The technostructure does not exist or is not relevant and technical support is low. In this type of structure, it is worth noting the proximity of the leadership to the operational level, often exercising some of these functions as well, which is not common in other types of organizational structures.

For the pharmacy to continuously improve and to define a strategy to do so, it is important to define the situation "as is", which means analyzing what are the opportunities and threats external to the organization, which may favor (opportunities) or threaten (threats) this improvement, and also to analyze what are the characteristics of the organization itself that it should seek to maintain and boost (strengths) and what are the characteristics that should be improved (weaknesses). Thus, a SWOT analysis makes perfect sense, based on the PEST analysis, the focus group, the research related to the sector, and the observation carried out.

The following table only considers the strengths, weaknesses, opportunities, and threats relevant to the successful implementation of the Lean methodology:

Table 6. SWOT Analysis



Author's own creation.

According to Wheelen and Hunger (2011), when scanning the organization's environment, one must consider its natural environment (such as physical resources), societal environment (general forces that do not directly touch on the short-run activities of the organization that can influence its long-run decisions) and task environment which is the industry the organization operates in, that includes elements that directly affect and are affected by it, such local communities, customers and employees.

When it comes to exploring internal strategic factors, resources are an organization's assets and are thus the basic building blocks of the organization. They include tangible assets (such as location), human assets (number of employees, their skills, and motivation) and intangible assets (such as technology) (Wheelen and Hunger, 2011, p. 138).

Considering the tangible and intangible assets, the pharmacy in question is a pharmacy on the outskirts of a large city, whose customers are an aging population. Still, the pharmacy is characterized as a pharmacy that tends to invest in innovation and thus has a profile that tends to embrace change rather than avoid it, as can be seen, for example, through online presence

and digital storefronts. This predisposition to change will tend to benefit the implementation of the Lean methodology.

The eleven answers to the questionnaire (four elements of the management team and seven elements of the functional team) led to the conclusion that the organizational culture model present in the pharmacy is clearly of human relations, as can be seen in figure 3., justified by a very close relationship between management and employees, where there is flexibility and appreciation of the conditions for human resources, above procedural rigor (internal processes model), innovation (open systems model), and especially the achievement of strategic objectives and business competitiveness (rational objectives model), which obtained the lowest rating of the 4. More detail on the responses to this questionnaire can be found in Appendix G.

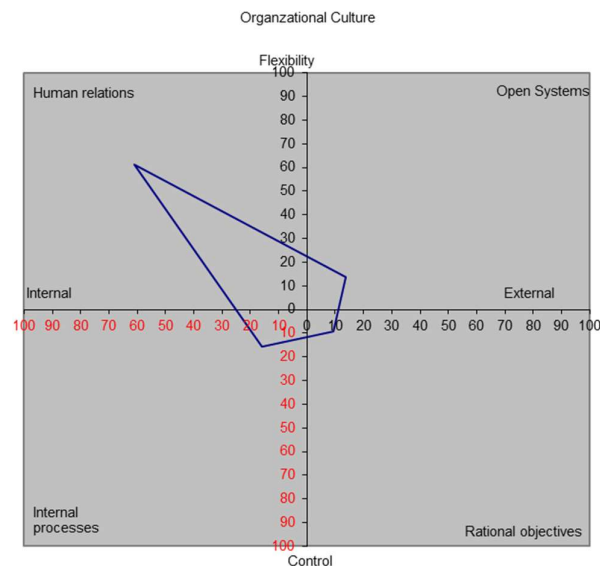
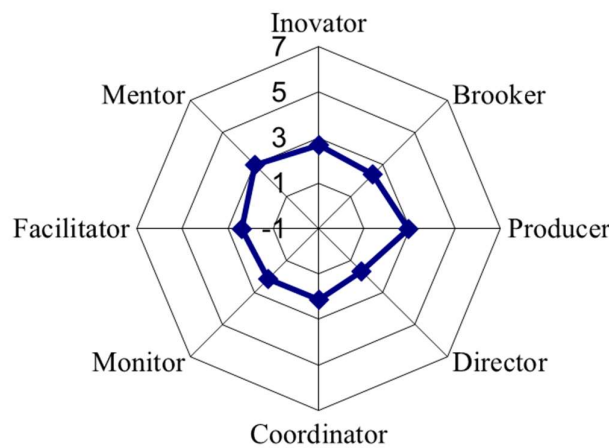


Figure 3. Organizational culture questionnaire results.

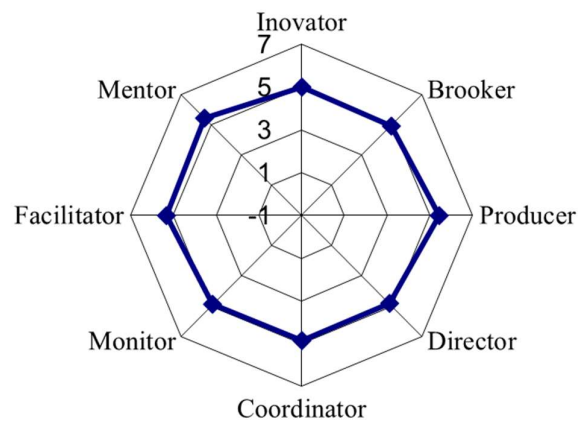
The profile types that stood out, as shown in figures 4 and 5, both from the perspective of the employees and the management elements, were mentor and producer, which is a curious result because, although the mentor profile meets the organization's culture results, meaning that the leaders dedicate themselves to developing people through careful guidance and empathy, contributing to enhancing skills and planning the individual development of the subordinates (Melo, p.923), the producer profile is associated with the model that obtained the lowest results, associated with a leader that is task-oriented, keeps focus on work and shows high interest and personal motivation (Melo, p. 923). This may be due to the fact that the response referred to the entire management team and not just to one leader, which may have highlighted the personality of one of the management elements that has not been in the team

long enough for it to be reflected on the organization's culture. It was also agreed that the profiles that are most distant from the pharmacy leaders are monitor (checks if people comply with the defined procedures and monitor constantly what happens in the organization) and director (a planner that focuses on defining and accomplishing goals and targets), which is in line with the results of the organizational culture questionnaire. More detail on the responses to this questionnaire can be found in Appendix H.



Inovator	Brooker	Producer	Director	Coordinator	Monitor	Facilitator	Mentor
2,69	2,38	2,94	4,00	2,13	2,13	2,38	2,94

Figure 4. Leadership type: self-perception.



Inovator	Brooker	Producer	Director	Coordinator	Monitor	Facilitator	Mentor
5,00	4,94	5,44	4,00	4,88	4,88	5,31	5,44

Figure 5. Leadership type: employees' perception.

As the results of the respondents previously mentioned would predict, the commitment most often expressed by employees is affective commitment, which means that they are very

emotionally involved with the organization. The continuance commitment is also high due to the sense of responsibility and gratitude felt by the employees, as most of them have also invested a lot in the pharmacy because they have been working there for several years. The results are shown in the following table:

Table 7. Commitment questionnaire results

Normative Commitment		Continuance Commitment		Affective Commitment	
Average value	34,50	Average value	23,63	Average value	38,63

More detail on the responses to this questionnaire can be found in Appendix I.

As mentioned, the pharmacy team consists of eight employees and four management members, the latter being members of the same family. Most employees have also worked in the pharmacy for many years, as previously mentioned, creating a family atmosphere among everyone as proved by the questionnaires' results, which may increase employees' dedication to the proposed actions because they feel they are part of the organization. However, the existing confidence between the team and management could make them feel too comfortable slacking off. The stability of the team, an uncommon situation in the industry, is also undoubtedly an advantage for the organization and makes it easier to implement any kind of change.

Since the leaders are also pharmacists, they have no management or leadership training, which can lead to difficulties in communication and decision making.

The structure of the organization (simple structure) has also shown to be positive in the pharmacy because it implies greater understanding on the part of leaders, but can also lead to micromanaging, with too much constant control over the team, and limit employees' freedom and innovation if the type of leadership would have been monitor or director, for example. The type of leadership present can also lead to problems of delegation of tasks and responsibilities, contrary to what is advocated in the Lean methodology, in which the participation of the various team members is essential and there can be more than one leader in team meetings.

Overall, the structure of the organization, the culture of human relations, the type of flexible and close leadership, and the affective commitment shown by the employees create favorable conditions for the implementation of the Lean methodology to be a success.

The performance diagnosis will analyze the pharmacies' ability to exploit its resources and turn inputs into outputs.

3.2. Performance diagnosis

With human resources being the key element in the implementation of the Lean philosophy and at the same time being the most frequent reason for the implementation not working, making sure of their perspective on the implementation is crucial. The staff that was available at the time participated in the discussion. The session was not recorded because it would be an inhibiting factor for the group members which means the analysis was restricted to notes taken during that session. However, because the questionnaires had already been answered and most of the assessment grid completed through observation, the focus group was just an addition of information and details rather than the basis of the entire assessment of implementation maturity. Thus, recording it was not essential to draw out specific details and the main ideas discussed. The role of the interviewer was only to ask a few key questions to guide the conversation and avoid dispersion of the focus of the discussion, but the participants had total freedom to give their opinion, examples of situations, give suggestions and exchange ideas with each other.

According to the focus group, it is recognized that an effort has been made to think about how to perform the processes differently and optimized but that the ideas and actions taken from the meetings have not been translated into tasks assigned in PDCA so that their realization can be monitored. It is also felt that communication has improved a lot in a two-dimensional way, and they now have a weekly time allocated for the transmission of information and presentation of suggestions for improvement. The team showed willingness to make an effort to improve the monitoring and follow-up of suggested improvements. It is also the team that updates the indicators on the monitoring board, which suggests an interest in the parameters being monitored. The management team is also very involved in the change process, always preparing information in a timely manner for team meetings and encouraging the involvement of employees in the decisions taken, even appointing an employee as a substitute to pass information at the Kaizen meeting if the current leader is not available.

As already mentioned, the assessment grid was built based on assessment grids published by Urban (2015) and Malmbrand et al. (2012). It was only adapted for the context in question, removing questions that would make more sense in other industries. After observing the physical space of the pharmacy, communication among the team and with the leadership in Kaizen meetings, analysis of the questionnaires and notes from group discussions, it was possible to fill in the grid.

Having scored a total of 50 points in the assessment (26 points in the first part concerning Lean culture and 24 points in the second part concerning Lean practices implemented in the organization), according to table 5, the organization fits in level 3, i.e. there is already a certain degree of implementation of the methodology, namely team commitment, time allocated to implementation, bi-directional information flow, and measurement and follow-up work (parameters that scored 4 or above), but there is still a way to go for these improvements and team involvement to be clearly visible. More detail on the results of the assessment can be found in Appendix F. Thus, it is necessary that work continues to be done to deepen the implementation but also to make the improvements already achieved sustainable.

Considering the maturity level obtained, it is possible to suggest an action plan tailored to the pharmacy's needs.

Chapter 4 Intervention project

The plan will be displayed in an A3 report that, as stated by Schwagerman (2013, p. 2), is widespread used in organizations for innovating, planning, problem-solving, and building foundational structures. In this case, the A3 report will be used for action planning over a period of one year.

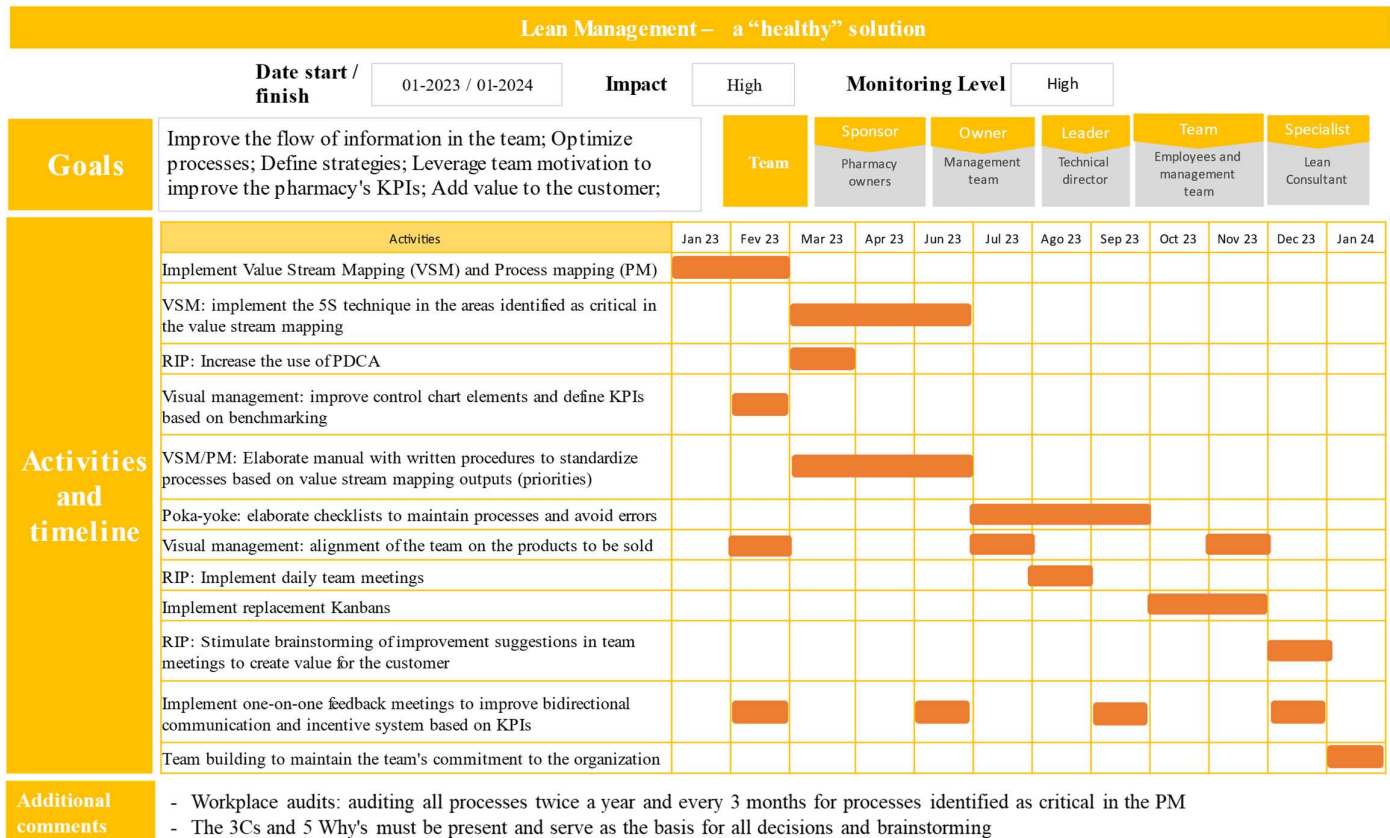


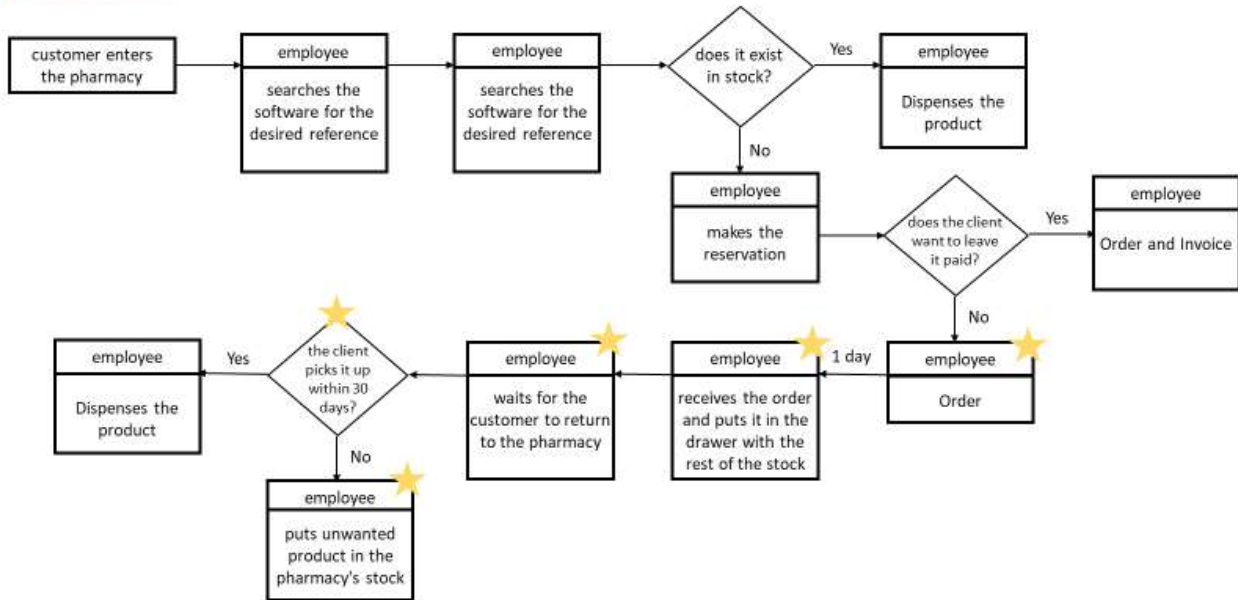
Figure 6. Proposed implementation plan

Value Stream Mapping and process mapping help visualize steps and processes and detect inefficiencies. As an example, we can consider the process of unpaid reservations, a process that, with inefficiencies, leads to unwanted and unnecessary stock, which implies costs and, consequently, waste.

The following figure shows how the pharmacy can map the process, identify the steps where it can implement changes to make it more efficient, and thus should design the desired future state:

Value Stream Mapping – Unpaid reservations

Current State



Future State

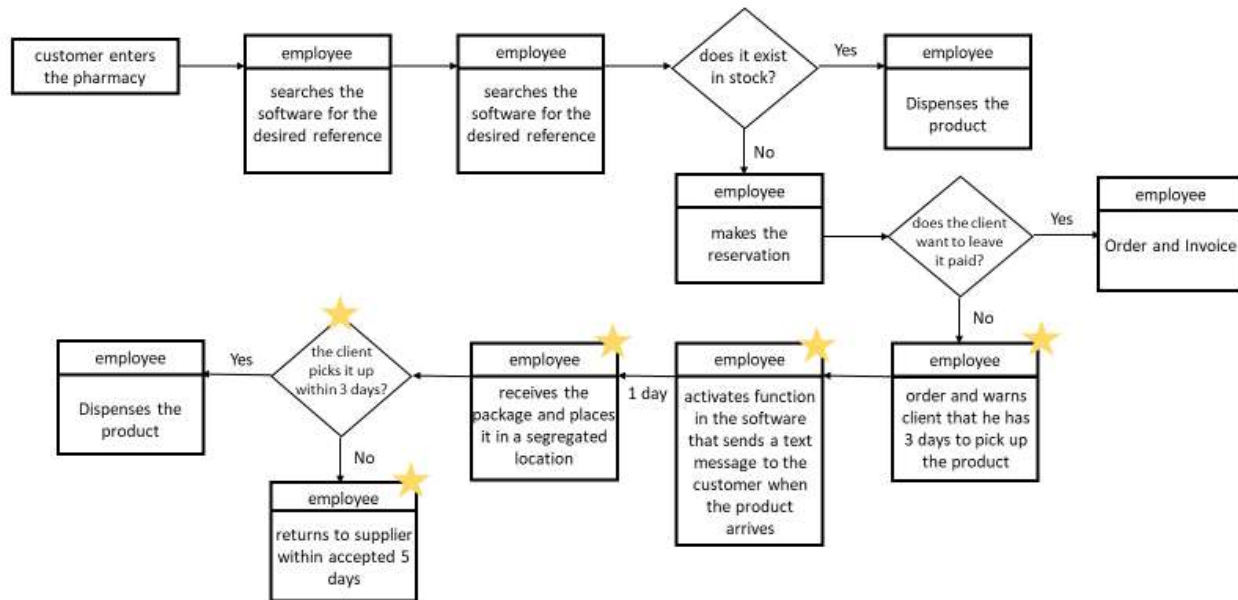


Figure 7. VSM and PM example with unpaid reservations. Source: Authors own creation.

By identifying the spaces where there is room for improvement with a star, it is easier to see what changes can be made. In this case, the suggested changes save financial resources, but also employee time and storage space.

To measure progress, in this specific case, the pharmacy can track the number of times they have to return the product vs. number of reserves they used to have to have to include in stock because the client didn't pick it up.

Identifying inefficiencies should be a team effort so that, on the one hand, all relevant inefficiencies are identified and, on the other hand, a number of suggestions for improvement and discussion about them also emerge. Furthermore, by participating in the process improvement process, the likelihood of complying with it increases significantly.

As processes are improved and defined, they should be placed in an employee handbook (physical or digital) so that it is accessible for consultation by all employees.

With value stream mapping, inefficiencies in terms of space organization are also identified. Thus, it is important to implement the 5S technique in the spaces that are considered a priority. Some examples of its impact are demonstrated in the following figures:



Figure 8. Documentation 5S example. Source: Ishijima, 2015, p. 667



Figure 9. Storage 5S example. Available at https://pim.sjp.ac.lk/news_5s.php. Accessed in October 2022



Figure 10. Storage 5S example. Source: Hepp, n/d.

As Key Performance Indicator, the pharmacy can measure time to find specific object before and after the organization.

As mentioned by employees, one of the difficulties in implementing the methodology has been using PDCA to monitor the status of actions. Thus, it is important to activate this tool because what is not monitored is hardly maintained. The following figures show some examples of its implementation in the control chart:

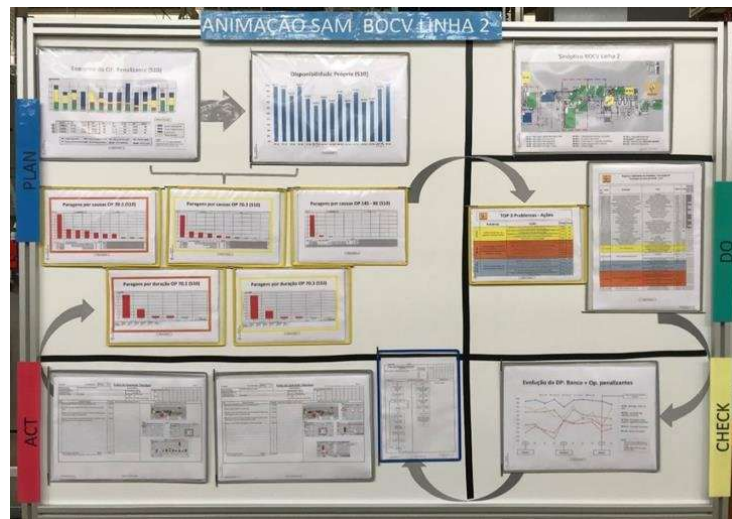


Figure 11. PDCA example. Source: Lemos, 2019, p. 7

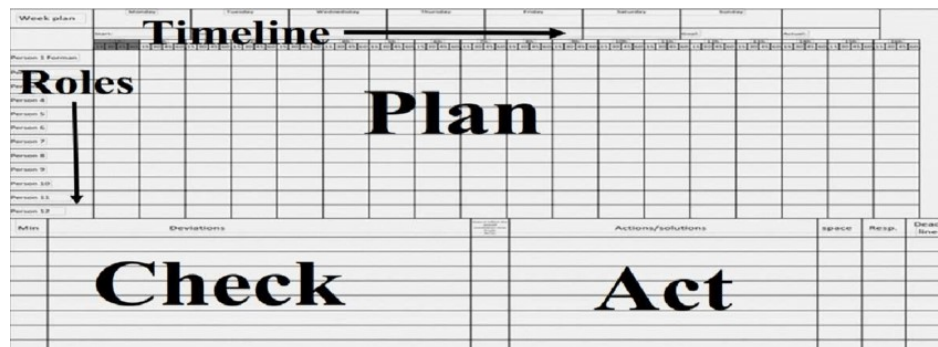


Figure 12. PDCA example. Source: Lerche, 2020, p. 66

To measure the success of the implementation, the pharmacy can count the number of actions still on PDCA after expiration date and the number of actions present on the board.

PDCA can then take on different formats. The important thing is that it has the identification of the employees and space to place several actions simultaneously. For implementation, it is important that there is also training for employees on how to use it in order to be as efficient as possible.

When optimizing the consumables management process, the pharmacy can use the placement of replenishment kanbans, i.e., the placement of cards with information about the consumables in question, to ensure that whichever employee uses the material, if it reaches a certain minimum stock, he or she has all the information necessary to create a replenishment flow, without running out of stock at the gemba. Again, the cards can have different formats, as long as they contain all the necessary information. Here are some examples:

Your Logo Here		Kanban Replenishment Card	
Part Number		Description	
Part Number		Description	
Order Qty	U/M	Card 1 of	Container
is Per	Cont of Med	Card 1 of	Container
Pull From		Supplier	
Pull From		Supplier	
Pull To:		Consuming Operation	
Shelf Location		Consuming Operation	
		Barcode	
		Tracking #	

Figure 13. Kanban replenishment card example. Source: Hoffman, 2018.

KANBAN CARD	
Product Number: _____	Issue Date: _____
Product Description: _____	Required Date: _____
Quantity Required: _____	Additional Notes: _____ _____
Location: _____	
Container: _____	
Supplier: _____	
Supplier Code: _____	Barcode

Figure 14. Kanban card example. Available at <http://www.leantoolset.com/kanban/>. Accessed in October 2022.

To measure the value of this cards, the pharmacy can count the times they run out of the consumables before and after the implementation.

The project presented reflects the need to maintain the motivation shown by employees with actions in which it is possible to verify results more quickly (RIP), but also to develop

actions with long-term results that will lead to a state of sustainability of the improvements that are being felt.

It is expected that at the end of its implementation, i.e. within one year, the pharmacy will be at least at maturity level 4.

Chapter 5

Conclusions

The objective mentioned initially is to study the implementation of the Lean methodology in a community pharmacy, thus considering its difficulties and understanding which and how the available tools should be implemented in order to improve its performance and, consequently, increase the value for the customer and the return for the organization. The contribution of this case study is, essentially, the suggestion of an implementation plan based on employee motivation and leadership investment, serving as another example of the implementation of Lean in a healthcare organization. Specifically, it fills a gap in the literature since, when looking for implementations in healthcare, to date, they have mostly been done in hospitals. The main goals were achieved, and it was possible to design a project with a time horizon of one year that takes into account the specificities of this organization.

This research has some limitations, usually attributed to case studies, namely being a single case study, such as the impossibility of generalizing the results obtained. Another limitation derives from the existence of multiple ways of implementing Lean, which means that the proposed project may even obtain satisfactory results in this organization in a given time period and, in the limit, take it to the maximum level of maturity and, in another organization, or even in the same organization but in another time period, have completely different results.

Considering the contributions and limitations of this study, it would be interesting to conduct future research in different organizations and to correlate the maturity level with the organization's culture, commitment type, and leadership personality profile, in order to obtain more information about the association of these factors with the success of the methodology implementation. Furthermore, since case studies do not allow the results to be generalized, more examples will exist to base yourself on, which will be of great interest in predicting the success of implementations and the level of maturity that can be achieved, and may save organizations resources. Since this community pharmacy had a culture and stakeholder engagement conducive to implementation success, it would be especially interesting to analyze an organization where the case was the opposite and it was predicted that implementation would not be so easy, to reinforce this association between factors and to understand how these issues could be circumvented.

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Appendixes

Appendix A – Organizational Culture Questionnaire

Each of the following items translates four descriptions of organizations. Distribute 100 points across the four descriptions according to how similar they are to your own organization. None of the descriptions is better than the other; they are just different. For each question, please use 100 points. For example, in item 1, if organization A is very similar to mine, organization B has some similarities, and C and D have any similarities to mine, I should give 70 points to A and the remaining 30 points to B.

1. Dominant Characteristics

- a. ____ Organization A has very unique characteristics, it is like an extended family. People seem to give a lot of themselves.
- b. ____ Organization B is very dynamic and entrepreneurial. People are able to take initiatives and take risks.
- c. ____ Organization C is very structured and formal. What people do is generally governed by bureaucratic processes.
- d. ____ Organization D has a competitive orientation. Its main concern is the achievement of results. People are oriented towards productivity and success.

2. The Organization Leader

- a. ____ The top leader in Organization A is generally considered to be a mentor, a facilitator, a parental figure.
- b. ____ The top leader of Organization B is generally regarded as an entrepreneur, an innovator, a risk-taker.
- c. ____ The top leader of Organization C is generally regarded as a coordinator, an organizer, an efficient expert.
- d. ____ The top leader of Organization D is generally regarded as a very demanding, productive, competitive individual.

3. Organizational Integration

- a. ____ What contributes to organizational integration in Organization A is loyalty and commitment. Cohesion and team spirit are characteristics of this characteristics of this organization.
- b. ____ What contributes to organizational integration in Organization B is the emphasis on innovation and development. The emphasis is on being on the crest of the wave.
- c. ____ What contributes to organizational integration in Organization C are the formal procedures formal procedures, rules or policies. The most important thing is to maintain smooth organization.
- d. ____ What contributes to organizational integration in Organization D is the emphasis on production and goal achievement. The aggressiveness of the market is a constant concern.

4. The Organizational Environment

- a. ____ The internal climate in Organization A is participative and comfortable. There is a high degree of trust and openness.
- b. ____ Organization B's internal climate emphasizes dynamism and the ability to face new challenges. Trying new things and trial-and-error learning are common.
- c. ____ The internal climate in Organization C emphasizes permanence and stability. Everything regarding rules is clear and followed to the letter.
- d. ____ The internal climate in Organization D is competitive and confrontational. Emphasis on beating the competition.

5. Criteria for Success

- a. ____ Organization A defines success in terms of human resource development, team spirit, and respect for people.
- b. ____ Organization B defines success in terms of having unique products in the market or the latest products. It is an innovator and a product leader.
- c. ____ Organization C defines success in terms of efficiency. Great importance is placed on low-cost production, flexible deadlines, and timely deliveries.

d. ____ Organization D defines success in terms of market penetration and market shares. Its main objective is competition.

6. Management Style

a. ____ The management style in Organization A is characterized by team spirit, consensus and participation.

b. ____ The management style in Organization B is characterized by individual initiative, innovation, freedom, and inventiveness.

c. ____ The management style in Organization C is characterized by job security, time in the role, and predictability.

d. ____ The management style in Organization D is characterized by high demand, productivity, and success.

Appendix B – Type of Leadership in the Team’s Perspective

In the following questionnaire some management behaviors are described. Your task is to indicate to what extent your leader fits these behaviors.

Respondents should use a seven-point scale, shown below, to answer each question, keeping in mind that 1 corresponds to "very rarely" and 7 corresponds to "very often".

By performing his work, my superior:

1.	Listens to the personal problems of subordinates.	1	2	3	4	5	6	7
2.	Meticulously reviews detailed reports.	1	2	3	4	5	6	7
3.	Solves problems in an intelligent and creative way.	1	2	3	4	5	6	7
4.	Clearly defines areas of responsibility for subordinates.	1	2	3	4	5	6	7
5.	Engages sincerely and personally in the work.	1	2	3	4	5	6	7
6.	Facilitates consensus building in group work meetings.	1	2	3	4	5	6	7
7.	It ensures the smooth continuity of daily operations.	1	2	3	4	5	6	7
8.	Compare records with the aim of detecting some discrepancy in them.	1	2	3	4	5	6	7

- | | | | | | | | | |
|-----|--|---|---|---|---|---|---|---|
| 9. | Shows empathy and concern when dealing with his subordinates. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. | Sets clear goals for your work unit. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. | It looks for innovations and potential improvements. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 12. | Seeks that his pace of work is not interrupted. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 13. | Seeks to demonstrate high motivation in the performance of his duties. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 14. | Encourages participation in decision-making in group work meetings. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Appendix C – Type of Leadership in the Leaders’ Perspective

In the following questionnaire some management behaviors are described. Your task is to indicate to what extent your behavior fits these descriptions.

Respondents should use a seven-point scale, shown below, to answer each question, keeping in mind that 1 corresponds to "very rarely" and 7 corresponds to "very often".

By performing my work, I:

- | | | | | | | | | |
|-----|--|---|---|---|---|---|---|---|
| 1. | Listen to the personal problems of subordinates. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. | Meticulously review detailed reports. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. | Solve problems in an intelligent and creative way. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. | Clearly define areas of responsibility for subordinates. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. | Engage sincerely and personally in the work. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. | Facilitate consensus building in group work meetings. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. | Ensure the smooth continuity of daily operations. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. | Compare records with the aim of detecting some discrepancy in them. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. | Show empathy and concern when dealing with his subordinates. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. | Set clear goals for my work unit. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. | Look for innovations and potential improvements. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 12. | Seek that my pace of work is not interrupted. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 13. | Seek to demonstrate high motivation in the performance of my duties. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 14. | Encourage participation in decision-making in group work meetings. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Appendix D – Type of Commitment Towards the Organization

This questionnaire is made up of a series of statements that represent some possible feelings people have towards the organization they work for.

Regarding your own feelings about the company you are currently working for, please indicate the degree to which you agree with each statement. For this purpose, please assign one of the 7 alternatives that follow to each statement:

The meaning of the 7 possible alternatives is as follows:

1. Strongly disagree
2. Moderately disagree
3. Somewhat disagree
4. Neither disagree nor agree
5. Somewhat agree
6. Moderately agree
7. Very much agree

1. I would very much like to develop the rest of my career in this organization ____
2. Many things in my life would be greatly disrupted if I decided to leave this organization now ____
3. I feel no obligation to stay in my current job ____
4. Even if it was in my best interest, I didn't feel right about leaving the organization I work for now ____
5. At this point, staying in this organization is as much a matter of necessity as of will ____
6. Frankly, I consider the problems of this organization as if they were also mine ____
7. I don't feel like I am "part of the family" ____
8. I feel that for lack of other options I cannot consider leaving this job ____
9. I would feel guilty if I left my organization now ____
10. This organization deserves my loyalty ____
11. One of the few serious consequences of my eventual departure from this organization would be that there would not be many alternatives ____
12. I don't feel emotionally attached to this organization ____
13. This company has great personal significance for me ____

14. One of the main reasons I continue to work for this company is that my leaving would involve considerable personal sacrifice - another company might not offer the same benefits I have in this one ____
15. I wouldn't leave my organization now because I feel I have an obligation to the people who work there ____
16. I feel indebted to the organization I work for ____
17. If I hadn't invested so much of myself in this organization, I would seriously consider going somewhere else to work ____
18. I don't feel a strong sense of belonging towards this company ____

Appendix E – Lean implementation assessment

Part I. Lean culture

1. Organization's vision components:

- a. A clear vision of organizational improvement, shared by all employees, exists in our company;
- b. We believe that in order to achieve a long-term vision of the company, short-term gains are sacrificed if necessary;
- c. In our company we do not accept temporary solutions to problems. We get them right first time, and if it is necessary, we stop the whole process to solve the problem immediately;
- d. Our company shows respect for our business partners, and if they want us to, we help them to improve their processes.

2. Employee training, commitment and understanding. Employee training:

- a. No training in lean for employees;
- b. Start of training: some employees trained;
- c. All employees attended some training in lean, but competence in improvement techniques varies;
- d. All employees attended training in improvement techniques and the underlying ideas of lean;
- e. All employees continuously train in different aspects of improvement work and are considered highly competent in improvement work.

3. Employee commitment:

- a. No commitment to lean, openly negative towards lean or does not display any commitment;
- b. Sees lean as a temporary project and is willing to dedicate limited time and energy for improvement work now;
- c. Expresses support for lean and dedicates time and energy for coming up with improvement ideas, but does not take an active role in problem solving and adoption of new ways of doing work;

- d. Actively participates in improvement work, comes up with improvement suggestions, sees problems through to long-term solutions and is a driving force for lean adoption;
- e. Exceptional approach to employee's role in lean. Sees improvement work as an important part of everyday job. Equal focus on new solutions and sustaining previous ones.

4. Infrastructural elements. Time for improvement work:

- a. No time specifically allocated for improvement work;
- b. Infrequently, some time is allocated for improvement work;
- c. Frequent improvement meetings or similar in most areas, but teams are at varying stages;
- d. Frequent improvement meetings or similar in all areas means everyone is involved in improvement work;
- e. Exceptional approach where improvement work is part of everyday work for all employees.

5. Resources for improvement work:

- a. No investments or resource allocation as a result from improvement work;
- b. Some investments in connection to lean adoption, such as visualization board, etc;
- c. Some visible investments/resource allocation in most areas as a result from improvement work;
- d. Several visible investments from improvement work, focused on facilitating individual tasks;
- e. Visible investments throughout the service site in connection to lean adoption, focused on enhancing customer value and/or process flow.

6. Leadership:

- a. Our company emphasizes the development of leaders who identify with the company's vision and rules;
- b. It is obvious that top managers are often found close to the value stream, and they serve there in problem solving;
- c. We believe that decisions should be forwarded to an operational level; employees are empowered to make decisions about issues related to their work;

d. In our company we do not accept “pretend projects” that run without a full understanding of their meanings and without the conviction that they will bring good results.

7. Bi-directional vertical information flow:

a. No bi-directional vertical information flow. Employees do not have a way of forwarding information to different levels of management, and they rarely get information from management;

b. Starting to use methods for forwarding information and issues between employees and different levels of management, but informal approach in a few areas;

c. Forwarding of information between employees and different levels of management is done in a systematic way in most areas of the organization;

d. Forwarding of information between employees and different levels of management is working well in all areas of the organization, and employees continually receive information and responses. Ongoing refinement of the approach;

e. Exceptional approach to bi-directional vertical information flow. Forwarding of information daily from the improvement teams all the way through to the business unit and head office. In the same way, information is continually fed back to improvement teams from different levels of management.

8. Operational improvement:

a. The norm is that we still carry out improvement projects in various spheres of the company;

b. It is important for our company to improve all operations systematically, and all employees continuously work on discovering and eliminating waste;

c. In our company nobody hides faults; spotted errors are treated as an opportunity to improve;

d. We emphasise communicating in a visual way all the guidance of operations, and other important information, such as errors and performance.

9. People treatment:

a. The employees are treated with respect and healthy partnership; care of people is manifested in attention to their needs and their development;

- b. We believe that continuous learning for all employees should be an integral part of the work in our company;
- c. We always remember to challenge people; challenges are taken on by managers and employees;
- d. We pay attention to facilitate conditions for individual initiative and creativity in every position in our company.

Part II. Lean practices

1. Customer value. Identification of customer value:

- a. No real effort to understand customer value;
- b. Start searching for ways to understand customer value, but informal approach at varying levels in different areas of the organization;
- c. Most areas in the organization are actively discussing what customer value is, and which activities add to that or not;
- d. Most employees can see and describe what activities are value adding or not for the customer and in their own work they can identify what part of their activities add to customer value and which do not;
- e. Exceptional, innovative approach to identification of customer value, recognized as best practice. Customer value has been redefined and is constantly challenged. All employees can see what part of their activities add to customer value and which do not.

2. Flow. Workplace design for flow:

- a. Work area is disorderly and employees spend a lot of time searching for information and other resources needed to do the job;
- b. Start searching for a way to organize the workplace, discussions around location of information and resources availability;
- c. Information and resources have been sorted and organized for easy retrieval;
- d. Information and resources located based on when and where they are needed in the process in order to facilitate flow;

e. Exceptional and innovative location of information and resources for process flow. It is possible to see the most recurring processes by looking at the organization and location of resources and information.

3. Standardization. Standardized tasks:

a. No use of standardized tasks;

b. Start using standardized tasks in some areas, may not be written down or in forms of simple checklists;

c. Use of standardized tasks in some selected areas, starting to become more explicit, detailed and written down;

d. Use of standardized tasks in most areas. Starting to follow up if agreed-upon standards are used at all times;

e. Exceptional use of standardized tasks in all areas. When deviations (quality, time, etc.) occur, the standard is used as a guide to find the reason (was standard followed?, If yes – improve standard, if no – why? Training needs or other reason? Etc.).

4. Visualization. Visual signals:

a. No use of visual signals;

b. Start using visual signals in some areas, signalling, for example, location of different types of resources but to a varying degree and possibly not always up to date;

c. Visual signals used to facilitate work in some areas, signalling not only location of resources but also process progress and starting to visualize some deviations;

d. Extensive use of visual signals in all areas to draw attention to multiple types of deviations;

e. Exceptional and innovative use of visual signals in all processes. It is possible for anyone to see the current situation and any problems or deviations by looking at visual signals in the workplace;

5. Multifunctional employees. Employees measure and follow up work:

a. No following-up of work by employees themselves. Metrics used to evaluate are commonly set by head office and difficult for employees to affect;

- b. Start searching for methods for following up the work and processes locally, but informal approach in few areas;
- c. Starting to measure and following up some work by employees themselves, local metrics are starting to appear;
- d. Measuring and following up work in most processes but at varying stages. Metrics follow up process rather than individual;
- e. Exceptional approach to following up processes by employees in all areas. Innovative metrics are developed and used by employees to follow up process improvements.

6. Continuous improvement. Employee participation in improvement work:

- a. No improvement work by employees;
- b. Start of improvement work. Informal approach in a few areas, all staff does not participate;
- c. Most staff participates in improvement work, but at varying levels. Experimentation with time, participants and agenda for improvement work meetings;
- d. All employees participate in improvement work, but level of activity varies in different areas. Participation is based on knowledge of the process in focus for the meeting;
- e. Exceptional participation in improvement work in teams. All employees participate actively in improvement work regarding processes that they are part of. Recognized as best practice/role model.

7. Focus of improvement work:

- a. Improvement activities are ad hoc and there is no clear focus of improvement activities;
- b. Improvement activities focus on improving the working environment, housekeeping, etc;
- c. Improvement activities are mainly focused on issues related to the working environment, housekeeping, repair of tools, etc. but in some areas process improvements are starting to appear;
- d. Issues related to process flow and customer value in improvement work are becoming predominant in all areas;

e. Exceptional and innovative improvement work. Recognized as best practice/role model. Continuously improving the entire flow (not just a function) is part of everyday work for all employees.

8. Structured problem solving:

a. Improvement activities are ad hoc and not part of a systematic approach. Often focus on symptoms and not real root cause. Problems are solved in “fire fighting” manner;

b. Start of systematic improvement work. Searching for the root cause of problems, starting to use problem solving tools;

c. Root cause analysis and other problem solving tools are being used routinely. Employees are proficient in problem solving techniques;

d. Improvement work as experimentation, where outcome after implemented solution is assessed and adjustments made accordingly;

e. Exceptional approach to improvement work. Improvements are made not just by solving apparent problems, but also by challenging the current situation.

9. Sustaining improvements:

a. Earlier improvements are not sustained;

b. Increasing awareness of the importance of sustaining earlier improvements. Start searching for proper methods for securing that improvements are sustained over time;

c. Most areas have a systematic way of checking whether agreed upon improvements are followed. If they are not followed, reasons are discussed;

d. All areas have a way of assuring that agreed upon improvements are sustained over time. If they are not followed, reasons are discussed and there is evidence of changes to work standards or similar based on those discussions;

e. Exceptional innovative approach to ensuring that improvements are sustained involving both employees and managers. If improvement is no longer in use, reasons are discussed and if necessary the improvement is updated based on the findings of this analysis.

Appendix F – Lean implementation assessment results

Assessment results			
Part 1		Part 2	
1.	1	1.	2
2.	3	2.	2
3.	4	3.	3
4.	4	4.	3
5.	2	5.	4
6.	2	6.	3
7.	4	7.	3
8.	3	8.	2
9.	3	9.	2
Subtotal	26	Subtotal	24
Total			50

Appendix G – Organizational culture questionnaire responses

Organization	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11
Organization A	410	380	450	380	150	172	420	350	420	360	535
Organization B	75	100	60	30	150	159	20	100	50	120	45
Organization C	80	65	90	130	175	120	110	100	95	60	20
Organization D	35	55	0	60	125	149	50	50	35	60	0
Total Points	600	600	600	600	600	600	600	600	600	600	600

Appendix H – Types of leadership questionnaire responses

Facilitator	E1	E2	E3	E4	E5	E6	E7	Total	Average	Facilitator	MTM1	MTM2	MTM3	MTM4	Total	Average	Facilitator
7	6	6	6	7	6	6	5	42	5,25	5,3125	5	4	6	4	19	2,375	2,375
16	6	7	7	5	6	7	5	43	5,375		4	5	6	4	19	2,375	
Mentor	E1	E2	E3	E4	E5	E6	E7	Total	Average	Mentor	MTM1	MTM2	MTM3	MTM4	Total	Average	Mentor
1	6	4	7	7	5	6	6	41	5,125	5,4375	6	5	7	5	23	2,875	2,9375
10	7	6	7	7	7	7	5	46	5,75		6	4	7	7	24	3	
Inovator	E1	E2	E3	E4	E5	E6	E7	Total	Average	Inovator	MTM1	MTM2	MTM3	MTM4	Total	Average	Inovator
4	6	3	4	7	5	7	5	37	4,625	5	6	5	6	3	20	2,5	2,6875
12	7	7	4	7	5	7	6	43	5,375		6	6	7	4	23	2,875	
Intermediate	E1	E2	E3	E4	E5	E6	E7	Total	Average	Intermediate	MTM1	MTM2	MTM3	MTM4	Total	Average	Intermediate
3	7	5	7	7	2	6	5	39	4,875	4,9375	7	5	6	4	22	2,75	2,375
13	7	6	5	6	5	6	5	40	5		5	5	5	1	16	2	
Producer	E1	E2	E3	E4	E5	E6	E7	Total	Average	Producer	MTM1	MTM2	MTM3	MTM4	Total	Average	Producer
6	7	6	7	6	6	7	6	45	5,625	5,4375	7	7	7	7	28	3,5	2,9375
15	7	4	7	7	5	7	5	42	5,25		3	6	6	4	19	2,375	

Director	E1	E2	E3	E4	E5	E6	E7	Total	Average	Director	MTM1	MTM2	MTM3	MTM4	Total	Average	Director
5	5	4	5	6	5	6	4	35	4,375	4,8125	3	3	4	2	12	1,5	1,6875
11	6	6	5	7	6	7	5	42	5,25		5	3	5	2	15	1,875	
Coordinator	E1	E2	E3	E4	E5	E6	E7	Total	Average	Coordinator	MTM1	MTM2	MTM3	MTM4	Total	Average	Coordinator
8	6	6	7	6	5	7	5	42	5,25	4,875	6	4	6	3	19	2,375	2,125
14	7	4	7	5	2	6	5	36	4,5		3	5	5	2	15	1,875	
Monitor	E1	E2	E3	E4	E5	E6	E7	Total	Average	Monitor	MTM1	MTM2	MTM3	MTM4	Total	Average	Monitor
8	6	6	7	6	5	7	5	42	5,25	4,875	6	4	6	3	19	2,375	2,125
14	7	4	7	5	2	6	5	36	4,5		3	5	5	2	15	1,875	

Appendix I – Commitment questionnaire responses

Normative Commitment		Continuance Commitment		Affective Commitment	
E1	42	E1	20	E1	42
E2	31	E2	19	E2	42
E3	37	E3	33	E3	38
E4	42	E4	15	E4	42
E5	33	E5	25	E5	35
E6	34	E6	19	E6	38
E7	31	E7	27	E7	36
E8	26	E8	31	E8	36
Average value	34,5	Average value	23,625	Average value	38,625