

MESG
MESTRADO EM ENGENHARIA
DE SERVIÇOS E GESTÃO

Replenishment process optimization in a retail store

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Master's Dissertation

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2015-09-21

Aos meus.

Replenishment process optimization in a retail store: case study in Decathlon Matosinhos

Abstract

In today's world being available to provide a customer, in the fastest way possible, the services he needs is crucial for a company's success. The main tasks that a company performs have the customer as the main participant. The supporting processes where the customer is not involved are therefore supposed to be shorted in time, so that when the customer participates in the main processes the employees are free to help him.

With this in mind, urges the need to redesign the activities performed before a store opens. The first major process of a store is replenishing the products sold in the days before. The problem is that the task of unloading the merchandise from the truck and replenishing the products by the shelves, so that employees are ready to welcome customers, is taking too long, and instead of a 3 hours process, it's consuming at times more than half a day.

Addressing this problem, this study aims to reduce the time of setting-up the products from truck to shelf so that every section inside the store, have this process ending every day by 11 o'clock, meaning that this process lasts at maximum for 3 hours and a half. In order to do this, the study begins by understanding the current situation of the company, analysing it by running surveys to the employees and an interview to the director of the store in order to reach the reasons behind this problem. There is also an analysis using key performance indicators, to evaluate the process as-is, and what changes are needed.

Then a set of measures were defined and tested, so that it's possible to observe which measures have optimized the process, and reduced not needed efforts.

Finally, a comparison between what existed before and after the measures is performed, using key performance indicators, becoming possible to know if it improved overall efficiency.

Keywords

Efficiency - Replenishment process - Key performance indicators

Acknowledgments

Terminando esta longa jornada, que começou há 17 anos atrás, num banco de escola primária, as palavras não conseguem descrever o que sinto. Em primeiro lugar, quero agradecer aos meus pais e família por me terem dado tudo o que precisava para ter sucesso: carinho, educação e liberdade.

Aos meus irmãos, Miguel e Mariana, por serem a coisa mais importante da minha vida, e por partilharem comigo as suas vivências e me fazerem sentir um irmão mais velho babado. Uma nota especial para a minha Maii e Paii, que por mim foram batizados de nome, e me dão toda a atenção e ajuda quando preciso.

Obrigado aos meus amigos, que foram surgindo ao longo da vida e me foram dando o privilégio de os conhecer. Aos que ainda estão comigo um bem-haja, e àqueles que perceberão, um Salvé.

Gostaria de agradecer a Letras e a Engenharia por me terem acolhido e por me darem bagagem para enfrentar este mundo competitivo, com a certeza que serei mais um, mas quem sabe o melhor preparado para enfrentar o desafio.

Obrigado pela sua orientação Professor Alcibiádes, o seu exemplo e sucesso, foram uma inspiração. A liberdade que me deu permitiu-me fazer o trabalho a meu jeito, mostrando de forma direta aquilo que valho.

Agradeço, à Decathlon Matosinhos pela oportunidade e por continuarem a apostar em mim. Pessoalmente, deixo uma palavra à Raquel Amaral, e a todas as amizades que criei na loja.

Obrigado a ti, minha Inês.

Refugio-me agora nestes versos de Ricardo Reis, imaginando-os cantados em fado por um grupo qualquer.

Sim, sei bem
Que nunca serei alguém.
Sei de sobra
Que nunca terei uma obra.
Sei, enfim,
Que nunca saberei de mim.
Sim, mas agora,
Enquanto dura esta hora,
Este luar, estes ramos,
Esta paz em que estamos,
Deixem-me crer
O que nunca poderei ser.

Ricardo Reis, in "Odes

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Acronyms and Definitions

Agencement – pieces that can be attached to the store structure to hang clothes or place products. Shelves for instance.

Bac – plastic box that contains merchandise coming in the truck

Doublon – The responsible for the warehouse. The Doublon changes every day, and is necessarily a section manager.

KPI – Key performance indicator

Magnum – big container with merchandise that can be filled with the same product or with products from different sections

Mutualized team – team responsible for setting-up the products that are going to be replenished by the rest of the employees

TRPT - Total replenishment process time

TSHP – Time spent on handling products

1 Introduction

1.1 The Decathlon Group

The first Decathlon store opened in 1973 in Lille's surroundings, in France. The main objective at that time was to offer a wide range of products at low prices.

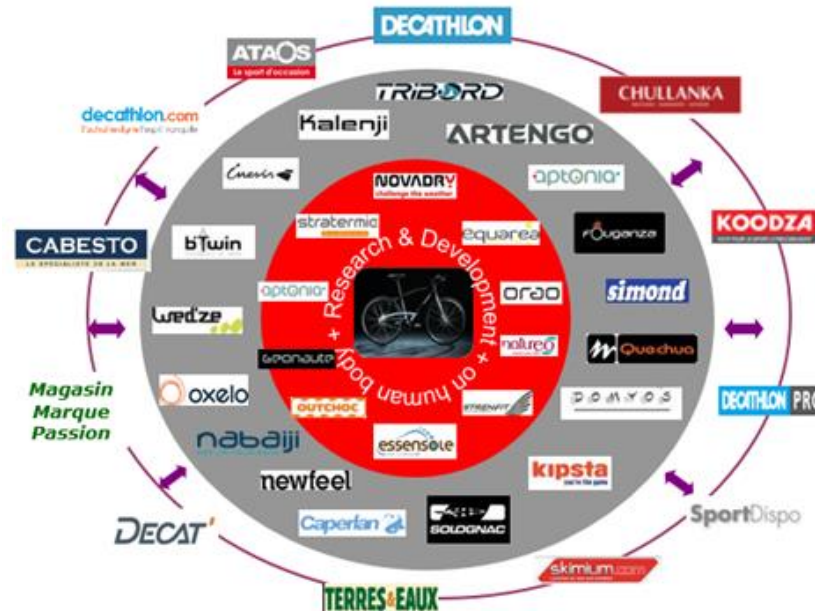


Figure 1- Decathlon's Group Network (Decathlon website)

Besides Decathlon there are other ways of selling products, like KOODZA or DECAT. This means that a customer in Portugal can buy Decathlon's products not only in Decathlon, but also in KOODZA. In the grey part of the picture, there are several brands that are part of the company, and each of those produces their own products. Decathlon owns twenty "Passion Brands", since the company tries to enhance them in order to compete with the biggest brands like Nike. For instance, Kalenji produces running clothes and shoes and Quechua provides material for hiking and climbing. This means that every section of one store has their own brand. In the red circle, it's possible to observe the technological improvements and findings that Decathlon uses in their products, like Novadry, that is used to give waterproof to the products. Research and development is crucial for the company, because they have to compete in different sports, with different and powerful brands. Every year Decathlon's brands try to create new products in their facilities all over France, developing several patents a year.

With over 63000 employees their mission is to make sport benefits accessible for all people. Today Decathlon is spread in 22 countries, being France, Spain and China the ones with most stores.

The main values inside Decathlon are Responsibility, which is given to every employee, giving them the freedom to take decisions and act for their success and Vigor, which means that everyone must have energy, strength and happiness.

1.2 Decathlon Portugal

In 2000, in Amadora, opens the first Decathlon store in Portugal. The main strategy at that time, was to take advantage of the location of the space, where it already existed several stores, like Makro, MediaMarkt, Ikea or Jumbo. Having the highways A5 and A36 converging near that area made this commercial area one of the most profitable in Europe. It was meant to be successful right from the opening. By now it's still the most profitable store in Portugal, despite being smaller than the Matosinhos store.

There are 24 stores opened in Portugal since that, all over the country, with projections to open new stores in the North of the country.

In 2011, in Setúbal, it was created the Regional Logistic Warehouse, so that products can be stored first in the warehouse in Setúbal, and not coming directly from the Central Logistic Warehouse from Spain and France. This project is crucial for the strategy of Just in Time stock, since the products take no longer than a day to come from the Setúbal, instead of a 7 days trip from the central warehouse. It allows to better control the stock, not having the need to have security stock in the stores. Optimizing the logistic and scale economies is an objective, and having the majority of the products near the stores is important for that. The only products that are stocked outside the country are heavier and more expensive products, like professional tennis nets or basketball backboards.

In 2014, online sales were launched, allowing customers to buy their products at home, and picking them wherever they want. It's not an innovation, but another service that complement Decathlon's offer.

1.3 Decathlon Matosinhos

The store was open in 2010, in Leça da Palmeira, in the surroundings of Porto. The location takes advantage for being close to MarShopping and Ikea, and with the creation next to Decathlon of Leroy Merlin, Norauto and Conforama, it's becoming a big commercial area, meaning that the quantity of customers is growing every day.

In the summer, the number of employees can be close to a hundred, being the staff currently divided into 9 sections. Every section have their own sports, like the Mountain section, composed by hiking and climbing, with the passion brands being Quechua and Wedze. Every section have their own section manager, and above him there is the store director.

In order to not overload the director, each day the section manager is responsible for ruling the store, becoming a store manager. There is one store manager from 7h30 to 14h30 and another one from 14h30 until the closing.

There is also another responsibility, which is taking care of the warehouse, and the responsible is called Doublon. Every section managers can be a doublon, but there are also two employees that occupy this position once or twice a week. The schedule is the same as the store manager, so there is a doublon for the morning and another for the rest of the day.

Their main tasks are receiving the truck, managing the morning team to an efficient replenishment, cleaning the warehouse, and send all boxes and pallets back to the regional warehouse.

1.4 Project Description

Averaging good financial results since 2012, the store is focused in being more profitable, by selling more product quantities. Despite following this strategy, the store discarded increasing efficiency in their own processes, and reducing waste. In the final of 2014 there was a balance meeting, where it was decided to invest not only in the relationship and tasks that are directly related with the customer, but also in introducing new procedures and measures to improve the store tasks performed by the employees.

The main process performed in Decathlon is the replenishment of the products sold in the days before. It comprises receiving the truck, handling the boxes and pallets to each section, sorting products, place alarms in the international brands, and then distribute the products to the shelves.

This process is made of several stages, being supervised by the doublons¹, and performed by the employees. Usually it complies nine employees, an employee for each section, the doublon and the store manager of the day. The doublon and the store are responsible for receiving the truck and for checking if all the products are in good conditions. They also are the ones that unload the merchandise from the truck to the warehouse. After that the employees start checking the boxes and verifying to which section it belongs. Then they use trolleys to place the boxes and then they leave the warehouse and go for their section to sort the products, place the alarms and distribute it.

The main issue in this process is that is nothing is made following a determined procedure. Some employees go to their section and then start treating the products, while others stay in the warehouse doing that. There is no team effort, because every employee only cares by their own section, and for instance, when the tennis section finishes their replenishment, they don't help other sections that are not finished yet.

In order to evaluate what can be done to improve the overall efficiency of the stages of the process and to introduce needed changes it was created the project in the beginning of January, specifically conducted by me. Despite reporting to the director of the store, I've had the freedom to work closely to the employees and the section managers, so that the changes are not imposed, but introduced in the process being known and clear for every member of the store.

Therefore, first there will be an analysis about the store, where a survey will be answered by the employees and an interview will be made to the director of the store. Then it's possible to understand what exist currently in the store and how the process is being done. After listening to their opinion, it's the time to start defining measures and applying it in the process. After applying the measures, there must be ways of controlling whether it's working or not, and two key performance indicators will analyze the situation, and after that we can conclude over the results.

1.4.1 Research Questions

Performing a study it's fundamental to define clearly which scientific questions are to be answered. In this thesis, the two main questions are:

Question 1: How can the replenishment process of Decathlon Matosinhos be improved?

Question 2: What are the main benefits obtained by introducing measures to improve efficiency?

These questions are highly related with the core process of the store, replenishing the merchandise, and have to do with the optimization of it.

1.4.2 Main Goals and Motivation

The main goal is to understand how Decathlon can be more appealing for their customers by improving their organization tasks and by making sales assistants more available for customers. Introducing changes that will allow sales assistants to be more available right from the time the store opens to the customers in the morning is the main goal. That will allow that a customer may have a more technical buy and enhance their customer experience inside the store.

Since Decathlon Matosinhos haven't tried to enhance their overall efficiency, giving some standardization and defining procedures is actually a big challenge. Introducing change inside an organization with several employees working in the store for over a year can be difficult, since their work routine is deeply implemented. In other way, there also lots of employees which are working for the first time, in part-time, so creating some material to be followed is crucial so that they can have a smoother begin in the business.

Having ways of evaluating how the changes turned out will be positive, not only for understanding what is being done in a good way, but also finding what can be improved.

Since there was no previous work done in improving efficiency in this store, this project can be seen as the first step towards a new stage, where every member is aware of what he can do to help the company and the client, and with that, help himself and develop a better performance.

1.5 Project Methodology

The project was divided in 4 stages:

1. **Bibliographic research:** in order to sustain the results and the findings of this thesis, at first, it was necessary to gather all the information about the company to better understand the context where this process could be applied. Optimization of the replenishment process is the theme of this study, and there are some concepts that are related with this. Studying the difference between applying lean to the industry or in retail, the different type of stocks that exist, and how can we empower people and reduce waste is part of the subject. Understanding how change can be implemented in a smoother and not disturbing way is also important, and the state of mind of the workers during the change must be taken into account.
2. **Analysis of the process:** which includes the interview to the director, the questionnaire to the workers and the registry of the process key performance indicators
3. **Development of a strategy based on efficiency measures:** after knowing the opinion of the community and the results of the process, a set of measures were done. Redesign the warehouse, create a mutualized team, determine new ideas in how to improve sorting the products and giving more functions to the doublon and the store manager were some of the actions that are part of the strategy of optimizing the replenishment process
4. **Analysis of the process with the new changes:** one of the purposes of conducting a study like this is to get results about the improvements and actions performed during the process. Having

measured the results for over a month, it represents well whether the actions reduced the time of the process.

1.6 Covered Topics and Report Organization

This report is organized in seven chapters:

1. **Introduction** – This chapter has the intention of presenting the Decathlon Group and the store where this dissertation takes place, and it also complies the project description, the research questions that are to be answered, and the main goals and motivation for doing this study. In this chapter is also explained the methodology followed to do this dissertation.
2. **State of the Art** – The literature review regarding the main areas of this study will be presented. Different concepts like process optimization, stock management and people management are described.
3. **Replenishment process AS-IS** – This chapter has the aim of revealing how the process is currently being performed, having the description of the stages of the replenishment process and the use of key performance indicators to rate how the process is going. It also reveals the director and the workers opinion about how things are going and their suggestions for the process optimization.
4. **Development and application of optimization measures into the replenishment process** – the creation and the application of the optimization measures are presented, explaining how they change the current process.
5. **Results of the measures applied in the process** – In this chapter is presented the results obtained in the process after applying the measures. This results are based in the key performance indicators.
6. **Discussion of the results** – Following the previous chapter, comes the analysis of the results obtained comparing to the process written in the chapter 3.
7. **Conclusions and evolution perspectives** – Ending this document are presented the final conclusions about the work done and are presented some considerations about how to improve the process and how was performing the study in Decathlon Matosinhos.

2 State of the Art

This chapter shows the main findings inside the relevant areas of the theme of this study. It includes information about operations management, lean methodology and how to make employees embrace change.

2.1 Operations Management

Operations management is the activity of managing the resources which are devoted to the production and delivery of products and services (Chambers et al., 2007). The expression is divided in two parts: Chambers et al. (2007) define operations saying that is happens every time an organization produces some type of product or service; and management as the process of dealing and controlling things or people (Oxford University Press, 2000).

Kang et al. (2008) defends that the transportation of container cargo has become highly standardized in the intermodal shipping industry, which means that this process, part of the operations management, is one of the core processes nowadays. Even the unloading operation itself can be further decomposed into multiple stages, each of which can be studied separately (Kang et al., 2008). This statement gives more importance to this task, and allows to look at this process as a set of smaller processes.

Chambers et al. (2007) say that all operations produce products and services by changing inputs into outputs. In the case of retail the input of the process is the quantity of products sold in the day before and the output the unloading of the products to replenish it. This also means that companies are obliged to compete in various dimensions of performance (price, quality, flexibility, delivery, etc.), therefore using, for example, strategies and techniques such as lean manufacturing and supply chain management to respond to these changes (Gunasekaran and Ngai, 2012).

Chambers et al. (2007) also share that an effective operation can give four types of advantage to the business:

- it can reduce costs
- it can increase revenue
- it can reduce the amount of investment
- It can provide the basis for future innovation.

2.2 Lean manufacturing vs Lean in retail

Lean manufacturing has been practiced and optimized by Toyota since the middle of the twentieth century. The Toyota Production System was in 1988, named by John Krafcik “lean manufacturing”. Chaplin and O' Rourke (2013) said that Lean thinking is concerned with identifying what the customer desires, eliminating all activity within the production process which does not contribute to this goal, stream lining the remaining steps and then matching all activity to deliver at the speed required by the customer.

Has Shah and Ward and refer in their study (cited Jaboul et al., 2013), lean manufacturing is an integrated socio-technical system whose main objective is to eliminate waste by concurrently reducing or minimizing supplier, customer, and internal variability

The process is seen as never ending since once you have completed the cycle, you return to the beginning and try to reduce the number and duration of the steps again, being Lean thinking

concerned with the control of waste (Chaplin & O' Rourke, 2013). Waste is defined as any non-necessary activity that does not add value for the customer (Doolen & Worley, 2015).

The main pillars are thus: produce only what is necessary, at the necessary quantity, and at the necessary moment (just-in-time (JIT) philosophy); and autonomation (empowerment for employees) (Ohno, 1988), trying at any time to avoid excess.

Despite the fact that lean thinking started in manufacturing, whose mission is to develop products, in the last few years, the service industry started to apply some of those concepts in their our sector. The logistics started to be a crucial part in a service company and retail companies are working on better and more detailed adjustment of their logistics networks and processes to their specific needs (Kuhn and Sternbeck, 2014). Kuhn and Sternbeck (2014) also said that companies are open to insights and solutions from other industries with the aim of improving their own logistics performance.

Determine which kind of operations can be made in retail similar to what is made in the industry is the challenge. Kuhn and Sternbeck (2014) defend that for retail managers, in-store operations analyses are therefore a promising starting point for better understanding shelf stacking and refilling, derived from line feeding principles in the automotive industry.

They also said that despite the above, systematic alignment of logistics activities with in-store operations in the following step would require new decision support systems for logistics planning that explicitly integrate specific store requirements. This turns the challenge way more difficult to control, having also to take in consideration manager's major allies, the employees.

2.3 Process optimization

A process can be described as a sequence of tasks or activities that meant to develop a result. Developing this process in a way that it achieves the result in the fastest way possible may not be that easy.

You can be constantly trying to improve the process, like Rother (2009) says, continuous improvement: it means that you are improving all processes every day, or you can try to evaluate the process in certain periods of the year and make corrections, after analysing what is missing. And the way people evaluate the process can be very different. While others prefer to look at numbers, other believe in common sense and make adjustments without measuring it.

Rother (2009) says that if we believe the way ahead is set and clear, then we tend to blindly carry out a preconceived implementation plan rather than being sensitive to, learning from, and dealing adequately with what arises along the way. With this said, people cannot think they know it all, and superior to their competition just because they're on top at the time.

As Rother (2009) says there is no "finish line" mentality. The objective is not to win, but to develop the capability of the organization to keep improving, adapting, and satisfying dynamic customer requirements. This capability for continuous, incremental evolution and improvement represents perhaps the best assurance of durable competitive advantage and company survival.

2.4 Dealing with Human Resources in Retail

Having employees inside a company that are not only working with machines, and doing their tasks for the company, but are also part of client's process of buying a given product makes human resources so much important.

While the success of an implementation may hinge on a variety of factors, the implementation may itself affect the performance of employees within the organization. Lean implementations have been linked to increases in safety, higher employee morale, and employee empowerment (Alavi, 2003). So giving more responsibility to an employee, can be seen by him in two different ways: he might find it challenging and gets motivated with it, or he may see it as too much workload and gets frustrated.

Empowering people is one of the Lean pillars. A company have to keep their employees aware of the processes they perform, and understand how using employee's perception and intelligence can be very hard, since the retail sector is typically characterized by relatively low payments, a high proportion of part-time and female employees, and a higher than average staff turnover (Jones et al., 2010).

Having this mind is crucial to balance an employee motivation, and give him the return when he performs well, just by acknowledging his effort and giving him a prize (more responsibility or even more income).

Rother (2009) defends humans possess an astounding capability to learn, create, and solve problems. He spokes about Toyota's ability to continuously improve and adapt and defends that it lies in the actions and reactions of the people in the firm, in their ability to effectively understand situations and develop smart solutions. Toyota considers the improvement capability of all the people in an organization the "strength" of a company.

Using their capacities to observe what is going inside the process, and giving them the possibility to give their opinion and act autonomously, cannot be applied in every company, but it can certainly be applied in more companies than what is currently happening.

2.5 Stock Types

In any kind of activity of a given company, whether its industry or a service provider, stock is always present. What changes is the destination of that stock. It can be sold or it can be used to fulfil company' activities, like a ream of paper is needed to write a report.

Lopes dos Reis (2005) says that stock is the group of activities of any article that constitutes a reserve of products hoping to fulfil a giving future need. For instance, a company that daily produces flower for a bakery is constantly preparing the flower to be bought when the bakery needs it.

There is also different types of stock. Regular stock that comprehends all the articles consumed in a regular mode. Lopes dos Reis (2005) defends that it can be divided in active stock or reserve stock. The difference is that the active stock have a defined place to be stored and are the first place to be looked when something is lacking, and the reserve stock don't have space next to the active stock.

Another type is the safety stock. This stock prevents any possible rupture that can happen if the store sells more than expected. Controlling this stock can be a nightmare. During the crisis from 2011 to 2012, several stylists and stores were not decreasing the production, believing that the purchasing power will still be at the same level. What happened was that it decrease, and with

that the collections were not sold, so they were getting any profit and got stuck with huge amounts of stock, that were so fashionable for the next years. Without having money to pay the suppliers they were obligated to declare bankruptcy and leave the business.

The global stock includes all the previous types of stocks spoken before summed up.

2.6 Waste Management

Waste in any business can be considered something that doesn't create any value for the company. Inside the Toyota Production System, developed by Taiichi Ohno and Eiji Toyoda, comes a very singular word, "muda". This word means waste or uselessness.

Rother (2009) also says that the negative result of "improvement equals eliminate waste" thinking is twofold: we cannot discern what is important to improve, and we tend to maximize the efficiency of one area at the expense of another, shifting wastes from one to another rather than optimizing and synchronizing the whole.

Having a defined strategy and a mission that gives direction to the processes, without having random actions during the year can be the better option.

For instance, waste can be having too much stock, and when the demand is lower than expected it gets unutilized. A solution for it can be the model Just-in-Time. Cho et al. (2007) defends that in order to avoid problems like inventory unbalance and surplus equipment or workers, there me a scheme that adjust to changes and demand fluctuations.

This production system is able to shorten the lead time from the entry of materials to the completion of the product.

In retail, having a good information system is also crucial for this model. If it actualizes with the sales made in every 5 minutes, it allows coordinating the process in the warehouse and adjusting the stock.

2.7 Strategy implementation

Ideas and strategies are important, but the real challenge is to execute them (Barnevik, 1991). Brainstorming ideas to solve a problem and defining a strategy to apply those is fundamental, but the conversion from theory to practice is quite more challenging. It may involve alterations in the company's structure, processes redesign, and staff behaviour.

According to Lopes dos Reis (2000), it must be studied a social alteration model to help determine how the new strategic plan will be accepted by the intervenient and avoid any kind of resistance. Inside this perspective, it's possible to conclude that it helps the stakeholders of the process understand why are these changes occurring and to communicate in a transparent way.

Lopes dos Reis (2000) also says that there are three main stages when introducing this model: the first step in the analysis is to identify the people involved in the process and their motivations, the second stage is to evaluate the level of social resources, which means the friendships and habits of the workers, and the final stage is to have an overall opinion of the transformation problem. This final stage might mean that the responsible for introducing the model have to have a global perception of the possible weaknesses in the model and have to know how to face the possible resistance from the workers that he may found in the second stage.

Being aware of problems or the motives that may led to workers not being happy the change, is not easy at all. Following a model, that gives consistency when integrating the new procedures with resources that are already is then very important for its success.

3 Replenishment Process AS-IS

3.1 Describing the main stages of the Process

The replenishment process starts when the truck, which comes from the distribution center, arrives at the store's dock. At 8h, the doublon and the section manager open the store and head to the warehouse, to the gate where the truck connects for the products unloading. Then they start unloading the products to the middle of the warehouse, expecting that the employees arrive at 8h30. Every section has their own employee which is responsible for opening the boxes, sorting them and remove the papers which are inside the clothes and shoes and put alarms on the products which are from international brands, like Asics or Nike. After finishing this tasks which usually takes some hours, each employee goes to their section to replenish the products into the shelves.

In this process there are no specific procedure. For instance, an employee might sort the boxes with stock of his section inside the warehouse and another one can do the opposite, and not sort the boxes, coming directly to the store to replenish. The time both spend in this action can be very different and it must be decided which is the best way to do it.

3.1.1 Merchandise's route before arriving to the store

Decathlon stores are equipped with an information system that updates the store sales in every 5 minutes. This allows controlling the stock automatically, which means that if a product is sold today before 6 pm, the same product will be included in the truck of the next day. After that hour the merchandise only comes two days after. There are a central warehouse in France, where the most expensive and less sold products are stocked, and a regional warehouse in Portugal, in Setúbal, which is provided with every other products. If the product is in Setúbal then it happens as described, the merchandise comes one or two days after the selling. If not, the order is automatically created and the product comes directly from the central warehouse, in approximately 1 week. Considering that the Matosinhos shop sells large quantities, a truck arrives to the store every day. Not so profitable stores only receive it thrice a week. The driver makes the trip from Setúbal to Porto in the dawn and arrives the store at 7h45. The truck is sealed, and the only person that can open it is the store manager at 8 o'clock when the truck lands in the dock.



Figure 2 - Merchandise inside the truck

3.1.2 Unloading the truck

The merchandise is composed by cardboard boxes, bacs (which are plastic boxes), magnums (bigger plastic boxes). These are divided in pallets, and usually the truck is divided in 4 sections. Right next to the door comes the pallets with cardboard boxes containing bikes (since the first thing that leaves the warehouse are the bikes that goes to the section where the bike's section employee prepares them to be used). The doublon and the section manager start to unload it and place it in the warehouse in no specific place. When there is no space in the warehouse, they place it next to the exit, already inside store.



Figure 3 - The wheel cars, the bac (plastic box) and the magnum (at the right near the bac)

3.1.3 Product sorting

Inside the cardboard boxes, bacs and magnums there are different products, since shoes, clothes or bigger products (usually come in the cardboard boxes) like tennis racquets or footballs.

Usually it happens that the magnums are full with shoes from different sections which implies that the employees from the different sections have to sort those products and place them in bacs. Another time consuming task is removing the paper inside the shoes. In order to keep the shape on those, every brand sends their shoes with paper. The store politics is to remove them in order to better place the shoes in the rack. Despite having different types of shoes inside the section, the employees don't divide them in a specific way. For instance, the tennis and walking section have different aisles, so if the products are all mixed the time wasted is bigger. Since there is no procedure defined every employee decides what how he wants to sort it. The clothes that are made from Decathlon brands come with hangers, meaning that they are ready to be replenished. For international brands clothes there is a need to put an alarm on it, and also to put the hanger.

3.1.4 From the warehouse to the shelf

After sorting all products from the cardboard boxes and magnums, and placing them into bacs, the employee from each section need to transport them to their section. For that, the bacs are placed in wheel cars, and the employee drives them to the section. When he gets there, he starts placing the products without any kind of organization. Some employees start by replenishing

the “quick replacement products”, like balls, socks or backpacks. Others start by replenishing the most sold products, in order to have those already replenished when the store opens, like shoes.



Figure 4 - Image of the products ready to be sold, in the shelves

3.1.5 Role of the participants

To better understand what is supposed to be done and who does what, it is important to describe what the intervening parts in the process are expected to perform:

Store Manager – He starts by opening the store at 8 am. After that he goes to the warehouse with the doublon and he opens the truck. He and the doublon unload the merchandise from the truck to the warehouse. After that he leaves the warehouse, and sets up the point of sales and verifies the security exists of the store. At 9h50, he allows the store opening.

Doublon – He enters the store with the store manager at 8 am. He goes to the warehouse and unloads the merchandise. Then he verifies the labels that come in the cargo, to check if every pallet was brought. While doing that he has to observe if the employees are not wasting time speaking with each other and controlling the product sorting. Usually at 8h30 comes Logic, which the company that transports and assembles the material that a customer bought inside the store and wants to receive at home, like table tennis tables or fitness machines. At Tuesdays, Thursdays and Saturdays, comes a truck to ship all the bacs, pallets and magnums that came full with merchandise. The doublon is responsible for counting it and write an email warning about that.

Employee – Every section must have their own employee to replenish the stock. The discrepancy is that some sections have more than one employee doing it. The most profitable sections like Fitness, Mountain and Water (in summer) have to have 2 or 3 employees doing this process. This means that one employee is in the warehouse sorting the products while the other goes directly to the store replenishing the cardboard boxes (these boxes only contain one

type of product, while a bac might have shoes and clothes inside it). The employees must be focused in completing the task in the fastest way possible. After the store opening, there are multiple distractions, since they have to greet customers, offer them help and verify orders and reservations from the previous days. This means that the replenishment is no longer the major focus task and the replenishing time keeps increasing.

3.2 Key Performance Indicators

As we can read in the state of the art, a key performance indicator is a tool that allows evaluating the performance of a given task or process. The key performance indicators that can be used to evaluate this process are the time used for sorting the products and the total replenishment process time.

3.2.1 Time spent on handling products

After the truck arrives, the period of time between which the first product is transported from the truck into the warehouse until the moment when the last product is sorted into the appropriated bac is called time spent on handling products. Within this process, activities such as alarming a given product or placing a hanger inside a given piece of clothing may happen.

3.2.2 Total replenishment process time

This key performance indicator measures the time between unloading the merchandise and the last product replenishment. This indicator shows how fast the total process is being performed. It's critical to understand the actual situation of the process and if the measures that are going to be implemented is improving it.

3.3 Identification of Critical Points

In order to verify how fast the employees are handling the products and how much time they need to replenish the merchandise, the key performance indicators were put in practice. This analysis took place before any kind of change was introduced in the process. This means that the results aren't influenced by any procedural change. Between the 9th and the 22nd of February, the replenishment process was tested. Below are the results:

Figure 5 - KPI results for week 10 and 11

Week	Day	WeekDay	Nr of quantities	KPI - TSHP	KPI - TRPT
S10	9/2/2015	SUNDAY	3800	3h	5h30
S10	10/2/2015	MONDAY	4500	3h15	7h30
S10	11/2/2015	TUESDAY	1800	2h	13h
S10	12/2/2015	WEDNESDAY	2100	2h20	14h
S10	13/2/2015	THURSDAY	3900	3h30	14h45
S10	14/2/2015	FRIDAY	2200	3h20	13h30
S10	15/2/2015	SATURDAY	2900	2h50	13h50

Week	Day	WeekDay	Nr of quantities	KPI - TSHP	KPI - TRPT
S11	16/2/2015	SUNDAY	3500	2h30	13h
S11	17/2/2015	MONDAY	5000	3h45	18h30
S11	18/2/2015	TUESDAY	2000	2h30	13h15
S11	19/2/2015	WEDNESDAY	2000	2h	13h
S11	20/2/2015	THURSDAY	4200	3h40	15h
S11	21/2/2015	FRIDAY	3000	3h30	13h15
S11	22/2/2015	SATURDAY	2600	2h	12h30

In the first column, it's represented the number of the week in 2015. The next column shows the day of the month and the other the weekday. The weekday it's important to verify if there is any kind of connection between the amount of quantities and it. The last two columns shows the results of the key performance indicators, being KPI – TSHP, the time spent handling products and KPI – TRPT, the total replenishment process time.

During these two weeks of observation and information registry, it's possible to observe that Monday, Thursday and Sunday are the days with most quantities coming in the truck. It's easy to understand why, since Saturdays and Sundays are the days when Decathlon sells more products, given the fact that the majority of people don't work at the weekend. In order to accelerate the stock for the weekend, Decathlon warehouse ships more stock in Thursday, so that the shelves are at full capacity. The average number of quantities in week 10 was 3000, while in week 11 it was 3180. Considering that is February and the promotions season is ending, this is considered a medium peak. It's not like in December or August, where the store is at an high peak, but it's selling more than in March or November.

The average time spending handling is 2h50. This means that just for unloading the merchandise and sorting the products it's almost 3 hours. Since the process starts at 8 o'clock, this means that the store is already open when the employees start replenishing the shelves, and they have already customers inside the store to be met.

The other KPI indicates that the average time for completing the total process is 6h13. So, very often an employee is not able to finish the replenishment in his shift. That means that the employee that enters at 13h30, has still merchandise to replenish, sacrificing other responsibilities.

These two indicators demonstrate the difficulties and the inefficiency of the process. The lack of procedure may be the reason to these problems. But it isn't the only reason.

In order to better understand these results, and to avoid grounding this information only in numbers, it was conducted an interview to the store director, to get his opinion about the difficulties the store and the process are suffering. To complement this interview and to integrate our collaborators in the change, it was decided to design a survey that gathers not only their opinion about the process, but also their opinion about the doublon (which is a critical part in this process, being the responsible for the warehouse) and their suggestions on how to improve the process.

3.3.1 Questionnaire results

The aim of this questionnaire is to understand how the community sees the current process and what their opinion is about their performance inside this process. This survey was sent to 55 persons being answered by 45. The questionnaire sent only for section managers and the employees from the sections that have to replenish. That excludes the cashiers and the director. The questionnaire is presented in the annex A and the annex B contains the answers.

The percentage of the inquired with age between 18 and 25 is 69%. Between 26 and 33 years there is 28% of the people. Only one person is more than 37 years old. The male respondents is higher (60%) than the female. The majority of respondents were salesmen (84%) and the rest were section managers. 47% of the people work in Decathlon for over a year, and only 9% of the sample work in the store for less than 3 months.

About the shift they use to work, it was quite balanced, being the night shift the one with most answers (40%). Considering the replenishment process, they were asked to answer if they think that the process is currently being efficient. 60% of the inquired answered yes. The ones that answered negatively to this question gave the following justifications:

- Products are not being sorted well
- Products should be better prepared and sorted by section in the regional warehouse
- Magnums with shoes from different sections is a mistake
- Poor circulation in the warehouse, the path is not defined
- Number of people is not adjusted in every section
- The truck should come earlier
- Bad intern organization
- Different procedures from the doublons
- Lack of formation through the process
- Employees without the same stamina and passion.

24% of the people have already worked in another retail store, and 82% of those think that Decathlon has a better replenishment process than the previous companies. Only one person asked negatively to the question about if any procedure is being followed during the process. In question 6, it was decided to divide the answers between section managers and employees, to check if both parts have different thoughts. All the section managers think that it is important that the doublon is constantly present during the replenishment process, while 18% of the employees think that he's not needed.

In order to characterize the role and the personality of the Doublon, and how he is seen, from question 7 to 11 there is a scale from 1 to 10 that shows how is their standard behavior.

In terms of sympathy, the grade from the employees was 6,7, while the grade from the section managers is 5. Talking about responsibility, the employees graded it with 7,4 and the section managers with 8. The next characteristic was about the Doublon pressing and insisting during the process. The employees rated the doublon with 6,8 and the section manager with 7,1.

About being bossy, the employees rated with 6, and the section managers with 5,4. Finally the last characteristic is about motivation. The grade from the employees was 5,3, while the average grade from the section managers was 7,4.

The next question takes in consideration 6 sentences, in order to understand the opinion about some concepts and ideas related with the replenishment process. The first statement is if the

process is currently being fast and efficient. 62% of the sample agrees with the sentence. About the cooperation between workers during sorting the products, the opinion differs. 73% agrees or totally agrees with this, but 20% thinks that some workers are not providing the needed effort.

About the influence of the *doublon* when pressing the workers for a faster replenishment, 27% totally disagree with this behavior and only 22% agree with this. The fourth statement says that there isn't a standard procedure to be followed during this process, 45% confirmed this point, but 28% think that a standard procedure can be applied. The next idea is about knowing if the workers are interested in this process, having only one person answered negatively. The last sentence tries to understand if they think that there are few persons to replenish the merchandise. The majority of the people agrees with this statement, but 14 persons still think that there is no need of adding more people.

The final two questions are made in order to understand how this process can be improved. 80% of the people think that this process can be standardized and applied to every section, and the suggestions for improvements were mutualized sorting (where there is a specific team to handle the products, while the others focus on replenishing the cardboard boxes and the products that don't need to be handled), sharing efforts with other sections and priority definition (first the shoes are handled, then the clothes...), and it's also possible to give their own idea. The two ideas suggested were helping the sections with more merchandise until a defined hour and having two different teams, one for replenishing only and other to meet customers.

3.3.2 Questionnaire analysis

The majority of the respondents are very young, since Decathlon's politics is to hire people for their first job at a young age. That reflects the low percentage of people that answered positively to the question about having worked in another retail company. Despite that 47% of the people still work in Decathlon for over a year. This means that no matter being a part-time, people get used to it and enjoy working in the company. This also means that the people working there have already plenty experience in the company and acting with customers. Most of the sample are males which represents well the real population of the store. Since the sales peak of the store is at night (see the director interview), there is more people working in that shift to attend customers and clean the store. The majority of the people think that the current process is efficient. The respondents that don't agree with the statement suggested some improvements that can be tested in the following part. This shows that they believe that there things to be improved.

It was decided to separate some answers between salesmen and section managers, in order to understand if there is different thoughts about the process. And the differences start right after. Every section manager thinks that the *Doublon* presence near the process is essential to the process, but 18% of the employees think differently. About characterizing the *doublon*'s paper throughout the process, the section managers think that they aren't that much sympathetic, but the overall thought (for the employees) is that they are being quite nice. The global perspective is that the *doublon* is a responsible person that takes care of any situation that may happen. The parts agree that the *doublon* is constantly pressing the employees to get things faster, which sometimes can be confused with the *doublon* being too much bossy in their perspective. The characteristic where there is more disagreement is motivation. The section managers believe that they are motivators, but the truth is that the employees rarely notice that.

The next set of questions where some considerations about the process are written and the workers have to show their opinion, help to expose it. Despite saying that the process is

currently efficient, there's still some people not agreeing with that. And it can be supported, when 20% of the people says that there are some employees not giving that needed effort in the replenishment process. Part of the sample (27%) don't like to be pressured by the doublon, which can cause some uncomfortable situations. The next question is very interesting. 40% said that the process can't be standardized, while only 28% defend that. The last question of the survey was meant to be a confirmation question. And the result was very different. 80% was already saying that this process can be standardized, which interrogates the answer they gave above.

Another interesting thought shared by many is that there is few people working on this process, which can be understood, since most of the people work on the night shift, where there is more customers. The most chosen alternative for improving this process was to create a mutualized team that are more focused in the warehouse, while other salesmen are replenishing the shelves inside the store.

3.3.3 Interview

This interview was performed in the beginning of February and the script can be found in the appendix C. The interviewee was Mateus Silva, the store director at the time. The aim of this interview was knowing is opinion about the difficulties the replenishment process is facing and what kind of suggestions could he give. This information is important since it will allow to understand if his opinion is similar with the findings in the questionnaire.

The director believes that this process is not having the importance it needs, since the store is being focused in the direct relation with the customer, and making the store profitable by reducing the price and selling more quantities. He is now realizing, that if the strategy is to sell more products, the store must improve the process of getting these products into the shelves more quickly. In his mind, he thinks that the employees are not performing at full power, because the store managers are not motivating them and making them aware that this process is essential to the store. He believes that some changes have to be made and that the warehouse space must be redesigned. He believes that circulation inside the warehouse is chaotic, and he wants the wheel cars, hand pallet trucks and the stacker (future purchase) to be drive through a determined path.

He reveals that the magnums filled with shoes and clothes from different sections are meant to be sorted by a mutualized team. It happens that Decathlon is starting to adopt this idea. In order to avoid dividing the employees by sections, they want to create a team which is responsible by alarming the products, putting the hangers on the clothes and removing the paper and plastic from the shoes. One of the suggestions proposed was to eliminate this last action, which is removing the paper from the shoes. It's a highly time consuming idea, and the customers may place it in garbage bins. He agreed with that and the solution spoken was to place one or two garbage bins in every aisle that contains shoes. The biggest change was the decision of starting earlier the replenishment process by receiving the truck at 7h30, with the doublon and store manager entering at that hour to remove the merchandise from inside the truck. This means that there is more half an hour to work in this process before opening the store to customers.

His main goal is to have satisfied customers since the opening, with employees focused on them. He established the time goal for 11 o'clock. He wants the whole process to end in any circumstance at that time. This interview was very clear in terms of what are the actions that can be changed and tested and which is the aim of these changes.

4 Development and application of optimization measures into the replenishment process

4.1 Developing a standard procedure inside the process

Taking into account the feedback from the workers and the director, it was clear that some standardization of procedures is lacking inside the process. The decision was to set a very clear procedure, which could be posted in the warehouse and comprehended by everyone. The new procedure is:

1. At 7h25, the doublon and the store manager enters the store.
2. At 7h30, the truck gets by the warehouse door
3. At 7h32, the doublon opens the truck.
4. By 7h35 they have to start unloading the truck (the truck can only be in our warehouse during 30 minutes).
5. At 8 o'clock enters the mutualized team and their start handling the bacs and separating them to the sections wheel cars.
6. The cardboard boxes containing easy replenishing products goes directly out of the warehouse. Then the store manager is responsible for handling and leaving those products in the correspondent section to be replenished by the section worker.
7. At 8h30, the rest of the employees enters and goes directly to the warehouse to get the products or if they have merchandise already in the section, the doublon warns them about that. At this time the mutualized team is finishing the division and handling, and can start working on the magnums filled with shoes and clothes that are not easy replenishment.

This is a clear procedure that sets a timetable for the main actions. The biggest change is starting the process at 7h30, and having a mutualized team entering at 8h to start placing the ready to sell bacs in the wheel cars and the to be sorted boxes in the a specific place in the warehouse. The store manager in the previous only helped by unloading the truck. Now he has another task. He have to get the cardboard boxes and the magnums with the products that are ready to be replenished to the sections. Until 8h30 he has to do it.

This means that the employee that enters at 8h30 have already something to replenish while the mutualized is handling the other products. The aim of this process is every section ending their replenishment before 11 am. The doublon can send someone which replenishment is already done to help those sections until that hour. It takes in account the opinion from the workers that suggested this idea as another solution for a more efficient process.

4.2 Creating and scheduling a mutualized team

Taking into account the opinion of the workers, and the Decathlon strategy of sending magnums with products from different sections all mixed, it was decided to create a team responsible by handling, sorting and alarming these products. In order to create this team, the section managers have to reschedule their teams' schedule, because the employee may start entering at 8 o'clock. For smaller sections, that only have 5 to 6 employees this means that the gap between 13h and 13h30 have to filled by section manager, or they have to put 2 persons doing the morning shift, one entering at 8 and other entering at 8h30.

In the next image is possible to see how the sections are going to be asked to be part of this team:

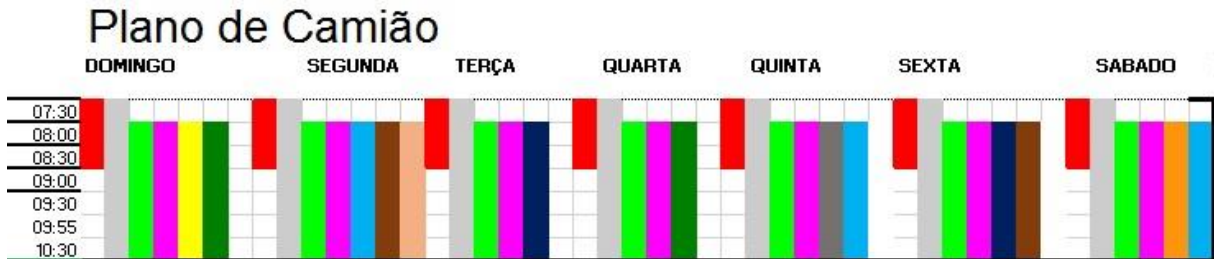


Figure 6 - Mutualized team schedule for every section

Universe	Rep's
Mountain	7
Fitness	7
Cycling	1
Tennis	2
Running	2
Water	3
Nature	2
TeamSports	1
Cashier section	1
Store Manager	7
Doublon	7
S&A	1

This plan is posted in the warehouse, so that the doublon can check if someone is missing from any section. Mountain and Fitness have more than 10 employees and usually the majority of the quantities are from that universes, so every day they have to have someone entering at 8am. They need to have another person entering at 8h30 to replenish the merchandise, and when in high peak of sales it is strongly recommended to add another person at 9am, since the quantities are very high. Cycling merchandise is all about bikes. They usually receive 3 to 4 bags to replenish with small pieces or clothing, but their focus is to have all the bikes assembled by 10 o'clock. For that motive and despite having 8 people working in that section, it was decided that they only need to send a member at Saturdays. Other sections like tennis, running, and nature which have 6 employees, need to be part of it twice a week. It's also strongly recommended to the section managers that when this sections are part of the mutualized team, another member of the team should be replenishing outside. The problem is that some responsible prefer to have more people selling at afternoon or at night and then they can't put two people in the morning shift. This means that the person that his working in the mutualized team, when all of the products are ready to be replenished, he has to pick up his own merchandise and he goes replenishing it. This means that if the mutualized takes 1h30 to handle the products, that person is only starting to replenish his merchandise at 9h30. The team sports section only have 4 to 5 employees, so they only perform once a week. S&A, it's a recent section that sells vitamin bars, cameras, sunglasses and watches. Since they only have 3 to 4 people it was decided that they should also be part of the team, and they help at Mondays.

As is possible to observe, Mondays is the day when the mutualized team have more members, since it's the day where there are more quantities coming, after the peak of the weekend. Tuesdays and Wednesdays are the days with less merchandise arriving, so there are less people working in this team. Nonetheless, every section which does not have a member in the mutualized team, still has to have an employee entering at 8h30.

4.3 Redesign the loading dock

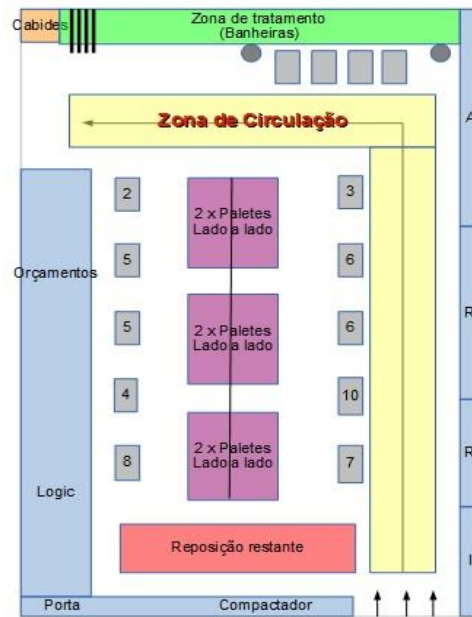


Figure 7 - New warehouse layout

After speaking with the director, it was stipulated that the warehouse needed to be redesigned. This new scheme reveals a complete new look over it. At the bottom, on the right, it's where the truck connects with the warehouse. Right next to the left is the garbage container and a door that connects with the outside. The Logic space is where the bought products like table tennis tables are waiting to be transported.



Figure 8 - The new space for Logic

This change was quite important, since there was no space for this, so several times the tables and the machines were all over the warehouse. This means that the van can stop near by the door and the products can be transported easily to it. There is also a circulation zone delimited by yellow lines that starts at the gate and ends at the door that the links the warehouse to the

store. The width of the line allows that two hand pallets truck. This means that two workers can pass by each other without having to swerve.



Figure 9 - The new path designed in the floor

At the right side, there is space for A – *Agencement*, R – boxes and pallets to be sent to the regional warehouse and I – *Interloja*, products to be sent to another store.



Figure 11 - Agencement



Figure 10 - Boxes to be send back to the regional warehouse

This area around the center of the warehouse was totally changed in order to allow the circulation in the middle and to define a place where the merchandise can be landed and then sorted. So the doublon and the store manager starts unloading the merchandise, and all the bacs and magnums that comes in pallets are placed side by side, two pallets each. There is space for having 6 pallets at the center of the warehouse, ready to be divided and sorted. It's also possible to put 8 pallets if the space between the pairs is reduced. Usually the boxes contains a “ready to sell” label or a “to be sorted” label. It also says in that label the number of the section. That's why near the pallets there is a place where the correspondent wheel car from a given section is standing, and the bacs must be placed there. There is a repetition in the section 5 and 6, which

are the most selling, mountain and fitness. So they have more quantities to be replenished and they need two wheel cars.



Figure 12 - New redesign of the center of the warehouse, placing wheel cars in the section number defined

A truck with 3000 quantities has in average 10 to 12 pallets. This redesign was considered having into account that in some cases the number of quantities can grow to 10000 in a Monday morning of late July. In that case, the center of the warehouse is occupied at full capacity, there is also some space to put some pallets that are then going to be moved to the center, but at least 8 to 10 pallets need to go to outside the warehouse. After sorting the bacs and the magnums that are in the middle, the merchandise which is outside, goes back to the warehouse.

At the top, in green, there is also one the biggest changes. The mutualized team have now their own space to sort the shoes that are in the magnums and bacs, and which the plastic has still to be removed.



Figure 13 - The place where the products are set-up to be replenished

When they find an international brand show that needs to be alarmed, they place it in a bac, and at the end of the sorting, they will alarm of the products that needs it. When seeing the labels that are in the boxes, if the label says (“to be sorted”), that box goes directly to that space. The objective is that the people which is replenishing have to do only that task, avoiding sorting products and removing the plastics. This means that every product is considered by them as an easy replenishing product, since it can go directly to the shelf.



Figure 14 - Set-up table, with different type of alarms

4.4 Introducing changes into the sub-process of sorting shoes and clothing

So as is possible to read in this chapter, shoes and clothes are the main items that comes in the truck. Some of the measures were already presented above, but this point works as a summary of those. In order to sort the products in a way that is easier to replenish, it was asked the teams how do they prefer to separate the products. The sorting chose is the following:

Cycling (there is no need to alarm)

- Clothing all mixed
- Pieces with accessories

Water (alarm apparel from international brands)

- Surfing
- Swimming
- Boat

Mountain (alarm shoes from international brands in the right foot)

- Lady shoes
- Men shoes
- Kids shoes

Tennis/Walking (alarm international brand in shoes and in clothing)

- Men walking
- Kids and women shoes
- Men tennis
- Lady and kids tennis

Team sports (alarm international brands in shoes and clothing)

- Everything can be put together

Nature (nothing to alarm)

- Equitation
- Golf
- Hunting

Fitness (nothing to alarm but international brand clothing)

- Clothes
- Shoes

Running (alarm shoes above 70 euros, in the right foot)

- Men shoes
- Kids and Lady shoes

Besides this removing the paper that are inside the shoes is no longer needed, since there are garbage containers all over the aisles that have shoes. This allows reducing the time for product handling.

Alarming the shoes is now a task performed by the mutualized team. Unfortunately, robbery is constant in this store, so having every shoes from international brands alarmed is something great. In the previous process, it was the employee from the section to alarm it, but usually he used to forget, since at the time he was going to do it, the store was already open and full with customers. Alarming shoes in the end of the sorting process works as mechanical process, where the team is focused in placing the alarms on the shoes without having to leave the space intended for it.

4.5 Motivating people and create awareness to embrace the change

Throughout the process the presence of the doublon is essential. He has to embrace a new mentality, and constantly be cheering the team to a faster replenishment. One of the changes that is now implemented is also adding music to the process. They start to use the store speakers with loud and motivating music, which wakes up the staff and amuses them. The doublon must be not so bossy, but he still has to be interested in knowing if the time is being reduced. For that, there was added a clock to the warehouse that everyone can see.

At this time none of the responsible can leave to have breakfast or to the office until their tasks are done. The workers cannot have a break before finishing the replenishment. The doublon has to warn when the store opens and when it is missing 30 minutes to the 11 hour deadline.

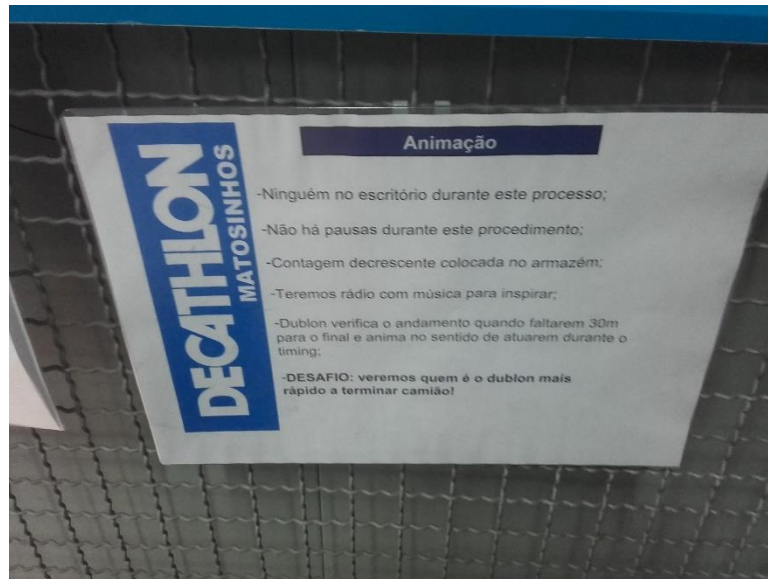


Figure 15 - Animation of the process

As spoken in the State of Art, embracing workers in the decisions may be crucial for the success of any change. The decision of integrating the workers in the decisions, by sending them a questionnaire, and keeping them informed about the changes, is very important for the success of this new stage. An email was sent warning them about the revolution took place on the 25th of April, the first day when the process started with this new ideas.

After the beginning of this new process, the workers could also give their feedback and express their opinion by email. This shows that their opinion is being heard and that the success of a company starts in the happiness of its workers.



Figure 16 - Email sent to the workers motivating them to embrace the new change in the replenishment process.

In the end of March was also scheduled a meeting, inviting all the members of the store to be present. In that meeting, it was presented the new procedure and the changes that were going to be made. A PowerPoint presentation explaining in detail how it would work and at the end room for questions was given, to avoid having any doubts for the first day.

5 Results of the measures applied to the process

These results were obtained since the first day, after launching the new measures in the process. In the table below is possible to observe the results in week 18, the first week of the new replenishment process. The final of April is not considering a high peak in term of sales, since the summer is yet to start and Easter have passed already. That can be observed by the average number of quantities: 3060. The number of quantities is the same of the number obtained in the

Figure 17 - Table with the results from the new process

SEMANA	DIA	SEMANAL	QUANTIDADES	TEMPO ATR	FIM REPOSIÇÃO		SEMANA	DIA	SEMANAL	QUANTIDADES	TEMPO ATR	FIM REPOSIÇÃO	
S18	29/04/2015	DOMINGO	2500	30 MIN.	10h20		S21	17/5/2015	DOMINGO	3300	1H	10h50	Tito
S18	27/04/2015	SEGUNDA	5000	1H20	11H40	Tito	S21	18/5/2015	SEGUNDA	4740	1H15	11H	
S18	26/04/2015	TERÇA	1350	1H	11H30	Tito	S21	19/5/2015	TERÇA	5235	1H	11H30	
S18	25/04/2015	QUARTA	2200	40 MIN.	9h55	Tito	S21	20/5/2015	QUARTA	2990	22 MIN.	10h25	
S18	30/04/2015	QUINTA	5000	2H15	12H		S21	21/5/2015	QUINTA	4775	45 MIN.	14H	
S18	1/5/2015	SEXTA	2900	1H15	10h30		S21	22/5/2015	SEXTA	4170	40 MIN.	16H	
S18	2/5/2015	SÁBADO	2490	30 MIN.	09H40		S21	23/5/2015	SÁBADO	3200	45 MIN.	10h30	Tito
SEMANA	DIA	SEMANAL	QUANTIDADES	TEMPO ATR	FIM REPOSIÇÃO		SEMANA	DIA	SEMANAL	QUANTIDADES	TEMPO ATR	FIM REPOSIÇÃO	
S23	31/5/2015	DOMINGO	5500	2H30	13H		S22	24/5/2015	DOMINGO	5700	1H	15H	Tito
S23	1/6/2015	SEGUNDA	6100	2H30	13h30	Tito	S22	25/5/2015	SEGUNDA	5800	1H15	14H	
S23	2/6/2015	TERÇA	3000	1H	10h50		S22	26/5/2015	TERÇA	2200	1H10	10H	
S23	3/6/2015	QUARTA	4200	2H20	11H30	Tito	S22	27/5/2015	QUARTA	2800	50 MIN.	10H15	
S23	4/6/2015	QUINTA	5080	1H40	12H		S22	28/5/2015	QUINTA	1900	1H	9H40	
S23	5/6/2015	SEXTA	5200	2H30	12h30		S22	29/5/2015	SEXTA	7400	1H20	15H	
S23	6/5/2015	SÁBADO	4000	1H	11H		S22	30/5/2015	SÁBADO	4300	1H40	12h30	
SEMANA	DIA	SEMANAL	QUANTIDADES	TEMPO ATR	FIM REPOSIÇÃO		SEMANA	DIA	SEMANAL	QUANTIDADES	TEMPO ATR	FIM REPOSIÇÃO	
S25	14/6/2015	DOMINGO	5200	2h20	14H		S24	7/6/2015	DOMINGO	3800	1h40	12h30	
S25	15/6/2015	SEGUNDA	7700	2H	14h30	Tito	S24	8/6/2015	SEGUNDA	8200	2H15	15H	
S25	16/6/2015	TERÇA	3500	1H	11H15	Tito	S24	9/6/2015	TERÇA	2200	45MIN.	9h50	
S25	17/6/2015	QUARTA	3500	2H30	14h30		S24	10/6/2015	QUARTA	5200	2h20	14H	Tito
S25	18/6/2015	QUINTA	7100	3H30	13H		S24	11/6/2015	QUINTA	7800	2H15	13h30	Tito
S25	19/6/2015	SEXTA	4500	2h	12h		S24	12/6/2015	SEXTA	4200	1H15	11H30	
S25	20/6/2015	SÁBADO	5000	2h20	12h30		S24	13/6/2015	SÁBADO	4400	1H40	13h30	

weeks registered in February before the changes. This means that we can directly compare the process using the key performance indicators.

In February, the average time for time spent handling products was 2h50 and for total process of replenishment was 6h13. At this time, the result for the key performance indicator TSHP was 64 minutes. Focusing on the other KPI, the average result is 196 minutes, which is translated in 3h and 16 minutes.

After this week, the results started being registered only in week 21, already in mid-May. The reason for registering this space of time between weeks 21 to 25 is the beginning of the summer, and the start of a peak of sales. The average of quantities in the first week is 4015, meaning a 1000 quantities increase. The result for the KPI THSP was 50 minutes. The average time for the KPI TRPT was 4h32.

With the store at full peak in weeks 24 and 25, with an average of daily quantities higher than 5100, the results were for the first KPI, 2 hours. For the KPI total replenishment process time the result was 5 hours, meaning that the process was ending by 1pm, almost in the afternoon shift.

Figure 18 - Results after making changes to the number of people working on the morning shift

SEMANA	DIA	SEMANAL	QUANTIDADES	TEMPO ATR	FIM REPOSIÇÃO		SEMANA	DIA	SEMANAL	QUANTIDADES	TEMPO ATR	FIM REPOSIÇÃO	
S28	9/7/2015	DOMINGO	5200	1h40	11h45		S29	12/7/2015	DOMINGO	7800	1h20	13h30	Tito
S28	8/7/2015	SEGUNDA	9500	2H30	13h20	Tito	S29	13/7/2015	SEGUNDA	10400	2h	12h40	
S28	7/7/2015	TERÇA	3400	50MIN.	9h45		S29	14/7/2015	TERÇA	2400	45MIN.	10h	
S28	6/7/2015	QUARTA	3890	2h30	10h		S29	15/7/2015	QUARTA	3000	55MIN.	10h15	
S28	5/7/2015	QUINTA	7000	1h35	12h	Tito	S29	16/7/2015	QUINTA	7400	1h40	14h	Tito
S28	10/7/2015	SEXTA	4900	2h	11h		S29	17/7/2015	SEXTA	2300	1h20	10h40	
S28	11/7/2015	SÁBADO	4340	1H	11h15		S29	18/7/2015	SÁBADO	5100	1h30	12h30	

After analyzing this results, some changes were made and the results above look at weeks 28 and 29, when the section water was asked to have an employee every day in the mutualized team and the medium sections like tennis or running start adopting the idea of having 2 members working in the morning shift when those teams have elements being part of the mutualized team.

Considering the weeks 28 and 29, the average number of quantities per truck was 5460. Setting-up the products took 93 minutes in average per day, and the total process lasted 250 minutes, which means 4h and 10 minutes. With this result, the process was ending by 11h40 in average.

By the side of the column, there is the name “Tito”. That means that in that days there was a participation of someone that can affect the employee’s behave, since the person responsible for introducing the changes was also there working with them.

Semana	Dia	Permanente	Quantidades	Duração ATR	Camião reposta (h)
	Domingo	DOUBLON			
	Segunda	Alonso	8976		
	Terça	Brito	3228	15m 20"	
	Quarta				
	Quinta				
	Sexta				
	Sábado	João L. Silva	1770	15m 20"	1h 30m
	Domingo				
	Segunda				
	Terça				
	Quarta	João L. Silva	5700	15m 20"	1h 30m
	Quinta				
	Sexta				
	Sábado	João L. Silva	7970	15m 20"	1h 30m

Figure 19 - Board inside the warehouse where the Doublon fills the information about the replenishment process, taking into account the key performance indicators

6 Discussion of the results

After analyzing the process before and after introducing optimization measures, and having now the results to compare both, this chapter will conclude if the process benefited with the change.

During weeks 10 and 11, the daily average number of quantities coming in the truck were 3000. In comparison, week 18, has also the same number of quantities meaning that both can be directly compared.

Before introducing any changes, the process of setting-up products inside the warehouse lasted by an average time of 2 hours and 50 minutes. After implementing the new strategy the time was 64 minutes. This means that the time after changing the process was reduced in almost two hours. This means that the mutualized team after 64 minutes were already prepared to leave the warehouse and help replenishing the products, at 9 am, 1 hour before the store opens.

Taking into account the total process replenishment time, in February, the time results were over 6 hours and 13 minutes. After the new changes it was reduced for 3h16. This means almost a 3 hours reduction, in the most complicated process of the store. This means that if the process starts at 7h30, it will last until 10h46, which is below the red line of 11 o'clock. This means that having a team preparing the products to be replenished, instead of a person by section doing all the job have contributed for a better process. It also means that this process can work just fine when the store is not at a high peak of sales.

The employees were motivated for the change, and the effort they made to understand the procedure, allowed to start welcoming customers in the first hour of the morning, which have an impact on the quality of the sales and also in increasing the value of one sale, due to the sales assistant advice.

The next comparison takes place in mid-May, week 21, since is the beginning of the sales high-peak, due to the summer start, and the high selling sections were not only mountain and fitness, but also the water section.

The average number of quantities were much higher, 4015, but nonetheless the mutualized team was able to enhance their performance and have better results at this time, performing their action in less than an hour, more precisely 50 minutes. Even with a 1000 quantities more the team was able to reduce this KPI time in 14 minutes.

About the total replenishment process time, the average time was increased to 4h32, instead of a result of 3 hours and 16 minutes (registered in Week 18). And this is not only explained by the number of quantities. At this time, section managers were asked to add more employees to the morning shift, especially the water section.

The problem was that rarely there was 2 persons from that section working, meaning that the section that makes more money, was still working in this week with only 1 person. This means that, that employee in the days of his section doing mutualized, was also replenishing is own merchandise, and even with the help of the ones who had already finished replenishing (people from other sections), he was still not able to avoid being the last section to finish the process. In this week, this team finished the process in last place, and sometimes with 1 hour difference for the rest of the sections.

In week 24 and 25, with the store at full peak, the water section finally had the members it needs to be successful. It was asked this section, to add an employee to the mutualized team every day, just like fitness and mountain. This means that the mutualized plan must be changed in

order to adapt the store to the peaks. At this time the results got even worse. Having more a thousand quantities than in week 21 (5100), the team were not able to reduce the time, and it even waste more time, 2 hours. This means that having another employee from the water section didn't were enough to make the setting up process faster. This can be explained by not having enough people to set up the products, since there was no experience in dividing the merchandise that came for that particular section. This means that handling bikinis and alarming flip flops. The inexperience of working with so merchandise from that section may have caused these time difficulties.

For the KPI total replenishment process time the result was 5 hours, meaning that the process was ending by 1pm, almost in the afternoon shift. Considering this, if we compare with February when the process lasted for more than 6 hours and the average of quantities were 3000, of course there is an improvement. But the objective was higher. The limit hour was not respected, having the process ending 2 hours after that. The biggest problem was that since the merchandise is still to be placed in the shelves when the store opens, many customers were already entering the store and asking questions to the employees. The center of attention was no longer the merchandise, but the customer. This explains why in some days, the process was ending at 15h or 14h30. The solution was to ask section managers to reinforce the morning shift, so that even if that section was not at a high peak, it could still help the other sections.

This solution was not very appreciated, but they finally guaranteed that in the days of their section performing mutualized, they would have two persons doing the morning shift, and the section of mountain, fitness and water would have 3 persons.

And in order to understand if it help reducing the times, week 28 and 29 were analyzed. The average number of quantities was even higher, 5460. But the setting up time was reduced again to 93 minutes, almost one hour and a half. The routine helped employees being faster, since they now understand how every product must be set-up.

The total process time was reduced to 4h and 10 minutes, having the process ending at 11h40, in average. The changes made by asking for more people performing the morning shift really helped improving this KPI, and bring it closer to the objective.

Despite having more people in the teams, what happened was that the section employees was no longer helping the teams that in more difficulties, so this action that helped controlling times in the last registries, now was no longer in action. So the employees were working hard to finish their own replenishment, but after that, instead of helping the others, they were focused on selling and meeting with customers.

The doublon which is considered an essential part of this process was also changing his performance. In the beginning, they were more lost in the process, but now they have more control and they can motivate better the teams to deploy a better service. By having the mutualized plan in the warehouse, he was able to quickly know who was late or missing, and immediately call the section manager to find a solution, whether call the person or come himself to replace the one missing.

The behavior of the employees was also different. In the first week they were deeply motivated in doing it properly, setting-up the products with the usual rhythm. But in weeks 28 and 29, there was no particular interest about the process, since things get so mechanized that they no longer thought they were doing something different, but only the normal procedure. The rhythm was so much stronger, and it needed to be, since the daily average number of quantities was 5500, and in some Mondays it exceeded 10000 quantities.

The relation between the store manager and the doublon was also improved. In February, the store manager was only unloading the merchandise and leaving to others right next to it, leaving the doublon alone. Now he is helping by transporting the easy replenishing and the heaviest products to the sections. This sensation of commitment and leadership by example helps motivating the staff, and shows that no matter the position you have in the company, the room for improving and learning new procedures must be always present.

7 Conclusions and Evolution Perspectives

In this section there is space to conclude about the work done in Decathlon Matosinhos. The limitations found in the study, as well how the company have embraced the changes will also be presented. Finally there is also space to suggest more improvements to the process.

The aim of this dissertation was to improve the replenishment process of Matosinhos' store. It started by analysing the company and culture and values of it. Then it was analysed the process and how was the performance of it, using key performance indicators. After knowing these results it was time to introduce some changes to the process, like creating a mutualized team or stop taking the papers from inside the shoes. All this actions were made with the workers knowing everything about the changes and being motivated for that, by email or communication inside the warehouse.

After 1 week of the process running with the new procedure, results were collected and it showed that the process was way faster than in February, for the same average of quantities. Having improved and readjusted the process for being ready to high peak of sales, in week 28 and 29, and having a daily average of around 5500 the process time was over the time limit of 11 o'clock by 40 minutes, but was still better than the results of February (6h13 minutes).

Question 1: How can the replenishment process of Decathlon Matosinhos be improved?

So the process was improved by implementing a new strategy composed by a set of measures with the aim of reducing time on the process.

The measures applied were:

1. Creation of a mutualized team
2. Redesign of the warehouse
3. Anticipate the hour when the truck arrives from 8 am to 7h30.
4. Communicate the change to the workers, by warning to the change by email and placing information about the new procedure in the warehouse
5. Stop removing the papers from the shoes.
6. Add more employees to the morning shift when the section is in a high peak of sales

Question 2: What are the main benefits obtained by introducing measures to improve efficiency?

Well the benefits were clear, reduce the time of the process and enhance the spirit of the workers for changing. The objective was set by me and the director to avoid replenishing after 11 am, and it can be observed that in the major part of the year, that can happen.

This work was very well received inside the company. Other stores and staff were also interested in knowing how was dealing with the change of the procedures and the results we got after creating the new procedure. Starting from scratch something that was never tried in Matosinhos was really excited. I believe that the store is now more aware of the importance of this process to the store.

Customers are winning with it. Having now more employees welcoming them right from the first hours of the morning is helping the store selling more and the business value of the store is improving significantly.

But it wasn't always that way. In the beginning workers and store managers doubted that something like this could result in long term, and that reluctance led to sometimes the section

managers were not prepared to put more employees helping in the morning shift. Changing procedures was not easy for the staff, since the revolution of procedures gave them new tasks and new challenges in their work.

In the end, I think everyone that is new in the company and works in this process, and have no idea about how this process used to be conducted, is now embracing the responsibility in an easy way and completing the tasks in shortened time.

In terms of limitations, I was lucky to be free and suggest any idea and test what I wanted. The process needed to be improved from weeks 21/25 to weeks 28/29 and the section managers even added more people to the process. I was even asked to attend a section managers meeting with the director to express my ideas and what changes would happen, and how they would communicate it to their employees.

In terms of future work, the aim was not fulfilled in every part. 40 minutes were missing to that goal. I believe that with staff being more prepared and more experienced now the results can be improved. I also believe that adapting this process to a certain part of the year can be possible. For instance, now in the rest of the year, water section may only be part of the mutualized 3 times a week, since it is no longer in high peak, but still have more members than a medium section. This type of adaptation is crucial for the process success.

Continuously improving by hearing the workers opinion and collecting information about the process using key performance indicators may be success formula to keep this process running in the best way possible.

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Appendix A: Questionnaire

Uma das principais atividades no dia-a-dia da nossa loja é a reposição dos produtos vendidos no dia anterior. Com o aumento do número de clientes e do volume de negócio, torna-se claro que a tendência seja de chegar cada vez mais mercadoria. É então fundamental que se faça uma reposição eficiente e que se foque nas boas práticas existentes, descartando-se aquilo que não está a funcionar. O presente inquérito serve como forma de perceber a forma como tem sido tratada a reposição na loja de Matosinhos.

Todas as informações são confidenciais e o anonimato das respostas é garantido.

* Required

Idade *

Mark only one oval.

- ☐ Entre 18 e 25 anos
- ☐ Entre 26 e 33 anos
- ☐ Entre 34 e 41 anos
- ☐ Mais que 41 anos

Sexo *

Mark only one oval.

- ☐ Feminino
- ☐ Masculino

Posição na empresa *

Mark only one oval.

- ☐ RD/Diretor
- ☐ Vendedor

1. Há quanto tempo trabalha na Decathlon Matosinhos? *

Mark only one oval.

- ☐ Menos de 3 meses
- ☐ Entre 3 e 6 meses
- ☐ Entre 6 meses e 1 ano
- ☐ Mais de 1 ano

2. Em relação ao seu horário de trabalho, qual a parte do dia que mais frequentemente faz? *

Mark only one oval.

- ☐ Manhã
- ☐ Tarde
- ☐ Noite

3. Partilha da opinião que a forma atual como se descarrega a mercadoria do camião é feita de forma eficiente? *

Mark only one oval.

- ☐ Sim
- ☐ Não

3.1 Caso tenha respondido não à questão anterior, queira indicar a sua justificação.

4. Já teve alguma experiência nalguma outra empresa do ramo do retalho? *

Mark only one oval.

- ☐ Sim
- ☐ Não

4.1. Caso tenha respondido "Sim" na questão anterior, indique se na Decathlon Matosinhos a forma de reposição é feita de forma mais eficiente que na empresa em que trabalhou.

Se tiver respondido de forma negativa à questão acima, por favor não responda.

Mark only one oval.

- ☐ Sim
- ☐ Não

5. Segue algum procedimento na forma de tratar o camião? *

Mark only one oval.

- ☐ Sim
- ☐ Não

Considera importante a presença e apoio constante de um Dublon no momento de descarga da mercadoria? *

Mark only one oval.

- ☐ Sim
- ☐ Não

Na seguinte escala caracterize a imagem que tem do Dublon, em relação ao critério abaixo mencionado. *

Simpático

Mark only one oval.

1 2 3 4 5 6 7 8 9 10

Pouco

Muito

Na seguinte escala caracterize a imagem do Dublon, em relação ao critério abaixo mencionado. *

Responsável

Mark only one oval.

1 2 3 4 5 6 7 8 9 10

Pouco

Muito

Na seguinte escala caracterize a imagem do Dublon em relação ao critério abaixo mencionado. *

Insistente (Controlador)

Mark only one oval.

1 2 3 4 5 6 7 8 9 10

Pouco

Muito

Na seguinte escala caracterize a imagem do Dublon, em relação ao critério abaixo mencionado. *

Autoritário

Mark only one oval.

1 2 3 4 5 6 7 8 9 10

Pouco

Muito

Na seguinte escala caracterize a imagem do Dublon, em relação ao critério abaixo mencionado. *

Motivador

Mark only one oval.

1 2 3 4 5 6 7 8 9 10

Pouco

Muito

De entre as afirmações seguintes, decida a opção que mais se adequa à sua opinião. *

Mark only one oval per row.

Discordo
totalmente

Discordo

Indiferente

Concordo

Concordo
totalmente

O camião é
descarregado
de forma rápida
e eficiente.

	Discordo totalmente	Discordo	Indiferente	Concordo	Concordo totalmente
Sinto que no momento de descarga do camião nem todos os colaboradores contribuem da mesma forma.					
Se o Dublon ou o meu responsável de secção me estiverem constantemente a pressionar trabalho mais rapidamente.					
Não existe uma forma comum de se tratar a mercadoria.					
O método de descarga da mercadoria é algo que me interessa e preocupa.					
Normalmente considero que existe poucas pessoas para tratar da reposição					

Que tipo de acções entende que tornariam o processo mais eficiente? *

Mark only one oval.

- Tratamento mutualizado (em que uma equipa está concentrada a cuidar dos produtos a tratar, enquanto os restantes se concentram no resto da reposição)
- Partilha do esforço entre secções (quando uma secção acaba a reposição vai ajudar as restantes)

- Estabelecimento de prioridades (por exemplo, primeiro trata-se calçado, depois roupa...)
- Other:

Entende ser pertinente uniformizar o processo de transporte dos produtos desde que saem do caminhão até às prateleiras? *

Mark only one oval.

- Sim
- Não

Appendix B: Questionnaire answers

Pergunta 1			Pergunta 2		Pergunta 3		Pergunta 4	
18 - 25	31		Masculino	27	RD	7	Menos 3 meses	4
26 - 33	13		Feminino	18	Vendedor	38	Entre 3 e 6 meses	8
34 - 41	1						Entre 6 meses e 1 ano	12
		Universe=56 pessoas	Nr Inquiridos=45				Mais de 1 ano	21
Pergunta 5			Pergunta 6		Pergunta 7			
Manhã	15		Sim	27	Falta tratamento			
Tarde	12		Não	18	Artigos devem ser melhor seleccionados e preparados a partir do CAR. 3 pessoas			
Noite	18				Banheiras multi são um erro. 3 pessoas			
					Má circulação no armazém			
					Tratamento fora do armazém			
Pergunta 8			Pergunta 9		Mercadoria dividida por secções			
Sim	11		Sim	9	Ajustar equipas consoante o volume de produtos no camião do dia a seguir. 3 pessoas			
Não	34		Não	2	Camião mais cedo ao fim de semana			
					Má organização interna. 2 pessoas			
Pergunta 10			Pergunta 11	RD	Diferentes procedimentos entre dublons			
Sim	44		Sim	7	Colaboradores sem o mesmo objectivo, energia e paixão. 2 pessoas			
Não	1		Não	0	Falta de formação no processo			
			Pergunta 11	Vendedor				
			Sim	31				
			Não	7				

Pergunta 12	Vendedor	RD	Pergunta 13	Vendedor	RD	Pergunta 14	Vendedor	RD
1			1			1		
2			2			2		
3			3			3		
4	2	1	4	3		4	2	
5	5	2	5	2	1	5	6	1
6	9	2	6	4		6	5	1
7	7	1	7	6		7	7	3
8	9	1	8	10	4	8	6	1
9			9	6	1	9	4	
10	2		10	3	1	10	4	1

Pergunta 15	Vendedor	RD	Pergunta 16	Vendedor	RD
1	1		1	2	
2	1		2	7	
3	1	1	3		
4	5		4	7	
5	7	2	5	2	2
6	9	3	6	8	1
7	3	1	7	3	
8	7		8	4	1
9	3		9	2	2
10	1		10	3	1

Pergunta 17	Discordo Totalmente	Discordo	Indiferente	Concordo	Concordo Total
1		4	9	28	4
2	3	6	3	13	20
3	12	17	6	7	3
4	4	9	6	23	3
5		1	3	23	15
6	2	12	6	20	4

Pergunta 18					
Sim	36				
Não	9				

Pergunta 19					
A	25				
B	17				
C	9				
Outra	2				
Esforço apenas até determinada hora					
Equipa camião e equipa loja - Personalização e reconhecimento dos pontos fortes de cada elemento na equipa					

Appendix C: Interview script

Nome:

Data:

Local:

Quais as grandes competências do staff desta loja?

Quais as principais dificuldades encontradas no processo de reposição de loja?

Qual o objetivo que pretende atingir com uma estratégia para a reposição?

Que sugestões de melhorias tem para renovar o processo?

Até que ponto o horário de camião pode ser antecipado por forma a dar mais tempo antes da loja abrir?