

## Optimization of processes in a small bakery maker through value stream mapping

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### ABSTRACT

The Lean Manufacturing System ends up supplying production with the exact quantity of essential items in the time required. This system ends up aiming for an efficient and effective order of production that aims to analyze workers, movements and the scarcity of waste and activities that do not add perceived value.

**Keywords:** Bakery, Small, Mapping, Value flow.

### INTRODUCTION

The Lean Manufacturing System ends up supplying production with the exact quantity of essential items in the required time. This system ends up aiming for an efficient and effective production order that aims to analyze workers, movements and the scarcity of waste and activities that do not add perceived value.

The foundation of the Lean Manufacturing System is to eliminate waste. As it is an element that, when identified and converted into useful activities of the process in which it is found, or when eliminated, provides productivity and efficiency to the set of remaining tasks.

With cost reductions and no reduction in the quality of services and products, it becomes an important factor for successful growth in the market. One way for companies to ensure that cost reductions occur is through cuts in some activities that do not add and absorb resources and do not add value, making the company always work with Lean Production, being the form of reduction from the beginning (raw material) to the shipping sector.

Within Lean Production, a very important tool can be mentioned, which is Value Stream Mapping (MFV), which is an organized process of modeling companies with a technique for building and elaborating manufacturing scenarios. To achieve the proposed objectives, a theoretical review is carried out, followed by an explanation of the method used, presentation of the results and conclusions.

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## **GOAL**

The main objective of the work is to analyze the production processes of a small bakery, aiming to optimize them. Seeking to identify improvements, Value Stream Mapping (MFV) was carried out.

The purpose of this project is to boost a company that was declining in sales with countless waste to be evaluated, poorly defined processes, no monitoring and no standardization.

The aim is to implement the quality of product and service processes that are fundamental elements for business competitiveness, through the standardization of processes, the development of goals using indicators and mapping of the value stream.

## **METHODOLOGY**

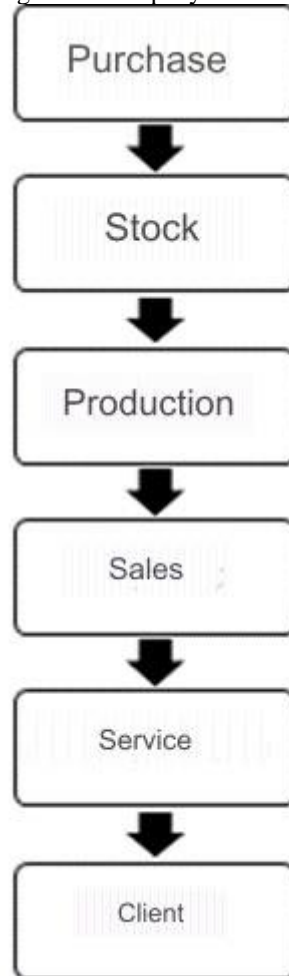
As a methodology, bibliographical research was initially used, which according to Gil (2010, p. 44) is “research developed from already prepared material, consisting mainly of books and scientific articles”.

Subsequently, a case study was developed in a small bakery in the municipality of Três Lagoas/MS. For Lakatos and Marconi (2011, p. 274), case study “refers to the in-depth survey of a given case or human group from all its aspects”. Therefore, a case study consists of a broad and detailed study, that is, complex, of one or more objects seeking greater knowledge of it.

The company studied in this work has been located in the municipality of Três Lagoas/MS since 2011, operating in the market for 7 years, with a vast portfolio of products and services, always seeking to innovate. The company operates from Monday to Friday from 5:30 am to 7 pm, Saturday, Sunday and public holidays from 5:30 am to 11 am, generating 12 jobs directly, including 1 general manager, 1 production manager, 2 bakers, 4 counter attendants, two cashier and 2 interns.

The maximum daily production quantity observed during the research was 800 loaves of bread. Figure 1 consists of the company's flowchart.

Figure 1: Company flowchart



Source: Authors (2018)

To collect data, visits were made to the case study company, with the aim of observing and identifying the stages of the production process. Through observation and a semi-structured interview with the production manager, it was possible to collect relevant information for the construction of the state map in the search for implementing improvements in the company.

## DEVELOPMENT

This section presents a review of the literature on Value Stream Mapping (MFV), PDCA Cycle and Kaizen Tool, to later carry out the analyzes aimed at in this article.

### VALUE STREAM MAPPING (MFV)

The Value Stream Map is the diagnostic and planning tool that guides all other lean production tools (MESQUITA, MESQUITA and SOUZA, 2014).

A value stream can be defined as the set of steps (value added or not) necessary to have a product or service, from the state of raw materials to product delivery and customer satisfaction. Value Stream



Mapping (MFV) is based on creating a “map” that shows what the flow of materials or information looks like. This map begins in the supply chain, passes through the company and ends at the customer, covering the entire raw material transformation process (BONATTO, 2013).

MFV is a strategic business tool that makes it possible to see the macro level of production. For this reason, it is able to show opportunities for improvement at each stage. Value stream mapping is also used as a means to identify bottlenecks and delays in production processes. This way, it is possible to understand which steps do not add value to the final product and, then, create a common language of the present state (picture of what the company is today) and the future state of the process (where it intends to reach) (JESUS, 2014).

It is important to emphasize that mapping the flow of information is as important as mapping the process. It is natural that these two flows are interconnected and the mapping must include both (FERNANDES, 2016). Furthermore, it is rare to have someone in a company who knows the entire value stream of a product. Therefore, detailed analysis of the process with the combination of information is always necessary so that effective actions can be articulated, aiming to achieve optimal global results.

In an MFV diagram you will find:

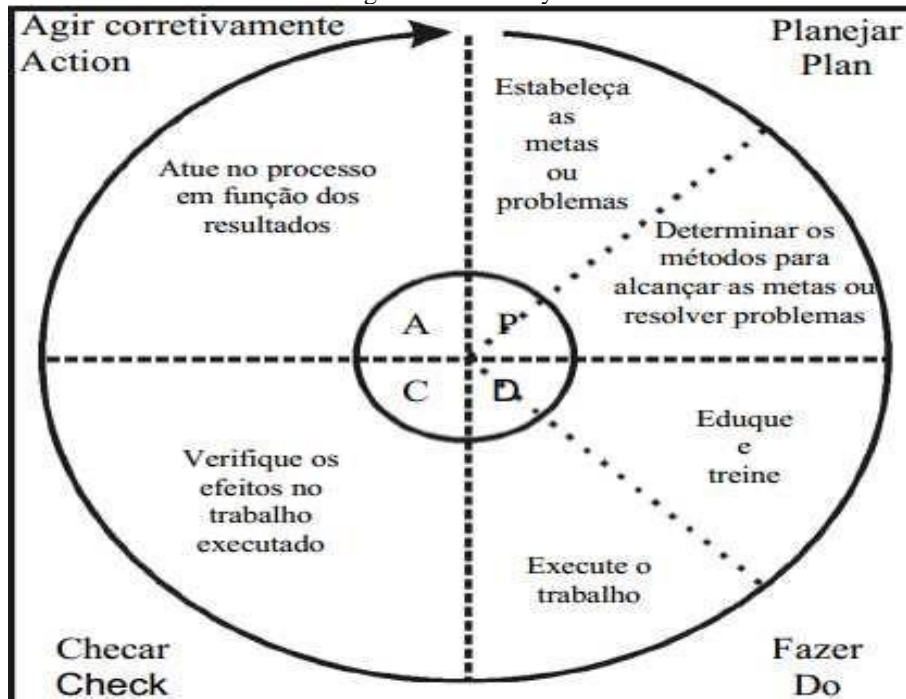
- Global control process;
- Suppliers and delivery methods;
- Inputs from suppliers;
- Work processes (including inventory warehouses) through which materials move;
- Waste and exits;
- Customers and delivery methods;
- Information flow that coordinates the process steps;
- Average times required in each process: real working time and overhead time;
- Number of people involved in the work.

## THE PDCA CYCLE

The PDCA cycle, also known as the Shewhart cycle, quality cycle or Deming cycle, is a methodology whose basic function is to aid in the diagnosis, analysis and prognosis of organizational problems, being extremely useful for problem solving (MOURA, 2011).

Few instruments are as effective in the search for improvement as this method of continuous improvement, considering that it leads to systematic actions that speed up obtaining better results with the purpose of guaranteeing the survival and growth of organizations (QUINQUIOLO, 2002). Figure 2 shows the structuring of the PDCA Cycle.

Figure 2: PDCA Cycle



Source: Souza (2013)

The PDCA Cycle is composed of four cyclical and continuous stages, which are (ALVES, 2012):

- P – Plan : prior to executing a process, activities must be planned, clearly defining the goals you want to achieve and the method that will be used to achieve them;
- D – Do (Execute): in this stage the results arising from the planning phase will be executed or implemented. Those involved in the process must be properly trained to carry out the activities and data must be collected;
- C – Check : in this phase the evaluation is carried out to check whether what was planned was achieved. To this end, a comparison is made between the stipulated goals and the results obtained;
- A – Action (Act, carry out corrective action): for the problems found, in this phase corrective actions will be defined, aiming to obtain the planned results.

The repeated and cyclical nature of continuous improvement can be summarized in the PDCA cycle, defined as a sequence of activities that are carried out in a cyclical manner to improve them (SOUZA and DUARTE, 2013).

## KAIZEN TOOLS

The word Kaizen has Japanese origins and means “continuous improvement”, which can be taken to the workplace, family and personal life. In industry, it has the same meaning, and refers to daily and constant improvement, with the aim of increasing productivity. Kaizen, when applied in industry, also



seeks to eliminate unnecessary processes, as well as waste of time, raw materials, etc. When cultivated magnificently, Kaizen can improve productivity and, consequently, the quality of the final product, without incurring expenses, and may even require minimal investment (SALGUEIRO, 2015).

The continuous improvement processes that integrate the Kaizen methodology serve to offer the industry that employs it a series of advantages. Among them, the main ones are:

- Value analysis;
- Waste elimination;
- Standardization;
- Better use of the workforce;
- Ease of implementing the Just in time (JIT) system.

Kaizen is completely linked to development, whether of a bakery or people. This tool is generally used to increase productivity and reduce costs.

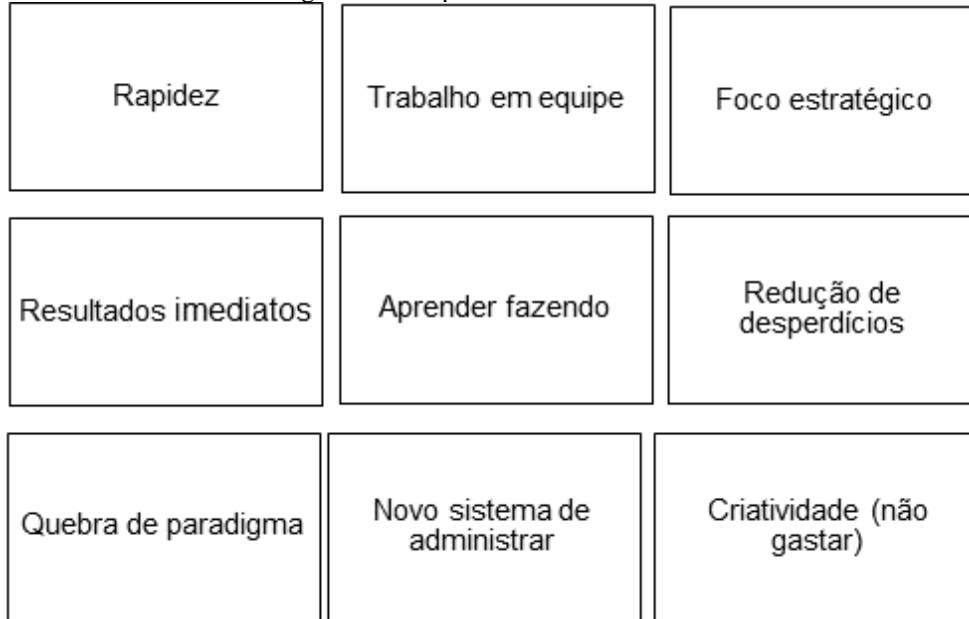
The method applied to achieve good results is to encourage continuous improvement of the activities to be developed.

According to Cesar (2010) the principles of Kaizen are:

- Emphasize the customer;
- Promote continuous improvement;
- Recognize problems openly;
- Promote openness;
- Create work teams;
- Manage projects through work teams;
- Feed the correct relationship process;
- Develop self-discipline;
- Inform all employees;
- Train all employees.

Figure 3 shows that this tool basically brings nine points: speed, teamwork, strategic focus, immediate results, learning by doing, waste reduction, paradigm shift, new management system and creativity (not spending).

Figure 3: Nine points of the Kaizen Tool



Source: Maximiano (2012)

Always aiming for teamwork, the kaizen tool works with its basic principles and methods in valuing employees, focusing on the success of the business to be evolved.

## PRESENTATION AND DISCUSSION OF RESULTS

This section presents the diagnoses found in the researched company, as well as suggested improvement actions.

## IMPROVEMENT OPPORTUNITIES

In identifying waste and activities that do not add value, in the current production situation, it was possible to carry out an analysis of the possibilities for reducing and eliminating them.

To implement the new production process, it is necessary to observe some important points:

- Improve the use of space in the cold room, as products will be stored pre-ready for baking, taking up more space;
- Transcribe processes in a more accessible and objective way;
- Provide training and motivation to the team regarding the proposed new steps and activities;
- Frequently analyze the new process through time/stock control throughout the production flow.

When evaluating production processes to reduce waste, there is a positive impact on productivity, creating a transformation and increasing the use of current capacity.

## SUGGESTIONS FOR IMPROVING BAKERY PROCESSES



To improve the Bakery, improvements were listed to be put into practice, as shown in table 1.

Table 1 – Suggestions for Improvements

Stage	goal	Methods Used	Expected results
1	Standardization of recipes and products produced	<ul style="list-style-type: none"><li>• Technical sheet (recipes with ingredients, preparation method, etc.)</li><li>• Collection of all stages of recipes and ingredients</li><li>• Registration of formulations (recipes from the technical sheet) in the recipe spreadsheet</li></ul>	<ul style="list-style-type: none"><li>• Standardization of each stage of the process</li><li>• Knowledge of the costs of each item</li><li>• Knowledge of expected profit margin</li><li>• Predicted price and actual price</li></ul>
two	Implementation of controls for process management	<ul style="list-style-type: none"><li>• Production calendar</li><li>• Production order</li><li>• Loss control</li></ul>	<ul style="list-style-type: none"><li>• Guarantee of supply of varieties in the store</li><li>• Reduction of product leftovers</li><li>• Reduction of losses</li></ul>
3	Implementation of pre - weighing to reduce waste and increase productivity	<ul style="list-style-type: none"><li>• Pre-weighing staff training</li><li>• Series weighing</li><li>• Pre -production order</li><li>•Refinement of production controls</li></ul>	<ul style="list-style-type: none"><li>• Product quality standards</li><li>• Product quality improvement</li></ul>
4	Implementation of freezing of self-made products	<ul style="list-style-type: none"><li>•Continuous study of the extreme needs of freezing equipment and utensils</li><li>•Standardized labeling of processes and identification of products to be frozen</li></ul>	<ul style="list-style-type: none"><li>• Guarantee of supply of varieties in the store</li><li>• Increased and expanded productivity of professionals within the bakery, in the preparation and production of savory snacks</li></ul>

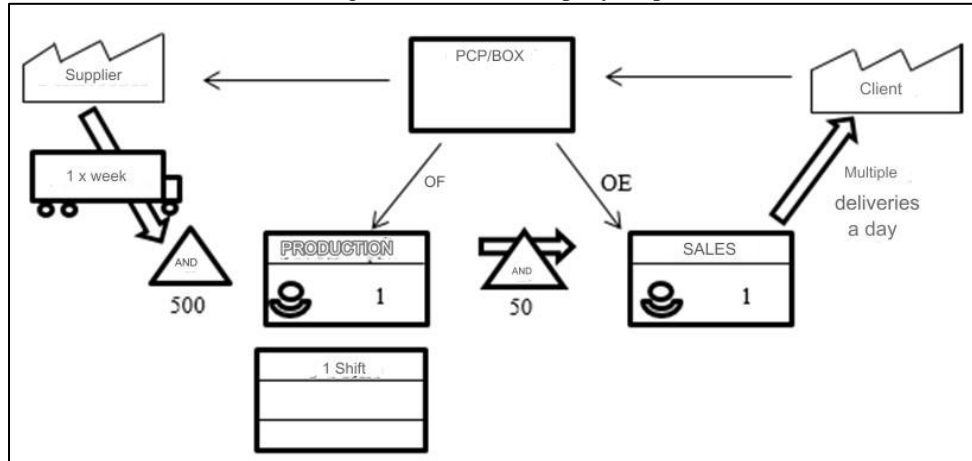
Source: The Authors (2018)

## CURRENT MAP AND DISCUSSION OF OPPORTUNITIES

Current State Mapping, which consists of a tool to have a real view of the flow focusing on its ideal state, was carried out through visits to the bakery. The Current State Map is shown in figure 4.



Figure 4: Current company map



Source: The Authors (2018)

## ACTION PLAN

After analyzing the critical points, it was possible to develop an action plan for each of them, as shown in table 2.

Table 2 – Action plan for problems

ACTION PLAN					
What	Who	When	Why	How	How much (Cost)
Internal structuring (organization chart, processes, sector layout)	Manager	01/15/2018	Process not defined and without responsible for the sector	Hiring a Production Manager and defining the person responsible for purchasing, finance and customer service	R\$ 1,600.00
Request partnership with companies seeking to increase the number of customers	Manager	02/10/2018	Sales below expectations	Company disclosure at the Young Entrepreneurs Association (AJE)	R\$ 65.00
Encourage improvement in performance and increased productivity of your employees	Manager	Monthly	Unmotivated employees	Development of incentive strategies (goals = results)	None
Launch new products or services	Manager	02/08/2018	Lack of product diversity	Manufacturing of products and services	R\$ 300.00

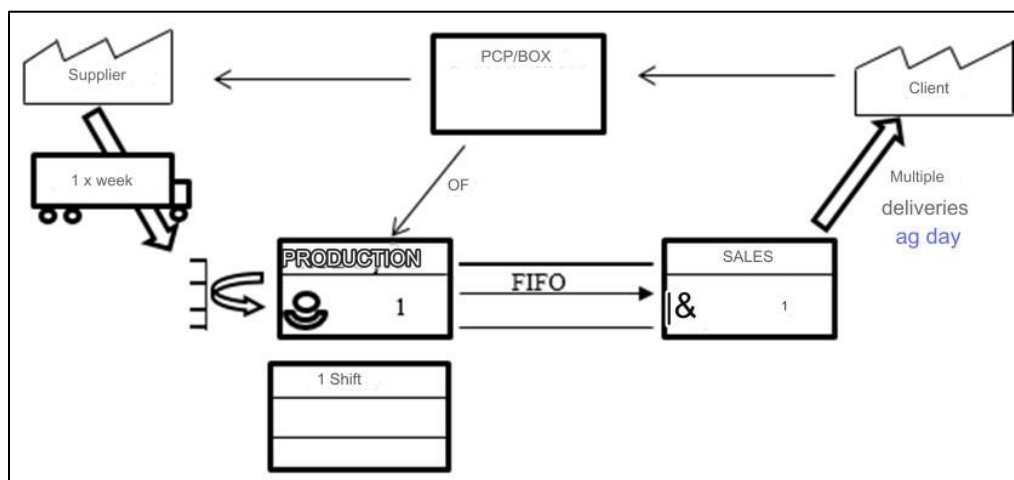
Train employees to provide customer service according to customer needs	Production manager	01 to 07/05/2018	Non-standardized service	Invest in human capital to promote personal and professional growth.	None
Using the PDCA cycle as a means of improving business results	Manager	Weekly	Lack of control of results	Monitoring and controlling results	None
Lack of feedback	Manager	Quarterly	Improve communication between bakery sectors	Inform the employee about his performance, result	None

Source: The Authors (2018)

## FUTURE MAP

The objective of the Future Map is to achieve a lean flow of value, where ideas for eliminating waste and improvements were highlighted in the Current Map, and they will be part of an action plan to be implemented in the Future State Map, as per shows figure 5.

Figure 5: Future map of the company



Source: The Authors (2018)

In this way, the new proposal helped to optimize the process through the Kaizen tool in the following points:

- Reduction of process lead time;
- Better use of available resources;
- Increased production from 800 loaves of bread to 1500 units daily;
- Greater incentive for improvement.



## **FINAL CONSIDERATIONS**

In view of what has been covered in the course of this work, it is clear that the application of lean production concepts is of great importance, especially with regard to activities related to control and balance of production, inputs, stocks, observing and analyzing always in addition to improving productivity, increasing profitability, reducing production expenses, eliminating waste and other problems related to the process.

It can be concluded that the Bakery, due to studies and research, adopted and implemented all the suggested recommendations, observing a reduction in waste, with considerable improvements in the use of machines, materials and labor, increasing productivity in all sectors through of the tools and processes implemented.



## REFERENCES

- Bonatto, F. (2013). Aplicação do mapa de fluxo de valor em uma indústria moveleira (Trabalho de Conclusão de Curso). Universidade Tecnológica Federal do Paraná, Medianeira. Retrieved on July 17, 2018, de [http://repositorio.roca.utfpr.edu.br/jspui/bitstream/1/1779/1/MD\\_COENP\\_2012\\_2\\_04.pdf](http://repositorio.roca.utfpr.edu.br/jspui/bitstream/1/1779/1/MD_COENP_2012_2_04.pdf)
- Cesar, C. (2010). A Importância Kaizen e Kanban no Processo Gerencial. Retrieved on July 15, 2018, from <https://www.trabalhosgratuitos.com/Exatas/Engenharia/Kaizen-106966.html>
- Fernandes, L. (2016). Mapeamento do Fluxo de Valor "VSM. Retrieved on July 20, 2018, from <https://pt.linkedin.com/pulse/mapeamento-do-fluxo-de-valor-vsm-lucas-fernandes>
- Gil, A. C. (2010). Como elaborar projetos de pesquisa. São Paulo: Atlas.
- Jesus, G. C. (2014). O mapeamento do fluxo de valor como ferramenta para melhoria no processo produtivo de um frigorífico na região oeste do Paraná (Trabalho de Conclusão de Curso). Universidade Federal Tecnológica do Paraná, Medianeira. Retrieved on July 12, 2018, from [http://repositorio.roca.utfpr.edu.br/jspui/bitstream/1/4331/1/MD\\_COENP\\_TCC\\_2014\\_2\\_07.pdf](http://repositorio.roca.utfpr.edu.br/jspui/bitstream/1/4331/1/MD_COENP_TCC_2014_2_07.pdf)
- Lakatos, E. M., & Marconi, M. A. (2011). Metodologia científica. 6.ed. São Paulo: Atlas.
- Maximiano, A. (2012). Teoria geral da administração. São Paulo: Atlas.
- Mesquita, D. C. V., Mesquita, W. G., & Souza, L. R. da S. (2014). Implementação do mapeamento de fluxo de valor de uma montadora de veículos, denominada empresa Beta. *Exacta – EP*, São Paulo, 12(2), 197-208. Retrieved on July 15, 2018, from <file:///C:/Users/Win7/Downloads/4851-30314-2-PB.pdf>
- Moura, G. C. de. (2011). Ciclo PDCA (PLAN – DO – CHECK – ACT) como método de planejamento estratégico na gestão da qualidade total. Retrieved on July 19, 2018, from [http://www.avm.edu.br/docpdf/monografias\\_publicadas/k218324.pdf](http://www.avm.edu.br/docpdf/monografias_publicadas/k218324.pdf)
- Quinquíolo, J. M. (2002). Avaliação da Eficácia de um Sistema de Gerenciamento para Melhorias Implantado na Área de Carroceria de uma Linha de Produção Automotiva. Taubaté/SP: Universidade de Taubaté. Retrieved on July 15, 2018, from [http://ppga.com.br/mestrado/2002/quinquiole\\_jose\\_manoel.pdf](http://ppga.com.br/mestrado/2002/quinquiole_jose_manoel.pdf)
- Salgueiro, G. N. (2015). Aplicação de ferramentas para melhorar o processo produtivo numa empresa do sector automóvel (Trabalho de Mestrado). Instituto Superior de Tecnologia de Lisboa. Retrieved on July 18, 2018, from <https://repositorio.ipl.pt/bitstream/10400.21/5502/1/Disserta%C3%A7%C3%A3o.pdf>
- Souza, A. P. de, Duarte, N. R., Carvalho, E. R. de, Melo, A. C. S., & Martins, V. W. B. (2013). Ferramentas da qualidade aplicadas à melhoria de operações logísticas: Um estudo orientado a farmácias de manipulação. Universidade da Amazônia, Belém. Retrieved on July 20, 2018, from [https://www.researchgate.net/publication/283709704\\_ferramentas\\_da\\_qualidade\\_aplicadas\\_a\\_melhoria\\_de\\_operacoes\\_logisticas\\_um\\_estudo\\_orientado\\_a\\_farmacias\\_de\\_manipulacao](https://www.researchgate.net/publication/283709704_ferramentas_da_qualidade_aplicadas_a_melhoria_de_operacoes_logisticas_um_estudo_orientado_a_farmacias_de_manipulacao)