THESIS OF MASTER'S DEGREE

The picking's impact on the Supply Chain's performance of large retail companies

Course of Master's Degree in Engineering
of Industrial Production & Technological Innovation

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A Word of Thanks

Before diving into the seriousness of the Thesis, I would like to take a moment and say a word of thanks to the different people who have guided me through this journey.

First of all, I would like to give a gigantic THANK YOU to Madam Anne CHALLOUATTE and Professor Maurizio SCHENONE.

Madam CHALLOUATTE for all her energy, happiness, commitment, availability and teaching skills, and of course, for granting me the opportunity to join Leroy Merlin and this project. She is one of the most professional persons I have ever met and is really great to work with.

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1 Introduction

According to the Education Plans of both the Politecnico di Torino & the IPAG Business School, the course of study must end with a final internship where the student can use the theoretical knowledge he has acquired and start to develop the skills that will help him succeed and perform at a professional level. This internship goes with a Thesis where the undergraduate must combine theoretical knowledge, on-field data, analyzing and resolving skills to synthetize his journey through the superior education in a coherent manner and present and resolve, if possible, a problem linked to it.

I was given the chance to do this internship at Lezennes (France), in the headquarters of the Leroy Merlin France Company, part of the ADEO group. I integrated a project team called "*Team Booster: Catalog's Performance*" that worked transversally into the company to help the various market and support teams to have a catalog of products as efficient and successful as possible. They used different leverages to do so, like for example: the postage-paid, the merchandising, the product's performance or **the outer**.

My mission was to generate a list of products, opened to a modification of their outer in the Leroy Merlin warehouses. This demand has been a direct consequence of an internal analysis of the company. This analysis has brought out a list of problems encountered by the Leroy Merlin's stores, one of which was the fact that the outer was not coherent with the shelf-capacity. The objective behind it was to cancel, or at least reduce, the overstock problem.

This subject was a pure Supply Chain issue by the impact it had on the various departments of the company, and therefore a perfect way to know if this universe was the one I would chose to run my career.

In addition to this general introduction, it seems important to me to mention two important topics that are basically the heart of this Thesis: The Supply Chain & the Picking.

1.1 The Notion of Supply Chain

The Website www.businessdictionary.com defines it as an "*Entire network of entities, directly or indirectly interlinked and interdependent in serving the same consumer or customer. It comprises of vendors that supply raw material, producers who convert the material into products, warehouses that store, distribution centers that deliver to the retailers, and retailers who bring the product to the ultimate user. Supply chains underlie value-chains because, without them, no producer has the ability to give customers what they want, when and where they want, at the price they want. Producers compete with each other only through their supply chains, and no degree of improvement at the producer's end can make up for the deficiencies in a supply chain which reduce the producer's ability to compete.*"

This notion has its roots directly into logistics. We could say that it began with the famous Frederick Taylor, American engineer who has first conceptualized and organized scientifically the working activities by searching to improve manual loading processes. His monograph The Principles of Scientific Management, published in 1911, remains one of the fundamental pieces of the industrial management. But like a lot of improvements through history, we have to "thank" war for the development of this way of thinking: indeed, Operations Research & Analysis have started during the 1940s when it has been demonstrated by scientists that military logistics problems linked to the Second World War, could be resolved by analytics.

This led to the appropriation of this methods and logic from the industrial and manufacturing businesses which saw through this new tool, a way to get the best out of their processes.

It is today one of the principle tools to save money by acting on processes, that were not considered when talking about profitability.

1.2 The Notion of Picking

The Engineer Sabrina Grimaldi, teacher at the Polytechnic University of Turin defines the Picking as:

The breaking down or decomposition operation, of the **SKU (Stock-Keeping Unit)** in order to create gathering of diverse materials, intended for the satisfaction of a delivery order or a work order.

Therefore, a partial withdrawal of the materials presents in a "*source SKU*" is performed and the material collected is divided into one or more *"destination SKU".*

The destination can be internal to the factory for work orders (kitting) or external for orders intended for shipping to customers (picking).

The fields of application of the picking operations are countless. However, certain conditions must be guaranteed for the execution of operations:

- packages or materials must be rigid;
- the materials must be easily counted;
- packages or materials (with the exception of small parts) must be individually identifiable or traceable;
- the weight and dimensions of the packages or materials must remain within the limits of movability prescribed by the standards ergonomics;
- the withdrawal must not be subjected to excessive operations of unpacking or repackaging due to the presence of packaging layers.

The picking of each type of material can be done by individual orders or lots of orders:

1. **Order Picking:** The mission of individual operators consists in the execution of a complete order or a fraction of order (it is enough to forward the materials which make up the various orders for the final package)
2. **Batch Picking:** The mission of individual operators consists of processing a batch of complete orders or a batch of fractions of orders (it is necessary to provide –

a valley of picking - a training operation for the single orders - sorting -, equipping a specification area).

In conclusion, we can see Supply Chain & Picking are two concepts with a strong relationship, the Picking being a process largely used in the aim of continuous improvement and performance of the Supply Chain.

Therefore, we can wonder:

What is the picking's impact on the Supply Chain's performance of large retail companies?

We will try to answer this question through the analysis of the project that has been carried out during my internship in Leroy Merlin France & through a process of benchmark and research to complete with theoretical and factual notions that will allow us to give a final answer to this issue.

2 The Company: Leroy Merlin

Leroy Merlin is a French retailer specialized in home improvement and gardening. Part of the ADEO group (Third global group of retail of home improvement and gardening products. It belongs to the **Association familiale Mulliez**, which also owns big French companies like Auchan, Decathlon, etc.), it is its biggest and original company.

2.1 History

In 1923, Rose Merlin and Adolphe Leroy, futures wife & husband, decide to create a selling company of overstocked military gears called *"Au Stock américain"* at Nœux-les-Mines (North of France). They had the idea after seeing all the American army equipment left in France after World War I. In fact, the auto-entrepreneurs quickly observed an increasing demand on construction materials and home improvement equipment, direct consequence of a post war area where rebuilding become the main activity. Therefore, the selling of furniture and building materials from disassembled American army barracks appeared like a great idea: the "Do-it-yourself" market was born.

Between 1952 and 1959, new shops are opened and in 1960, the couple decides to name its company after its own family names: *"Au Stock américain"* becomes *"Leroy Merlin"*.

The first self-service store opens in 1968 in the city of their debuts.

1979 is an important year for the firm: The Association familiale Mulliez, owner and founder of big French companies like Auchan and Decathlon, decides to take shares of Leroy Merlin to diversify its working environment. It finally buys it in its entirety in 1981.

Thanks to the impulse and the dynamic of the group it integrated, Leroy Merlin starts its international conquest with the opening of a store in Spain.

The expansion phase is confirmed:

- In 1994 and 1998 with the partnership and acquisition of the companies Bricoman and Bricocenter;
- In 2003 with the opening of Business Units in Poland, Italy, Portugal, China, Russia and Greece and the partnership with AKI Spain and Portugal;
- In 2004, Weldom and Dompro come to reinforce the group and to complete the group's offer;
- In 2007 and 2008, are respectively opened Zôdio and Kbane. If the first one remains classical in the concept with a focus on decoration and *"gadget style"* equipment of the house, the second one is more of a new player, wanting to become the specialist of sustainable housing and new energies and having for objective to make its clients homes more safe, more frugal and more respectful of the environment.

  It is also at this moment that appears for the first time the name **ADEO** which comes to take the place of the name Leroy Merlin Group. The idea behind this is to give a new independent identity for the entire group.
- In 2010, the ADEO Group hits hard by taking over the Italian Business Unit of Castorama, one of its major competitors.
- In 2011 – 2012, the company decides to diversify its selling networks buying out LIGHTONLINE, DELAMAISON and DECOCLICO (in France) and by creating HOMES-UP in China and launching an online community called KOZIKAZA.
- In October 2014, ADEO buys out Quotatis, an online platform which purpose is to put in relation private individuals with refurbishment work project, and an artisan. Created in 1999, this platform is also available in the United-Kingdom and in Spain.
- In November 2015, Tikamoon joins the group too.

2.2 Characteristics

2.2.1 The Mission

Leroy Merlin wants to help people build their dream house by:

- Adapting to the local market;
- Meeting with the inhabitants;
- Getting to know their projects to focus on them;
- Proposing products that meet as much as possible the needs of those inhabitants;
- Having welcomed and convivial stores where the client will feel good.

2.2.2 The Offer

The Leroy Merlin stores are big marketplaces of do-it-yourself products available in self-service and/or in assisted acquisition.

Those stores are organized around four different topics:

- The Do-it-yourself universe;
- The Build-it-yourself universe;
- The Gardening;
- And the Home Decoration.

Leroy Merlin offers also a large range of various services according to each country in order to facilitate the acquisition of products and the implementation & the monitoring of projects.

2.2.3 The Specificity

The Leroy Merlin's stores can propose between 30.000 and 60.000 products according to their size and their purpose (small or big catchment area). The objective is to guide the client towards the right solution.

To that extent, three elements are essential:

- **The Customer Guidance**

  Leroy Merlin sees its store's employees not as salespersons but as sales advisers who give to their customers the right level of advice.

  Before and after the sale: the website can give ideas, tricks, services, etc.

- **Skills Development**

  The Leroy Merlin's sales advisers often follow training programs.

  Also, every employee starts its adventure with the company with an internship in one of the stores because it is important for every collaborator to understand and to remember what the main purpose of the company is: to serve the client as he expects it.

- **Partnership with the Suppliers**

  The Product's Managers work closely with the suppliers to generate a constant improvement of the products.

2.3 Organization

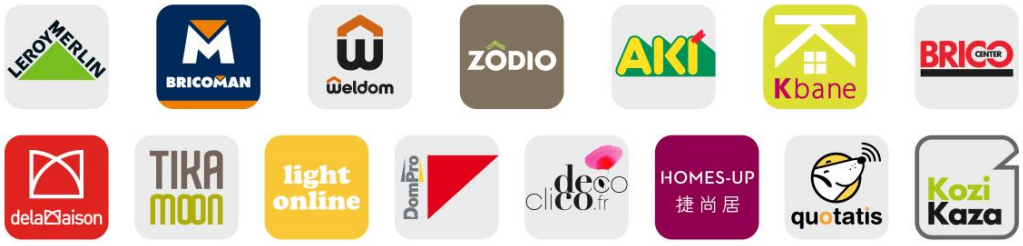
As said before, Leroy Merlin France is part of the ADEO Group. The companies of this group belong to one of the three following categories:

- **For the private individual** (Leroy Merlin**;** Weldom**;** Bricocenter**;** Aki**;** Kbane**;** Quotatis**;** Tika Moon**;** Light Online**;** Decoclico);
- **For the life of the house** (Zôdio; Alice Délice);
- **For the professional** (Bricoman; Dompro; Probox).

The different departments of the ADEO Group have various missions:

- To define the long-term strategy;
- To coordinate the different Business Units;
- To negotiate with some suppliers for the entire group;

Here you can find a picture with the different brands that constitute the ADEO Group:



2.4 Key numbers

2.4.1 ADEO Group

ADEO Group is owned at **85%** by the Association familiale Mulliez and at **15%** by its employees and has for CEO Mr. Philippe Zimmerman.

Countries served: 15

Stores: 760 and 555 franchised or member

Collaborators: more than 112.000

Turnover: 21.800.000.000 €

Clients served per day: 1,5 million around the World

Position on the French market: First

Position on the International market: Third

2.4.2 Leroy Merlin France

Leroy Merlin France is owned at **84%** by the Association familiale Mulliez and at **16%** by its employees and has for CEO Mr. Thomas Bouret.

Turnover: 5.631.783.000 € (2017)

Benefits: 241.486.000 € (2017)

Stores: 140

Collaborators: more than 88.000

Catalog: 60.000 references

Store dimension: from 6.500 to 17.000 m²

Number One on its market in France.

2.5 The Corporate Social Responsibility

On its website, the ADEO Group declares:

«More than ever, our commitment to the people all around the globe leads us to put our social and environmental impact at the heart of our daily actions. The POSITIVE contribution that we can have on our Planet, is a preoccupation shared between our customers, our suppliers and our partners. It becomes ineluctable. We build our home improvement platform coloring it with positivity, because it is a color we are pride to

bear. It is present in our Key Performance Indicators for the year 2018, through safety for all, our action sharing policies with our collaborators and the reduction of our carbon footprint. Measures for a sustainable development have been taken by the companies of our group, to make every woman and man of the ADEO Group a daily active actor for a more human and sustainable world. In 2018, we keep reaping the benefits of our actions and we are happy to share some of them with you:

1. **To Guide our Collaborators**
    a. Our engagement for Safety at Work with the following objectives: less than 50% in 2020 and 0% in 2025;
    b. To sensitize our collaborators to sustainability;
    c. To fight against the poor-housing;
    d. To promote diversity and equal rights.
2. **To be Proud of our Products**
    a. To preserve our resources, especially the wood;
    b. To propose praised and responsible private labels;
    c. To respect human rights & condition, and the environment;
    d. To support our suppliers and to formalize social & environmental controls;
    e. To prioritize product fixing;
    f. To ban and remove dangerous materials from our products.
3. **To Serve the Local Communities**
    a. To make home more sustainable;
    b. To create interactive area with the local communities thanks to our facilities.
4. **To Reduce our Environmental Footprint**
    a. To reduce our CO_2 emissions by 20% in 2020, and by 50% in 2025;
    b. To regularly update our carbon balance and act on it;
    c. To reduce the Logistic and the Supply Chain impact;
    d. To build and operate flawless facilities.

5. **To Have a Responsible Governance**
    a. To moderate a responsible development;
    b. To interact with our participating parties;
    c. To measure and moderate the performance;
    d. To communicate the good practices and advance;
    e. To develop social & environmental innovation. »

The group supports the association *«Bricos du cœur»*, which purpose is to *«Help people who help»*, by improving the volunteer's work environment. It can come under the form of a renovation project or an equipment donation. The aim is to give a good-looking and functional shelter to some low-finances associations.

2.6 Corporate Culture & Values

To be and to create together: the ADEO companies share a common identity while respecting their differences in terms of countries and/or cultures.

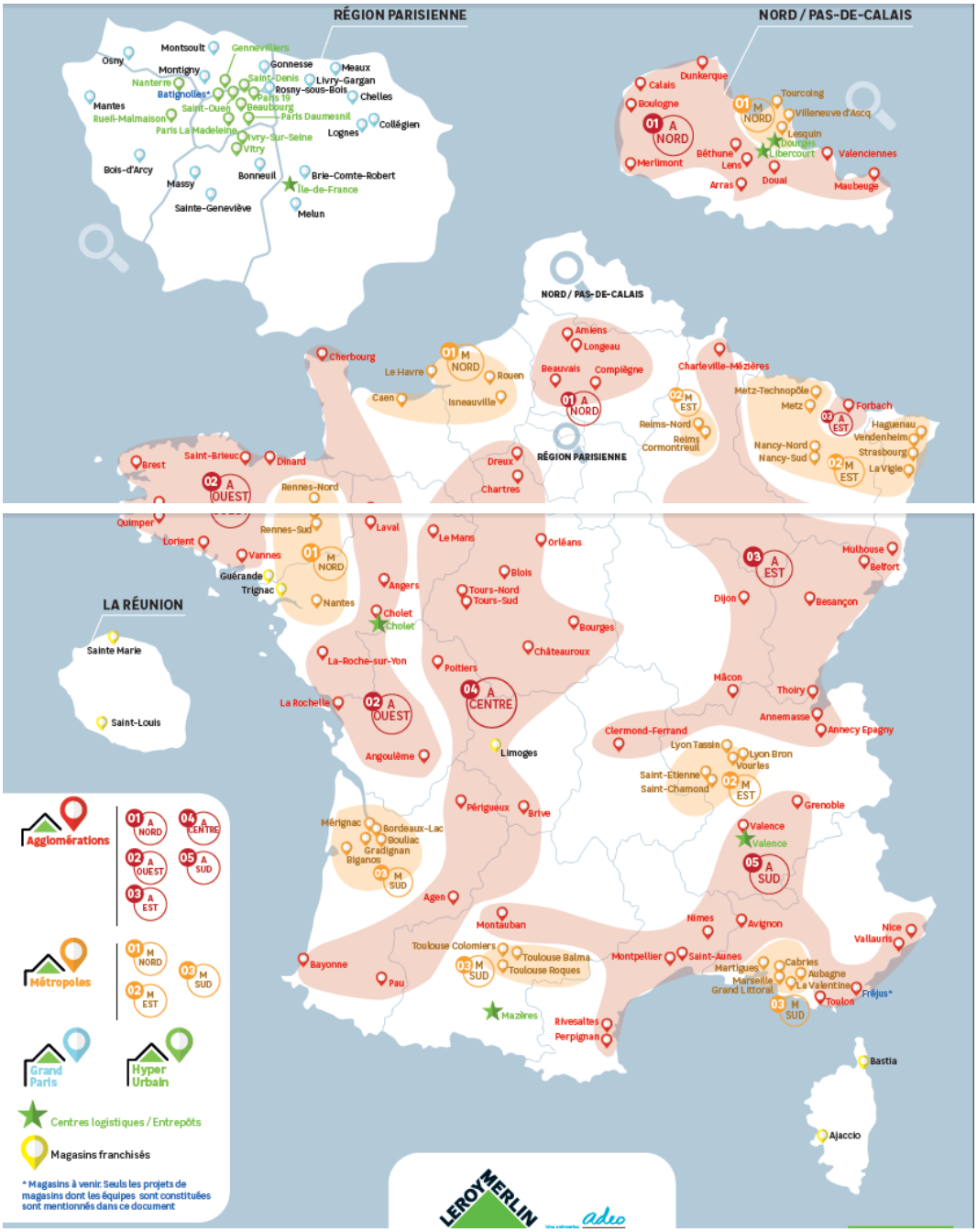
2.6.1 To put the individual at the heart of the company

Whatever its size, new or older, every ADEO company has the need to define itself at a human dimension. Every daily action is to be taken under values, a common ambition and the sharing of the experience and the resources.

2.6.2 To Share

- Build together our vision for the future: **To Want**;
- To acquire and develop one's skills: **To Know**;
- To free the individuals: **To Be Able**;
- To share the results: **To Have**;
- To commit to one another: **To Be and to Live Together**.

2.7 The logistic network (stores & warehouses)

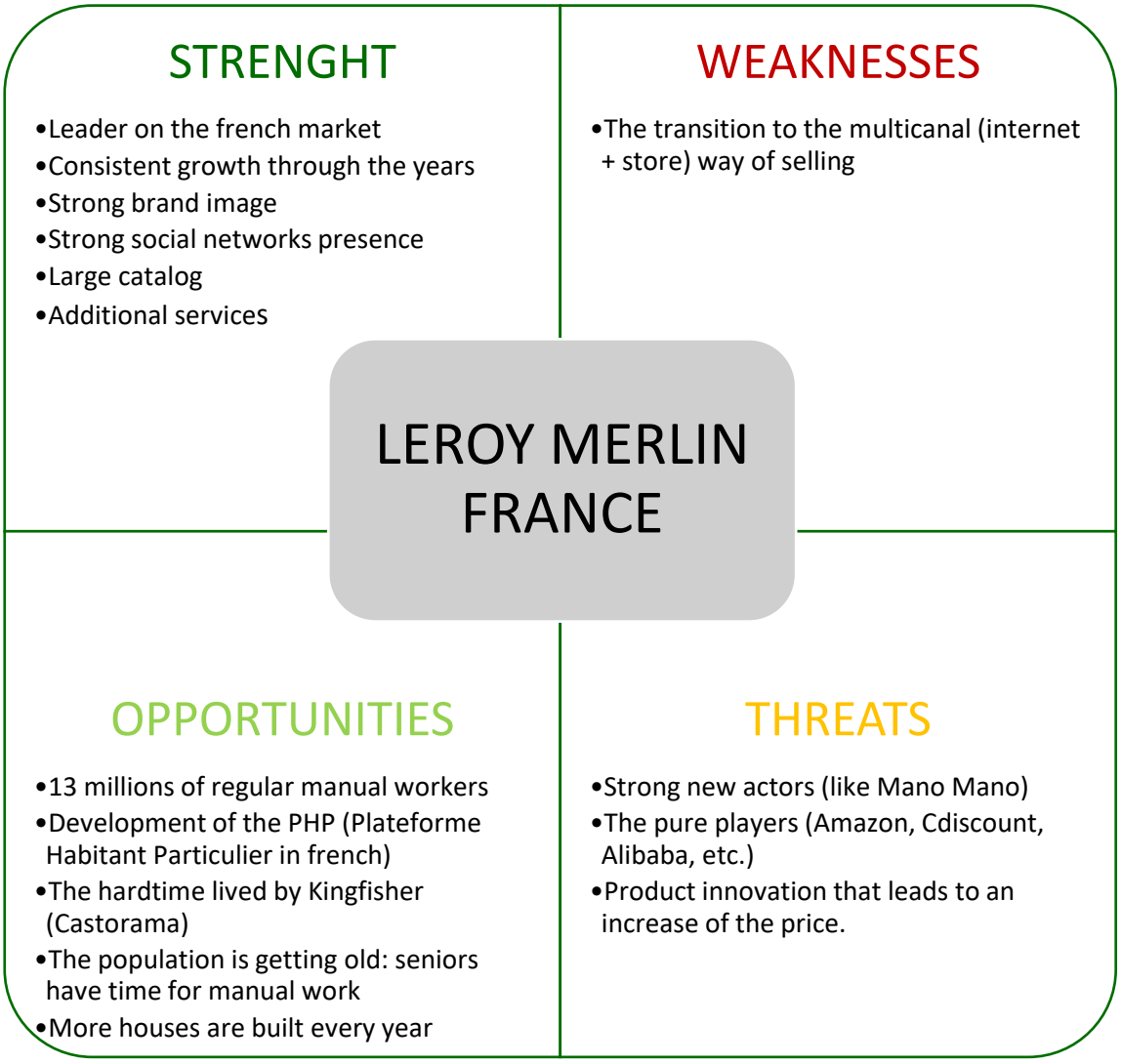


- Magasin franchisé = franchise store
- Centres Logistiques/Entrepôt = warehouses
- Métropoles = metropolis
- Agglomération = a city and its suburbs

2.8 Analysis of the company

As the mission carried out was serving only the needs of Leroy Merlin France, the analysis will only be done on this entity.

2.8.1 SWOT



2.8.2 Five forces of Porter

Clients

As Leroy Merlin is the leader of its market, we can say that the consumers consider it to be the best place to fulfill their needs. If we add the fact that Leroy Merlin has a really client-oriented policy in terms of After-Sale Services (the stores take back any product that does not fit the client's need, even if it is customized), the client does not have and does not need to have any leverage on the company.

Competition

Leroy Merlin's competition is divided between:

- The pure players (Amazon, Cdiscount, Alibaba, etc.)
- The classical actors (Kingfisher with Castorama, Mr. Bricolage, Bricomarché, the general retailers like Auchan, Carrefour, Leclerc, etc.)

One of the strongest weapon of Leroy Merlin is its capacity to deliver a good level of services (cf. https://www.lsa-conso.fr/leroy-merlin-fait-la-difference-par-les-services, 288391) and a really large offer. Also, there is not any specific barrier that could have a negative impact. The only aspect that remains important is certainly the war of prices between those actors.

Supplier

Leroy Merlin finds its sources as well in Asia or Europe to find the products they think will best meet their customer's needs. Despite the fact of being a strong actor on the international market, they must put up with big suppliers for who they are a very small part of their businesses. They represent the most difficult wheel to move into the direction of the company. But they monitor more and more the performances of their suppliers and are ready to give sanctions, even end a contract, if the quality of services does not match the expectations.

Substitution products

It does not exist for the moment.

New entrants

ManoMano, a brand of the company Colibri, came on the market in 2013 with an offer exclusively on-line. Since then, it constantly grows in terms of turnover and market shares, reason why Leroy Merlin takes it very seriously and multiply its efforts.

2.8.3 PESTEL

Political

The French government fixes the VAT and its variation, the number of work hours per week and regulates the laws of work. Beside from this aspect, the political analysis does not require a further analysis.

Economical

Like every other market, the home improvement one was impacted by the various economic crisis and the buying power's decrease of its consumers. But something makes it unique: its direct link with the real estate business. In fact, when people do a real estate acquisition, it often comes with modifications of it, especially when the good bought is old or is needing a rehabilitation.

Social

The economical aspect has an influence on the social one. Indeed, a lack of purchasing power lead people to privilege the Do-it-yourself rather than spending a high amount of money on a specialist manual worker.

Also, people seem to appreciate and invest more and more into the personalization of their house. People do not want a place to live, they want a home.

The ecology has become a priority subject from a public point of view and as mentioned in the precedent section. Inhabitants, all around the World and especially in France, have the desire to make a change.

Technological

The development of the Web as a digital place to buy has had an impact on the sales of the physical places. It has two big advantages:

- It gives the consumer the ability to buy whatever, whenever, in whichever quantity required;
- It gives the consumer the ability to reach a large amount of information on the product.

Despite that, consumers seem to keep a large interest for the physical point of sales because of the expertise that can be found with the salesman. For a third, it is the main reason to go to the store.

Environmental

France is willing to place the Environment at the heart of its every action. A few measures have been put in place to show this engagement, like:

An exoneration on the property tax up to 10.000 € if work renovation with the aim to reduce the energetic impact (like for example, isolation work) are carried out;

The CITE (Crédit d'Impôt à la Transition Energétique or Tax Rebate for Energetic Sustainability) which allow a tax rebate of thirty percent of the total amount of the work, with a ceiling set at 8.000 € for a person alone and 16.000 € for a couple with an additional 400 € for every additional person.

Beyond the fiscal and financial advantages, it is also linked with the desire to make some economies on the energetic bill. All those aspects are a real opportunity for the home improvement stores.

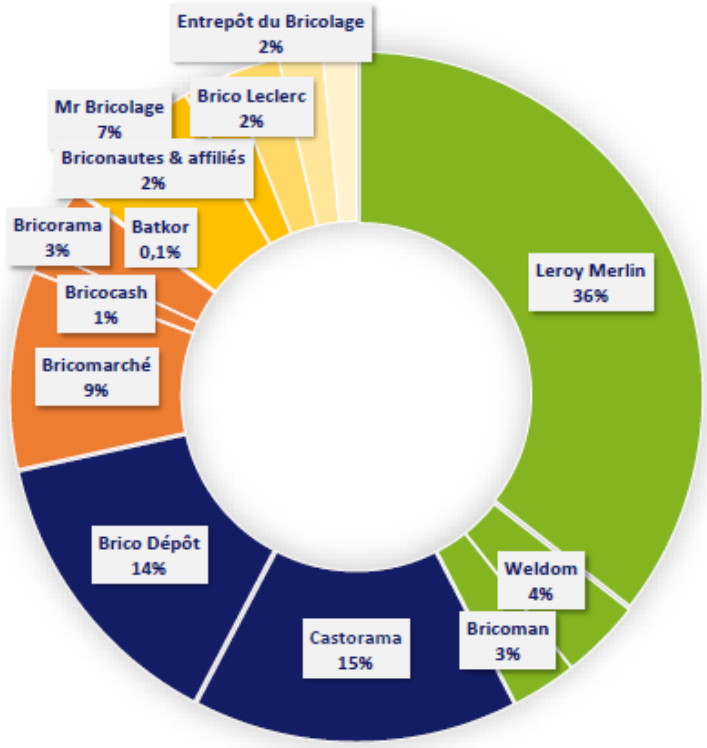
Legal

One of the biggest and most recent impact from a legal point of view in France, was the authorization for stores to open the Sunday, consequence of a longue and laborious fight of the various companies to obtain it.

December the 30th, 2013 the **decree 2013-1306** of the state counsel places the home improvement market segment into the category of establishments authorized to work on a Sunday, respecting the legal dispositions written in the article L312-12 of the labor legislation. Despite a rising opposition and protestation from the various French work syndicates (like the Force Ouvrière, the Confédération Générale du Travail, etc.), the decree is suspended before being confirmed and applied April the 10th, 2014.

2.8.4 Market Analysis

French Home Improvement market shares in % of the turnover in 2018



The website https://www.observatoiredelafranchise.fr/ indicates us that the Home Improvement market shows a resilience in a blurred context. Despite the «Gilets Jaunes» event who has been impacting drastically the traffic of stores located in the periphery of big cities and a limited number of authorizations for new building sites, the market still benefits from the large amount of transactions regarding old buildings. The direct consequence is a need for restoration or improvement. This manifest itself as a growth of 1,9% in 2019.

The GSB (Grandes Surfaces de Bricolage, French for Home Improvement Stores) represent 76% of the market with a turnover of 19 billion euros. The negotiation companies, which mix B2B and B2C, have 15% which is about 3,9 billion euros. Finally, the e-commerce shows its dynamism with 4% of market shares taken by the pure players and a turnover of 1 billion euros with a progress of 18%.

The ADEO Group detains 43%, followed by Kingfisher with 29%, Bricomarché with 9% and Mr Bricolage with 7%.

3 Application of the Theory

Considering that the Picking and the Supply Chain are the two main themes of this thesis, I relied mostly onto my “Logistics’ Programming” lesson.

We have already defined the notions of Picking and Supply Chain in the introduction. We can now focus on how they theoretically interact.

3.1 Stock Management

In theory, a company can handle various type of products in its warehouses like:

- Raw materials;
- Items;
- In-process goods;
- Finished goods.

Companies like Leroy Merlin detain the last one because they operate as “buyer/seller”. This implies that the company takes a lot of risks when stocking those products. In fact, the finished goods have reached their highest economic value: they do not need to be modified or altered to serve their purpose in the easiest and most effective way in order to satisfy the client. They follow a “look back” logic (the company tries to build the same level of stocks it had, based on the past selling data, so it can answer the demand while being able to respond to a sudden increase or decrease of it.), largely used by the large retail companies because it follows the market demand and not the single consumer demand.

3.2 The Stock

3.2.1 Definition

The stock can be defined as a group of products or resources used by a company.

In more precise terms, a production stock is the group of products that allows the company to create or form an output (raw materials, items, in-processed goods & finished goods).

A stock can be considered as the direct consequence of the difference between the demand and the offer. So, when a company "matches" the demand, its stocks will decrease, even disappear.

3.2.2 Purpose

The stock is used:

- To guarantee an independence between the various phases;
- To be able to answer the variation of the demand;
- To guarantee some flexibility to the productive activities;
- To face the variation of the delivery time of the raw materials;
- To benefit from the optimal dimensions (we are referring to product quantity) when the supplying order is made.

Concerning Leroy Merlin, the stock is used to be able to supply the stores of all the French territory and to reduce the acquisition cost.

3.2.3 Typology of stocks

The stocks can "live" differently. That is why they are different sorts:

- Cycle stock – large batch of products are received at a low frequency, so the fulfillment of the warehouse is synchronized with the demand which has a high frequency rate with small quantities;

- Safety stock – used to compensate the uncertainty of the demand and the offer which can be impacted by supply delays, a sudden rise of the demand or some mechanics failures for example;
- Seasonal stock – used for products that are sold only during a specific part of the year. A stock can be created during the low demand season so the high demand season can be satisfied;
- Pipeline stock – used to fragment, at least partially, the stages of a production or distribution system (for example: when they are geographically separated).

Leroy Merlin uses all those typologies of stocks except for the pipeline stock which is more oriented towards the companies that produces goods.

3.2.4 Costs of the stock

Having a stock implies costs to manage it, such as:

- Holding or carrying cost – the racks, the insurance of the facility, the employees' salaries, taxation, the deterioration of the products and their obsolescence, etc.;
- Set-up cost – is referring to the cost to pass from a way to product a specific product, to another way to product another product. **This cost does not concern Leroy Merlin**;
- Ordering cost – the administrative activities to create and serve the order but also to search and find the right suppliers and to maintain the order tracking system functional;
- Purchase cost – multiplication of the quantity of products bought by the price of a single unit. The only interesting aspect about it, is if it variates depending on the quantity ordered;
- Stock-out or shortage cost – economic representation of the damages done by a period when the stock was empty and unable to answer the demand. It can be a loss of clients, penalties for an order not honored in time, degradation of the brand image, etc.

3.3 Definition of picking

We want to remind the reader that:

- The picking is a breaking down or decomposition operation, of the SKU (Stock-Keeping Unit) in order to create gathering of diverse materials, intended for the satisfaction of a delivery order or a work order.
- Therefore, a partial withdrawal of the materials presents in a “source SKU” is performed and the material collected is divided into one or more “destination SKU”.
- The destination can be internal to the factory for work orders (kitting) or external for orders intended for shipping to customers (picking).
- The type of picking that will be considered through the example of Leroy Merlin is a classic picking, with only exception that the stores are the client.

3.4 Field of application

The fields of application of the picking operations are countless. However, certain conditions must be guaranteed for the execution of operations:

- packages or materials must be rigid;
- the materials must be easily counted;
- packages or materials (with the exception of small parts) must be individually identifiable or traceable;
- the weight and dimensions of the packages or materials must remain within the limits of movability prescribed by the standards ergonomics;
- the withdrawal must not be subjected to excessive operations of unpacking or repackaging due to the presence of packaging layers.

Regarding those specifications, the reality shows that practical and economic reasons do not necessarily follow them. In fact, when the product creates a real issue in the

stores, you can decide to modify its outer despite its oversized or undersized dimensions. It is the case with some of the products we will talk about in the next sections of this thesis.

3.5 Technics of picking

The picking of each type of material can be done by individual orders or lots of orders:

1. Order Picking: The mission of individual operators consists in the execution of a complete order or a fraction of order (it is enough to forward the materials which make up the various orders for the final package).
2. Batch Picking: The operator will pick all the products that compose a batch of orders at once. This includes a preparation phase called "sorting". It is a process that distributes the products that have been picked, based on their destinations. It can be done:
    - Manually[1] – the operator sorts out the products into motionless areas. Those areas are only allocated to one client or order;
    - Automatically[2] - the products that has been picked are placing on a conveyor belt that automatically dispatches the products into the right station, every station being associated with only one client or order;
    - Contextually to the withdrawal[3] – it is a picking where the products are putted into containers differentiated by client or order. The containers are on the contrary, on the same trolley.

This allows the operators to identify a specific area containing all the products required so, multiples orders can be done at once.

[1] Picture 1 of the appendices.
[2] Picture 2 of the appendices.
[3] Picture 3 of the appendices.

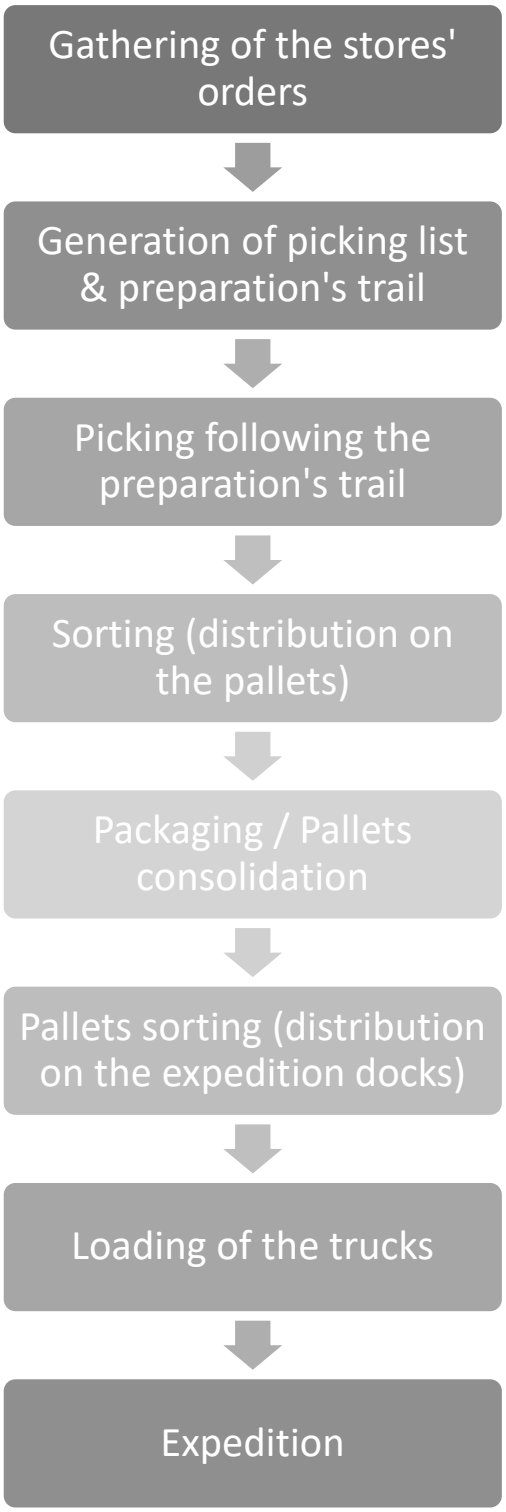
Leroy Merlin has decided to use the batch picking technic in its warehouses. Indeed, the warehouses have determined "preparation's trail" (a path through the warehouse's shelves designed to make the picking of the products follow a coherent course that reduces the wasteful movements and makes the products fits on the destination support – *which is usually a pallet*) allowing the creation of multiples orders at the same time.

3.6 Phases of the picking activity

The picking activity is not just taking a product out of its storage unit. It is composed of the following steps:

- Information management – the gathering of all the information needed (number of products, location of the products, destination, etc.) to do right. The time taken to do this step is largely reduced by the development of the informatic technology;
- Preparation's movements – the research for the right mean of transportation regarding the products to pick;
- Picking – the movement to reach the picking location, the positioning, the picking & the movement to place the product into the tool chosen;
- Sorting;
- Grouping;
- Packaging;
- Expedition.

Regarding Leroy Merlin, it could be summarized with the following SmartArt:



3.7 The time reduction of the picking phases

The picking is considered as a “non-added value activity” (an activity that does not create or add any value to the product or to the client’s use of the product). It is therefore important to reduce the amount of time allocated to this activity to spend it on more crucial activities. The parameters to take into account to do this are:

- The layout of the warehouse;
- The management of the orders;
- The preparation’s path;
- The physic location of the product;
- The handling means available.

Leroy Merlin has organized its warehouses following the basic principles of logistics: grouping products by their dimensions and classification, then, by their level of rotation. Regarding the management of the orders, the operators have at their disposal an electronic device, which is a mix between a calculator and a smartphone.

This device guides them through the warehouse and attributes them missions (term referring to the operational activities of the warehouse such as sorting, stocking, picking, shipping, etc.) they must complete. Thanks to it, they know how many products are composing the order and where to find them following the most optimized route possible. This route uses the preparation path that has been designed by the Area Managers (person in charge of a segment of the warehouse and the activity that happens into it). The operators can use diverse means to make the product navigate through the facility, but we will see them in the next point.

3.8 Modes of picking

There are basically two options to organize your picking:

- Operator to material – the operator must move toward the stockage unit of the product;
- Material to operator - picking carried out off the shelves, in special stations where the materials to be picked are temporarily deposited.

Like a lot of mass-market retailing companies, Leroy Merlin has chosen to implement the operator to material strategy. It follows what the theory says:

- Storage systems
    - Pallet racking[4] (like the website http://www.mhi.org indicates us, *"Pallet racking is a single or multi-level storage system that is utilized to support high stacking of single items or palletized loads. They are a fundamental component of any distribution, storage, or material handling operation. They allow rapid access to stored materials and maximize facility space while simplifying inventory requirements.")* for large and small SKUs;
    - Gravity shelving[5] (shelves slightly inclined so the product can move toward the edge of the shelve and the operator, when the product in front of it is picked. Thus, the operator does not struggle to pick the product.) for large and small SKUs.
- Handling systems
    - Pallet trucks[6] (the website www.safetyliftingear.com defines it as *"a wheeled trolley designed to lift and transport pallets. The truck's tapered forks slot underneath the pallet and the pump handle can then be used to raise and lower the load"*. It is slower than walking because the operator must manipulate it too);

[4] Picture 4 of the appendices.
[5] Picture 5 of the appendices.
[6] Picture 6 of the appendices.

- Trolleys with platform and man on board[7] (trolley with a driving system and a platform that allows the operator to step on it while it moves).
- Stacker[8] (the website defines it *"as machine that combines features of a walkie or walk-behind pallet jack with features of a lift truck where an operator would typically sit or stand while driving like a counterbalanced, reach or straddle lift truck"*).
- The conveyor belt[9] (the website www.dictionary.cambridge.org defines it as *"a continuous moving strip or surface that is used for transporting objects from one place to another"*).
- The vertical electronic order picker[10] (a machine that with an elevating platform that allows the operator to navigate through the warehouse and to reach products which storage units are placed on the higher levels of the pallet racks).

All those tools are used by the Leroy Merlin's warehouses. It confers them a high flexibility depending on how the way they want to move around the facility and the way they want to pick the products.

Regarding the vertical electronic order picker, Leroy Merlin has adopted an even technologized solution: they are placed between two pallet racks and follow a laser line disposed all along the length of the racks. The negative aspects of this technology are that the vertical electronic order picker is "stuck" in one area and that only one operator can use it at a time, but the positive ones are:

- A gain of space – because the space between the racks just ha to be the width of the order picker plus a security marge on both sides. The alleys are smaller, therefore, you can add more pallet racks in the same area;

[7] Picture 7 of the appendices.
[8] Picture 8 of the appendices.
[9] Picture 9 of the appendices.
[10] Picture 10 of the appendices.

- An increase of the operator's safety – the machine's features were conceived to guarantee it when he is in the elevating platform. Also, the fact that he is the only one on the alley during the time of the operation prevents any risk of getting slowdown, hurt or distracted by the work of a colleague;
- An increase of the product's safety – in this case, the operator comes to the product and handle it himself, not through the couple "forks of the machine + pallet".

3.9 Typology of picking routes

When the operator navigates through the pallet racks, he can adopt one of the following types of picking routes:

- Transversal[11] - straight flows through narrow lanes. It is also called the S-Shape routing strategy which is, according to the website www.erim.eur.nl, *"a route in which the aisles, that are to be visited, are totally traversed. Aisles where nothing has to be picked are skipped. Thus, aisles are visited in the shape of an S. The picker thus enters an aisle from one end and leaves the aisle from the other end, starting at the left side of the warehouse. After picking the last item, the order picker returns to the front end of the aisle."*
- Return[12] - U flows in wide lanes;
- Midpoint[13] - an about-turn flow. It goes down to the middle of the lane then turns back to get out from where it went in;
- Largest gap[14] - according to the website www.erim.eur.nl, *"In the Largest Gap strategy a picker enters an aisle as far as the largest gap within an aisle. A gap represents the distance between any two adjacent picks, between the first pick and the front aisle, or between the last pick and the back aisle. The largest gap is*

[11] Picture 11 of the appendices.
[12] Picture 12 of the appendices.
[13] Picture 13 of the appendices.
[14] Picture 14 of the appendices.

the part of the aisle that is not visited by the order picker. If the largest gap is between two adjacent picks, the picker performs a return route from both ends of the aisle. Otherwise, a return route from either the front or back aisle is used. The largest gap within an aisle is therefore the portion of the aisle that the picker does not traverse. The back aisle can only be accessed through either the first or last aisle. The Largest Gap heuristic is especially useful when the additional time to change aisles is short and the number of picks per aisle is low."

All those technics are used by Leroy Merlin trough the software that generates the preparation paths.

4 The Mission's Purpose

4.1 The Context

As seen before, Leroy Merlin takes advantage of a comfortable position at the top of the French Home Improvement market. Nevertheless, new actors like ManoMano, the rise of the pure players and the constant threat of its competitors do not allow the leader to rest.

In addition to that, a new dimension of the company has been making its way toward the very discussions of the leading teams of companies all around the world. Indeed, companies have passed by a few different eras in the market shares war:

The war on the offer that pushed the actors to widen their catalogs in order to set a qualitative and complete offer to their clients;

The war on prices that made them challenge their suppliers, their buying conditions and how much they should impact their margin to meet their customer's expectations about how much they were willing to spend;

And finally, today, it is the war on availability that drives them all and with it, the rising of the Supply Chain as a real and fundamental economic leverage both in terms of money spent to make the entire system work, and money earned by the product's availability.

Leroy Merlin France is an ambitious company that not only wants to dominate its market, but also to offer a qualitative service to its clients and a safe and handy work environment to its collaborators. This last point, combined with an economic point of view, lead the company to think about how to solve major issues that create a discomfort in the daily life of its employees, without impacting to much its margin.

In fact, one of the big lessons that the Supply Chain teaches us, is that efficient processes:

- Make your product more available;
- Make your product less likely to sustain damages or breaks (make the product detention safer);
- Make your transport network faster and safer;
- Make your employees' work less stressful and harmful;
- Make your employees more productive;
- **In conclusion: reduce your costs.**

Considering that not everything can be resolved by negotiating with the suppliers to lower the acquisition prices or rising the selling prices (which would drive the customers away) it appeared necessary for the company to carry out an internal analysis which would allow the reduction of the different costs involved.

4.2 The Objective

In order to carry out those analysis, Leroy Merlin has decided to create various transversal teams called *"Team Booster"*.

Their purpose is to work with the *"Team Market"* on subjects that were not taken into account or not dealt with because of a lack of time or knowledge from the diverse members of the Team Market.

Therefore, 4 teams were created:

1. Team Upstream – Marketing, to make the product available even faster;
2. Team Upstream – Supplier Flow, to analyze the suppliers' performances, to find new leverages for the negotiations, to sanction in case of bad or poor-quality deliveries, etc.;
3. Team Web, to unsure the products' availability on the various order's channels and to monitor the delivery promise;
4. Team Catalog's Performance (which I was a part of).

The Team Catalog's Performance mission was to ensure that the catalog delivered:

- Was answering the customer's need;
- Was coherent;
- Had the best delivery conditions from both the financial and practical point of view.

The method chosen to work on those subjects was an agile method shaped under the form of five workshops:

- The first - to make an update of the current market situation;
- The second - to present the different levers that could be used to optimize the processes and the costs, and give all the explanations needed by the team that does not necessarily have a Supply Chain or an Organizational background or knowledge;
- The third - to see what results were obtained, bring correctional actions and identified other ways to proceed if needed;
- The fourth - to implement in a more solid manner the strategy chosen;
- The fifth - to acknowledge the results obtained and make a synthesis of the efficiency of the processes chosen to see if it was adapted to the market, and if it must be used again.

The different levers the team has identified were:

- The minimum order quantity asked by the supplier;
- The merchandising – the capacity and the dimensions of the space dedicated;
- The acquisition price;
- The selling price;
- The catalog;
- The recommendation regarding the implementation (self-service, shelves, etc.)
- The outer.

4.3 My working area

My mission was centralized around the outer because the biggest irritation source that has been identified was the inadequacy between the outer chosen and the store's capacity to display the product. The direct consequences were:

- An overflowed selling area;
- The need to bring back in the stock the extra products;
- A waste of time to bring the products back to the stock and then back in the selling area again;
- A reduction of the storage space dedicated to other products that cannot be displayed in the self-serving area because of their dimensions, dangerousness, etc.;
- A potential economic risk when considering that the product, when put in the stock area, can be damaged, lost, stolen or become obsolete;
- An economic loss because of the time invested by the store's team to perform this task which has not any added value and because of the "visual out of stock effect" (to be out of stock means that the stock dedicated to a product is empty. The visual out of stock effect is a set of terms I use to explain the following situation: the shelves are empty while the stocking area is not. That means the client will think the product is not available anymore although the store still has the product.)

The strategy chosen to treat this problem was to build an **Excel file**, feed by diverse sources of information (characteristics of the product; Supply Key Performances Indicators; Selling Key Performances Indicators; Logistics Identification; etc.) in order to obtain the costs generated by the modification of the outer.

My work was therefore characterized by the following missions:

- To consolidate the Excel file with updated data & formulas;

- To ensure the level of confidence of the data used by comparing the results obtained by different sources and determine which one was the most accurate, so useful;
- To build new data requests on an SAP software called BOARD (Business Object V4.1);
- To generate an Excel file by market universe, sorting the products depending on the utility of the analysis regarding a potential economic and logistic advantage. Therefore, I had to determine the following filters to decide whether or not, a product should be analyzed:
    - **What was its current outer?** If the outer was already at one, an analysis would only generate a loss of time;
    - **How many sells on the last 12 months does the product have?** If superior to twenty thousand, it would only bring a delirious amount of work in the warehouse without changing anything in the store because the product is often asked and can satisfy this demand with a regular procurement;
    - **Was the product supposed to be stopped before 2020?** We decided that there was no need to make an investment on a product that was going to not appeared anymore on the Leroy Merlin's catalog;
    - **Is the product's range concerned by this project?** Leroy Merlin has various ranges to characterize its products, depending if it must be in every store, or only big stores, if it is a display model, a product intended for sales period only, etc.;
    - **Was the product detained in the warehouses concerned by the project?** In fact, the project was focused on the "classic warehouses", preventing an action on the "web warehouse" or the warehouses of partners.
- Once the file generated, to make a selection of a combination of products:
    - Some which were causing an overstocking problem;
    - Some which did not present an overstocking problem, but which would generate revenue if delivered by one. They were chosen in order to

counterbalance the investment made on the products evoked at the precedent point. That was the **economic selection**;

In order to obtain a list which guaranteed both a minimal negative economic impact (or even a positive one) and the reduction of the overstocking problem faced by the stores;

- Then, I was supposed to present the lists to the Supply Planner of each market so it could tell me if some products would present a safety risk for the people or for themselves if delivered by the unit. That was the **qualitative selection**;
- Finally, the lists were presented to the Logistics & Transport, and Supply Chain Directors so they could give their approval.

4.4 The impact expected

What we were seeking to achieve, was a drastic reduction of the overstocking problem in order to allow the store's team to focus on their main mission: to serve the client with the right piece of advises, a right and qualitative product for its need, in the right quantity when he needs it.

Consequently, we were expecting:

- The modification of the outer of 3.000 products before 2020;
- The near annihilation of the overstocking problem, with:
    - A decrease of the stock value;
    - A rise of the stock rotation;
    - A reduction of the wasteful activities;
    - An increase of the selling dedicated time to optimize the turnover;
    - A reduction of the visual out of stock effect;
    - Better work conditions for the store's collaborators;
    - And of course, an increase of our turnover.

The balance we had to keep at the cost level can be summarized with the following illustration:

5 The Strategy & Tool used

5.1 The actors' synchronization

A big aspect of this project was to make every single department, involved or touched by the decisions we were making, goes toward the same goal despite being animated by very different objectives.

In fact, a big part of the supply chain & the company was involved:

- The clients because, after all, they were the ones we were trying to satisfy;
- The stores as they are our direct interface with the clients, and the very core of every for-profit organization. Considering that, it seems obvious to give them the best working conditions possible;
- The warehouses which have seen a rise of their working charges as there is a big difference in terms of effort between delivering a pack of 24 products and delivering one pack of 10 products, another of 8 and a last of 6. The thinking behind how to integrate those products into the pallet in a way they do not break or fall or get altered, while maintaining the stability and the coherence of the pallet cannot be neglected too;
- The headquarter and the following departments:
    - The Logistic & Transport Department
    - The Market Teams
    - The Financial Department

5.2 The Excel File

As said before, the tool chosen to carry out this analysis was Excel because of its flexibility and its large range of action. Indeed, it has the capacity to gather information from different sources and exploit them using simple formulas and display.

The file that I worked on was composed of five different sections:

1. The product's characteristics[15];
2. The outer's impact from the KPI's point of view[16];
3. A "Real" economic impact based on the costs generated in the warehouses[17];
4. A "Theoretical" economic impact based on the cost generated by the fact to pick the product by the unit (this approach considers that the logistician goes back to its starting point every time he picks a product, when in reality he can pick up more products at the same time – so it is a "Worst Case Scenario" approach)[18];
5. A criteria board that allowed me to determine which products should be picked at the unit[19].

5.3 The Other Tools

5.3.1 PEGAS

PEGAS is a pretty basic software. Its main function is to allow the Demand & Supply Planners to manage the financial, the physical and the digital parts of the warehouses.

It gives the possibility to modify the outer to see the potential future price[20]. Once the modification done, the system integrates the information and applies it. Therefore, the person who carry out this mission must be really careful when manipulating the data, because he or she can easily harm irreparably an entire chain of order. The second point of vigilance that this software presents is the fact that it is not possible to make massive changes: every new data must be entered manually, one at a time.

That is why the Excel File was created, in order to carry out these simulations at a bigger scale.

[15] Picture 15 of the appendices.
[16] Picture 16 of the appendices.
[17] Picture 17 of the appendices.
[18] Picture 18 of the appendices.
[19] Picture 19 of the appendices.
[20] Picture 20 of the appendices.

5.3.2 PYXIS

Pyxis[21] is a software which gives access to product's data. The main use it has, it to allow the person to find an information that was missing on the main database. Thanks to it, I could bring this missing information and carry out the calculation to obtain the profitability of the reference I was analyzing.

5.3.3 BOARD

BOARD[22] is an SAP software which gives the ability to generate personalized reports. I mean that you can chose various information regarding the product (for example: number, denomination, warehouse, supplier, market team, etc.) and obtain them under the form of a CSV file that you can then transform in Excel file if you need to exploit it.

5.3.4 QLIKVIEW

QlikView[23] is a Business Intelligence and Data Visualization software from the company QlikTech. It is a digital tool that allows the users to consult data from various support (computer, smartphone, etc.), through selections and researches, visual management, and many other functionalities. Leroy Merlin basically uses it as a generator of specific information based on selling data from the different stores.

5.3.5 STEP

The file STEP[24] is a logistic data base that gives product's information from the physical characteristics point of view. It helped us determine if the product's dimension could prevent us from shipping it by the unit. If a product presented dimensions that were considered too small, making it too "weak" to be packed with bigger and heavier

[21] Picture 21 of the appendices.
[22] Picture 22 of the appendices.
[23] Picture 23, 24 & 25 of the appendices.
[24] Picture 26 of the appendices.

products, it would receive a “malus”. This malus would not exclude it from being selected but would put in light the fact that it was necessary to find a way to secure it (for example: creating a box of small/fragile products that we would fil with bubble wrap or putting it into small plastic bags).

5.3.6 LARTEN

The LARTEN[25] like the file STEP, is a logistic data base that gives some product information but this time, from the storage location point of view (in which warehouses is it stocked, etc.). It helped us regarding the visits that we planned for Phase 2[26], giving us the product’s distribution through the warehouse’s network.

5.4 Phase 1

Regarding Phase 1, the idea at first, was to carry out the analysis on a list of a thousand products chosen by the precedent intern who worked on the subject. Considering that the company wanted to act on three thousand products by the end of the year, I figured out that I would make us lose time to focus only on those thousand products. So, I submitted the idea to carry out the analysis directly on the thirteen product’s classification:

1. Material
2. Woodwork
3. Electricity & Plumbing
4. Tools
5. Kitchen Storage
6. Floor & Wall Tile
7. Sanitary Plumbing
8. Comfort & Renewable Energies

[25] Picture 27 of the appendices.
[26] Cf. 5.5 Phase 2

9. Gardening
10. Ironmonger's
11. Painting
12. Decorating
13. Lighting

Therefore, we could easily find a way to make as much products as possible deliverable by one, while reducing the economic impact on the market team's "account".

The economic rule that was chosen to minor as much as possible the economic impact was to not exceed a loss of **0,1% of the margin/turnover ratio**.

This considered, two different ways to predict what was going to happen were determined:

- The first one was the most realistic. It took away the money spend on the warehouses additional working hours generated by the unitary picking from the gains obtained by the reduction of the stock, the availability of the product and the reduction of the time spent on dealing with overstock.
- The second one was the Worst-Case Scenario. It was based on the fact that the warehouse's employees would only do unitary picking no matter what the size of the order they received. Let's clarify the situation with an example:
  If a store would send an order of seven pieces of a certain product, the algorithm considers that the warehouse's employee will make seven roundtrips because he will take only one product at a time. While, in reality, he will take the seven pieces at the same time (if their dimensions allow him to do so) and make only one roundtrip.

The Leroy Merlin's database is composed of around 371.000 products because it centralized the catalogs of the other companies of the ADEO group.

Around 206.000 products are available in the warehouse's database. Obviously, not all of them are saleable and/or available for unitary picking. It was therefore necessary to define some filters to help us focus on a doable list. We decided to remove products:

- Exclusively distributed by the e-commerce warehouse and by the Weldom warehouse;
- That were going to be stopped before 2020;
- Not part of the main ranges of Leroy Merlin (A, B, C, D and N. The others were like E for Expo, P for Promotion, etc.);
- With outer already at one.

As a consequence, remain only 31.634 products that can undergo the analysis.

One thing that we did not expect was the fact that some products which has been created or reintegrated recently into the Leroy Merlin databases would not be analyzable because of the delay of the data's integration into the system. Adding the fact that we decided to cancel the products with a selling quantity on the last twelve months superior to twenty thousand units (it would be unproductive to serve by one a product which is asked a lot by the client), it reduced again our range of action to those numbers:

1. Material: 56
2. Woodwork: 70
3. Electricity & Plumbing: 306
4. Tools: 173
5. Kitchen Storage: 233
6. Floor & Wall Tile: 342
7. Sanitary Plumbing: 516
8. Comfort & Renewable Energies: 24
9. Gardening: 208
10. Ironmonger's: 323
11. Painting: 73
12. Decorating: 358
13. Lighting: 412

Total: 3.094 products

3.094 products potentially deliverable by one, without conducting the economic analysis. It made us understand how far we were from reaching our objective.

Still, I carried out the economic and the qualitative analysis on the 13 product's classification and I obtained those results:

Class	N° of Ref.	N° of Problematic Ref.	Turnover	Margin	Margin/ Turnover	Expected Impact On Team Market's Margin	Margin/ Turnover Expected	Worst Case Impact On Team Market's Margin	Margin/ Turnover Worst Case	Warehouses Additional Working Hours
1	4	2	57 540 479 €	11 208 943 €	19.5%	585 €	19.5%	-1 226 €	19.5%	6
3	17	14	287 812 530 €	80 699 953 €	28.0%	7 732 €	28.0%	-31 219 €	28.0%	125
4	92	67	377 283 522 €	98 841 803 €	26.2%	13 420 €	26.2%	-100 151 €	26.2%	1030
5	22	10	156 657 415 €	42 763 794 €	27.3%	1 477 €	27.3%	-40 472 €	27.3%	156
6	26	12	162 352 873 €	85 571 751 €	52.7%	11 125 €	52.7%	-9 510 €	52.7%	83
7	20	15	59 301 003 €	27 072 741 €	45.7%	308 €	45.7%	-21 706 €	45.6%	203
8	1	1	4 583 704 €	1 247 316 €	27.2%	1 415 €	27.2%	-1 002 €	27.2%	5
9	80	59	438 834 894 €	61 066 547 €	13.9%	14 392 €	13.9%	-56 792 €	13.9%	309
10	78	63	157 077 704 €	59 912 896 €	38.1%	5 034 €	38.1%	-66 578 €	38.1%	449
11	9	7	110 302 178 €	56 408 670 €	51.1%	6 616 €	51.1%	-12 873 €	51.1%	48
12	36	32	162 965 651 €	66 019 221 €	40.5%	3 037 €	40.5%	-33 886 €	40.5%	265
13	57	34	311 491 787 €	129 459 386 €	41.6%	-5 811 €	41.6%	-59 865 €	41.5%	677
Total	442	316	2 286 203 740 €	720 273 021 €	31.5%	59 329 €	31.5%	-435 281 €	31.5%	3357

As we can see, the range of action was even smaller than we thought. Indeed, modifying an outer costs a lot and not many products were presenting a positive impact at the financial level, even though they were canceling the overstock problem.

We had 442 products eligible, with 316 of them that presented an overstock problem. This would have added 3.357 work hours in the warehouses (which is the time of 1,84 employees for a year, so basically, it would have required the hiring of two workers).

With a potential loss of 435.000 €, we were staying under the variation of 0,1% of the margin/turnover ratio. The positive side was the potential gain of 60.000 € that we could

theoretically easily reach. This was an encouraging start, but the reality often prevents what we are seeking to achieve, to happen.

Indeed, Leroy Merlin have been performing really well in 2019 and it had a direct impact on the warehouses: the activity level was booming. The example of the Valence warehouse speaks volume: it has known a rise of activity up to 150%. Consequently, the Logistic Board took the decision to reduce again the list to make it compatible with this particular context. At the end, only 182 products were granted the “deliverable by one” option. It was time to think about a new angle of attack.

5.5 Phase 2

After we saw the limits of the “deliverable by one” strategy, we decided to find another way to deal with our overstocking problem.

We thought that the best compromise was to find if a smaller outer was available inside the actual outer. For example, if an outer of 8, was composed of 4 smaller outers of 2.

This would allow us to reduce the number of actions induced by the unitary picking (and the time and costs related to those actions) and deliver the stores in more convenient and flexible way than the standard one.

Consequently, we started to look for a database that would tell us if a smaller outer would exist. The search was infructuous, this information was not available anywhere.

The only possible way to determine if they existed was to go to the different warehouses and open, products after products, the boxes to see if they were containing other boxes or the products directly.

The Leroy Merlin’s warehouses being dispatched all over the French territory, we decided to start with the two located near the headquarters, at the frontier between the Nord and the Pas-de-Calais.

After defining a list of approximately 300 products to analyze, I was sent to carry out this mission. The game was not worth the candle …

On those 300 products, less than 10 were presenting a smaller outer. There was not anything we could do at a high scale.

It seemed like it was not the right time to do it. For the moment, may be the best way to have an impact regarding this issue, was just to talk about it. So, my manager decided an internal communication about the lack of synchronization between our merchandising and our way of supplying ourselves, was probably the more accurate choice. Her idea was to make a film about it, making the store's employees the storytellers. If someone who faces an issue in his/her daily life talks about it, the impact is greater than if it was someone who just try to fix it.

Therefore, I passed a day in the store of the city of Lesquin, where:

- I filmed the different actions that were caused by the issue;
- I gathered the testimony of two employees through a questionnaire[27] (a member of the logistic team and a salesman) who efficiently described the trouble they were dealing with.

Then, I tried to do my best to create a 3:51 min video to give them a platform where they could be heard.

Our final goal was to make the employees who work in the headquarters understand:

- The importance of this subject;
- The relief it would be for the stores' team if it was dealt with;
- The power of action they have;
- The good it would do for the all Supply Chain & the company;
- The economic gain they could make if they took the matter into their own hands;
- Therefore, integrates those aspects inside the negotiation with the suppliers to make it become one of the principal things to discuss during those annual meetings.

[27] You can find the French and the English version in the appendices.

Unfortunately for me, the video was first introduced on my last day, so I did not have the opportunity to see an eventual change in people's mind regarding this subject.

6 The Results

After acknowledging the fact that it would be very difficult to change the outer of a product through an intern process implemented on the warehouses, it first seemed obvious that the strategy used on this project could not allow the company to deal with the overstocking problem in a perennial way.

In terms of results, we did not have the chance to see any changes or real impact of what we had done. The reason for this lack of feedback was the too short amount of time between the moment we decided to give it a go, and the end of my internship.

But thanks to my internship supervisor, Madam Anne CHALLOUATTE, I had the chance to get some numerical results afterward: and they were clearly showing that our first strategy was not that bad after all.

We had a vision on both the 2018 and 2019 numbers on 176 products, which is why the results are not presented on the 182 originals.

We can see that:

- 58% of the products chosen, have seen their overstocking problem reduced. It has drastically reduced the visual out of stock effect which has generated more turnover and an increase of the margin by 70.000€;
- 66% of the products have seen their stock rotation in the stores progress, which generates a saving of 28.000€ of financial expenses regarding the stock;
- The impact regarding the warehouses' stocks is also very positive. The reduction of the outer represents a saving of 53.000€;
- The use rate of the double delivery service (allows a store to make orders and to be supplied two times a week while it was only once a week before. This was implemented to serve the stores better according to their needs in order, once again, to reduce their stocks, to make the product more available, etc.) has increased from 8% to 19%;

- The cost sustained by the warehouses because of this policy is about 57.000€.

Therefore, the net balance sheet is about 94.000€ of a combination of savings and revenue which represents 530€ of financial gain by product. This is a complete success when we think of the 60.000€ we talked about in the section *5.4 Phase 1*, that were considered as maximum gain possible. This is coherent with the first test that has been made a year ago, where the first results were observed six months after the modification of the outers.

What we can learn from those results is that a picking strategy, regarding large retail goods, can be profitable for the company. It is not necessarily a suicide mission to try to let your stores decide what exact quantity they need to be as efficient and economically performant as possible.

In fact, most of the companies already unconsciously does it when their stores' stocks and their web's stocks are mutualized: the internet client will always ask a product by the unit, so if a company is able to do it for one client, it can theoretically do it for all its stores. Furthermore, this solution gives the possibility to easily stop the test and come back to the way things were dealt with before, by just cancelling informatically the choice "can be picked by one". The only things that remains to decide, are:

- The amount of product the company wants to try it on. This selection must be done through an equivalent analysis as the one we studied in this example;
- But most importantly, the human and financial capitals it is ready to invest to have the resources necessary so the process can be carried out efficiently.

In the end, if the analysis provides a positive prevision, it is just a little risk to be taken for a considerable potential gain in terms of process efficiency, improvement of work conditions & safety for the employees and financial results.

7 Benchmarking & Research

We saw that Leroy Merlin chose to maintain the picking's impact on its own part of the Supply Chain, allowing them to:

1. Control every aspect of this working method;
2. Keep a standard relationship with the suppliers.

Although it is a decision made from careful and continuous improvement of its internal processes point of view, we can legitimately wonder what did other companies choose to do?

We are consequently going to go through the analysis of various entities on this subject, while gathering the accounts and opinions of experts, in order to complete the Leroy Merlin case to obtain a finale answer to our original question.

7.1 The uses of the picking by the large retail companies

In the large retail companies' logic, the picking does not obviously appear as an efficient way of managing the order's preparation: when considering the considerable amount of product they have to move on a daily basis, it becomes understandable.

Nevertheless, when the technologic evolution and the rise of the pure players gave to the client, the possibility to get what he/she wanted within a short period of time, they knew they had to adapt and to develop their own answers.

Consequently, new services and processes emerged in this sector.

7.1.1 The rise of the drive-through

One of the biggest uses of the picking by large retail companies concerns the drive-through service.

The website www.dictionary.cambridge.org defines it as “a place where you can get some type of service by driving through it, without needing to get out of your car”. The first large scale use of the drive-through can be found in the restaurant industry, which has become one of the main services of the fast-food restaurants. This service was then decline to other industries and large retail companies decided to apply this model so their clients could get all the products they would find on their favorite grocery store, thanks to an already-prepared order that they would only have to pick up at a delivery station.

As surprising as it may sounds, France has created the “drive” concept. Indeed, we learn on the website www.lsa-conso.fr that in December 1997, Rémy Benayoun and Alain Peyrieux, two business specialists, filed a patent application for the brand “Drivemarché” to the National Institute of the Intellectual Property. The idea was simple: to give the client the opportunity to come with his/her vehicle and collect his/her groceries ordered a moment before. Unfortunately for the French pair, unsatisfying negotiations with French big large retail companies prevented them from deploying this revolutionary concept which stayed abandoned until June the 21st, 2000 when Auchan opened a similar concept close to its mall in Leers (City close to Lille, in the North of France).

It is now largely used by:

- The food industry (Mc Donald’s, Burger King, KFC, etc.);
- The large retail companies
    - With a drive-through integrated to the store (Like Leroy Merlin for example);
    - With a drive-through physically independent (Auchan, Leclerc, Intermarché, Carrefour, etc.).

Even though the picking caught the attention of big groups through this concept, it had to wait a little tool called “the Internet” to find a place inside their logistics’ processes

7.1.2 The picking in the warehouse: a consequence of the Internet's rise

The Internet has totally changed the World and the way humankind evolves in it. Therefore, it is not surprising to see it had an impact on business, especially on the Supply Chain and the way to manage the warehouse.

If there is one thing that we can acknowledge, it is: when the large retail companies are using the picking in their warehouses, it is almost exclusively for their online activities.

In fact, as illustrated by the website https://blog.octave.biz with its definition of the picking in the warehouse, it is largely used to deal with clients' orders made on their website. They have consequently decided to adapt and to create new jobs inside those warehouses like the "order picker" (person doing the order picking, defined by https://dictionary.cambridge.org as the process of taking goods that have been ordered from the place where they are stored and sending them to customers).

Auchan

An internship at Auchan Retail France from January to July 2018 allows me to say that like Leroy Merlin, the company Auchan equips its warehouses employees with a technological device that guide them through the building of the orders by telling them when and where to go so they do it as fast and efficiently as possible. The researches carried out cannot allow us to think they have found a new use to the picking.

Decathlon

The brand Mecalux confirms through a communiqué[28] that the company Decathlon also uses the picking regarding its web orders. As we can learn with the following article https://lexpansion.lexpress.fr/actualite-economique/comment-decathlon-adapte-sa-logistique-a-l-omnicanal_1900614.html, the sports' company picks its web orders

[28] https://www.mecalux.fr/nouvelles/rayonnages-picking-decathlon-vente-ligne-royaume-uni

altogether and then uses an automatic sorting machine to push the right product to the right client. Once again, this use of the picking seems usual.

Synthesis of those observations

It is quite difficult to obtain information on how those companies really perform at the Supply Chain level. Like the Supply Chain Magazine's journalist Jean-Luc ROGNON says in the editorial of its October edition, "[…] ce secteur, qui multiplie les réflexions en matière d'évolution de la Supply Chain, est aussi l'un des plus taiseux sur le sujet." which can be translated as "[…] this sector, which constantly thinks about how to upgrade the Supply Chain, is also one of the most quiet on the subject."

The researches on traditional large retail companies being not as conclusive as we could hope, it could be interesting to learn a bit from one of the most fast-growing companies in history, which happens to know a few things about logistics.

7.2 The picking according to Amazon

Amazon has probably become the most "logistics effective" company on the planet, using the latest technologies and keeping pushing its limits further. My fellow students comrades & myself having taken part in the Amazon Innovation Award 2019 (which is a competition where the students of four Italian Universities (Politecnico of Milan, University of Tor Vergata, University La Sapienza, Politecnico of Turin) are asked to rethink the Amazon's operations processes in an innovative way, the winning team flying to Seattle to present their project to Amazon management), we can confirm that the technological aspect is not considered anymore by the engineers of Amazon to upgrade their Supply Chain.

Indeed, in its automatized warehouses, Amazon keeps its employees from moving around by making the robot bring the product to them thanks to mobile shelves. The major advantage of such technology is the fact that the robots, being programmed via software, can be easily synchronized so:

- They constantly move without running into each other, permitting to reach a maximized occupation of the space available;
- They can go from a mission to another without any waiting time.

It allowed Amazon to reach the astonishing number of 5 billion orders sent in 2017 (https://www.lesechos.fr/2018/04/les-cinq-chiffres-fous-de-lempire-amazon-989097).

Therefore, the question that large retail companies need to ask themselves is:

Why not us?

7.3 A "symbiosis" between technology & humankind

If it is possible to do it for such a gigantic amount of singular orders, why would it not be possible for larger orders? If Internet is getting more and more people to come and order from web platform, the majority of the consumers still rely on the physical experience of shopping to fulfill their needs, especially the basic ones.

We can assume selling areas such as hypermarkets will continue to attract a large amount of people for a few more years at least. Considering that, the need to reach "perfection" regarding the supply seems vital if they want to face the online activity.

And it requires something companies are a bit afraid of: massive change.

In fact, mixing the Leroy Merlin case with the Amazon's processes could provide the suitable answer, but in order to do so, some thinking and investments are to be made.

As said previously, adopting the Leroy Merlin solution would generate chaos because of a too high number of people working simultaneously in a limited area. The solution would consequently be to not increase the number of persons, but the number of tools: the robotic mobile shelves.

With an organization that physically separate the non-mobile products (large dimensions and/or heavy) which would receive a "traditional treatment" and the mobile products that could be stocked on mobile shelves, a high efficiency could be obtained.

7.4 The supplier: a partner that must be considered

Even if the precedent points are to be dealt with, one considerable aspect has to be considered: the supplier. Suppliers have different objectives and as one would say: “Your priority is not my priority”.

Therefore, the company must make its partners understand the virtuous circle it could be:

- An offer adapted to the real demand;
- A retailer’s stock adapted to the offer;
- A supplier’s production adapted to the retailer’s need;
- An upgrade on the exact quantity of raw materials needed to have a production able to satisfy the market;
- A reduction of the waste all along the process that:
    - Reduces the costs involved for the actors concerned;
    - Reduces the environmental impact.

8 The Conclusion

Large retail companies have understood that the Supply Chain is the war to win regarding how the customers consume. It is embodied by the immediacy of their needs' satisfaction that pushed companies to always develop faster delivery services. Through the example of Leroy Merlin and the researches carried out on the organization of other large retail companies, we have seen that the picking is well integrated inside the way of thinking and the way of doing of those entities.

It first developed thanks to the drive-through, then via the explosion of Internet and brought the Logistics world to a new level in terms of resources allocated, way of optimizing processes at a large scale, but most of all in terms of strategic value. We now know that a company that masters its Supply Chain, masters the basic principles of business: Offer & Demand.

So maybe it is time for the picking to reach its full potential by allowing those big groups to supply their stores, not with a right quantity but THE right quantity.

Despite the fact that our study has been done on the only example of Leroy Merlin, the promising results it provides let us hope that the final purpose of the Supply Chain can be achieved: make the chain able to supply the quantity really needed to satisfy the need of the consumers, avoiding any waste (that would take the form of product to be stocked, which involved that all along the chain, too much resources were allocated) or shortages.

Obviously, it would require a lot of other companies to experiment this idea, but we can have the audacity to say that this form of Picking could have a great positive impact on the Supply Chain of large retail companies. The only condition being that they find the right formula between the amount of human resources and technology they need.

To conclude, we can say that the Picking had & has an impact on the Supply Chain of large retail companies. More than a tool, it has been a real driver in the development of the Supply Chain world, bringing the various actors to always innovate in terms of technology, strategy & organization to serve their clients faster and better. If its uses are mainly focused on the drive-through and the web order picking in the warehouses, the example studied through Leroy Merlin brought a new approach that maybe the optimized solution to finally match Offer & Demand.

We can therefore legitimately wonder what the perfect combination in terms of human resources, technology & layout of the warehouse, must be to reach the primordial goal of the Supply Chain: no overstock, no shortage, no waste.

9 Recommendation

Thanks to the analysis done in the sections *7 Benchmarking & Research* and *8 Conclusion*, we have now summarized the practices chosen by various actors. Therefore, we have tools that can help us propose ideas to Leroy Merlin on how it could carry on improving its processes of distribution and stocking.

The context of reorganization was not the best environment for a project with this complexity and financial risk. It had to deal with a period of high activity on certain markets which had an impact on the amount of resources mobilized in the warehouses, to answer a growing demand. It has brought the company to underestimate its capacity to manage the possibility for its stores to be served with the exact quantity they asked for, and consequently preserved it from bigger potential gains.

The choice of following a careful but less profitable strategy was indeed the right one: thanks to it, Leroy Merlin has not putted a too high burden on the shoulders of the warehouses while taking the opportunity to see if this new supply method could work.

If I could allow myself to give a piece of advice to this proud paragon of the French industry, it would be to continue to follow this strategy as long as:

- The warehouses can
    - absorb the additional activity by recruiting more people;
    - change their ways to do things to adapt to this new philosophy, meaning rethinking their organization to facilitate this process.
- The costs involved (especially those regarding the warehouses, like the additional workforces I was just talking about in the precedent point) are counterbalanced by the facilitation of the daily-life of the stores and by the increase of the time dedicated to business, which is after all, the core of every company.

In any case, the sustainability of this method cannot rely on the actual organization because of the number of people it would require. The warehouse would quickly become too crowded to be an efficient tool for the company. It is therefore fundamental that Leroy Merlin innovates or finds the right technology that would help keep a "normal" number of employees.

As said in the section *7.3 A "symbiosis" between technology & humankind*, the warehouses' layout must be rethought. The project must also be introduced to the Suppliers so they can understand the positive impact it can have on their activities and by doing so, supply in a way more adapted to the new model of Leroy Merlin.

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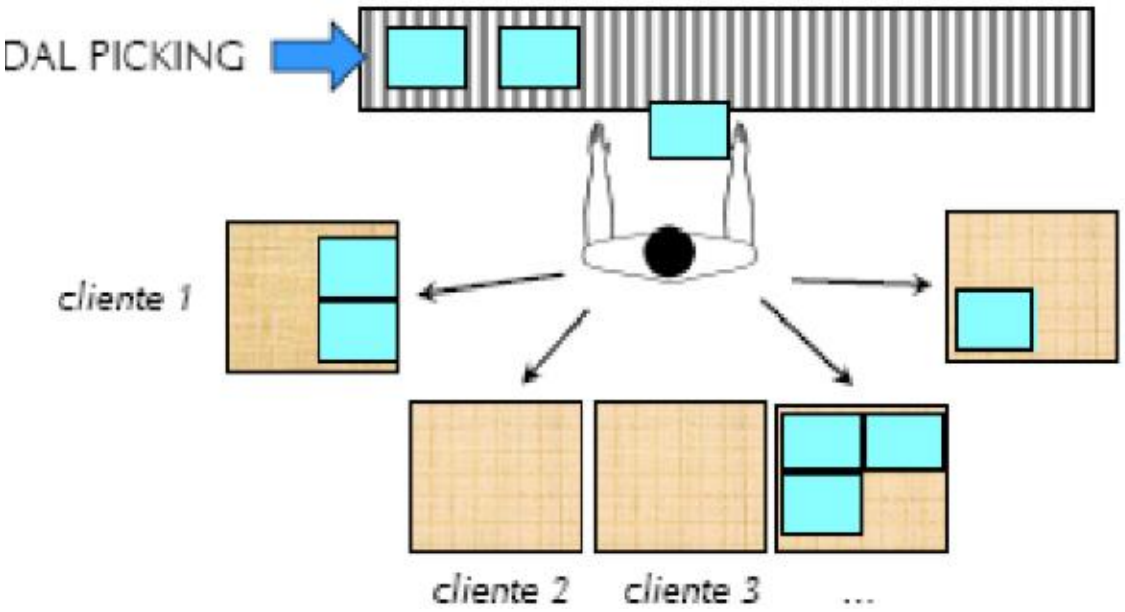
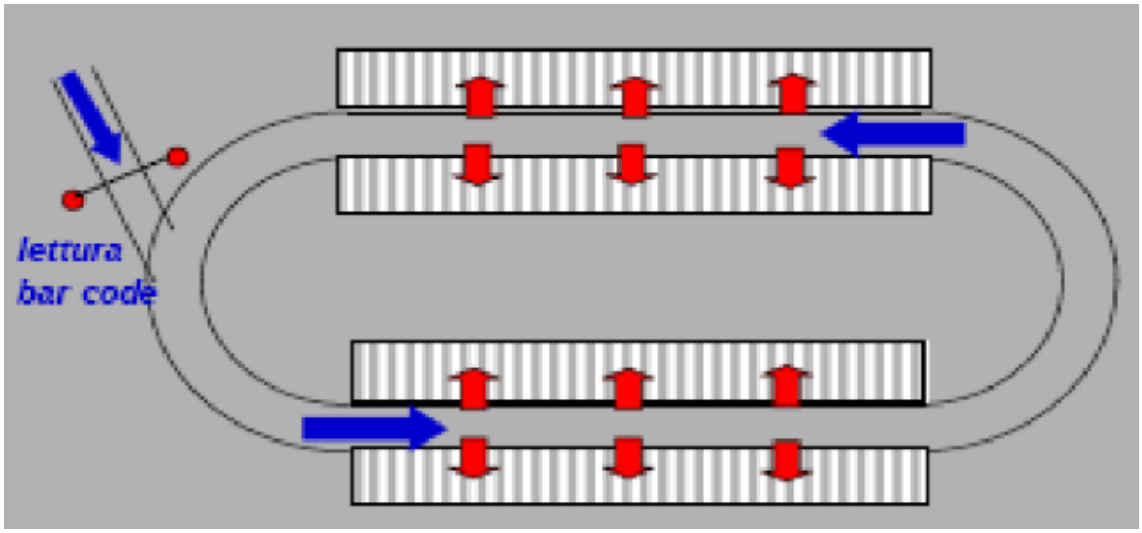
Appendices



Picture 1 - Manual picking (picture taken from the lesson "Sistemi di Picking" of the Engineer Sabrina GRIMALDI)



Picture 2 – Automated picking (picture taken from the lesson "Sistemi di Picking" of the Engineer Sabrina GRIMALDI)

Picture 3 – Container for picking contextual to the withdrawal (picture taken from the internet)

Picture 4 – Pallet racking (picture taken from the internet)

Picture 5 – Gravity Shelving (picture taken from the internet)

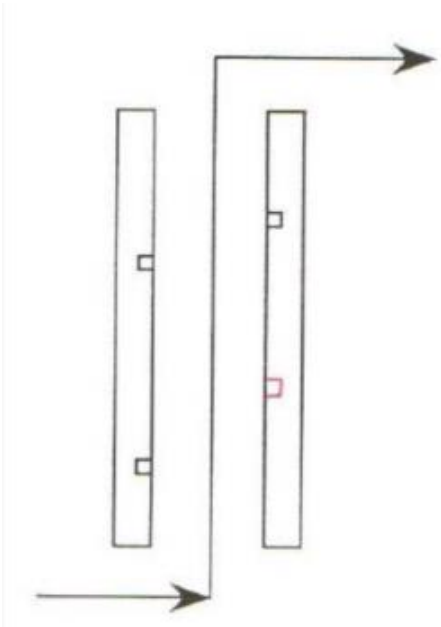
Picture 6 – Pallet truck (picture taken from the internet)

Picture 7 – Trolley with platform and man on board (picture taken from the internet)

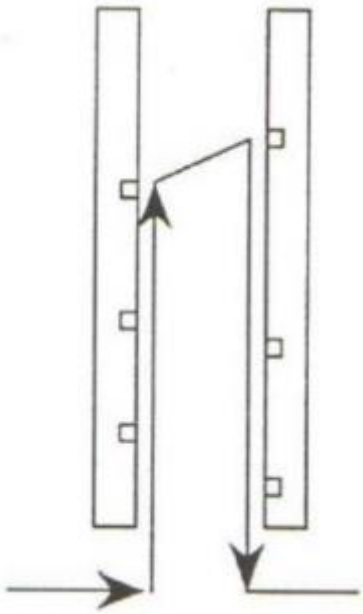
Picture 8 – Stacker (picture taken from the internet)

Picture 9 – Conveyor belt (picture taken from the internet)

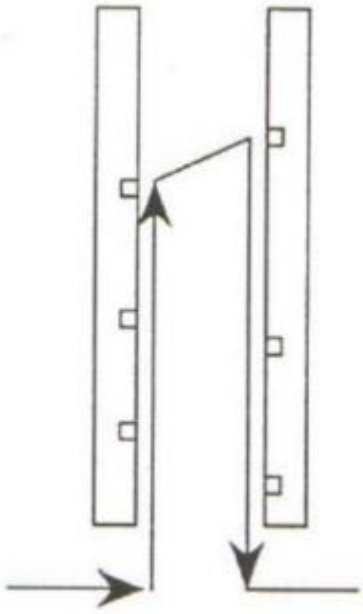
Picture 10 – Vertical electronic order picker (picture taken from the internet)



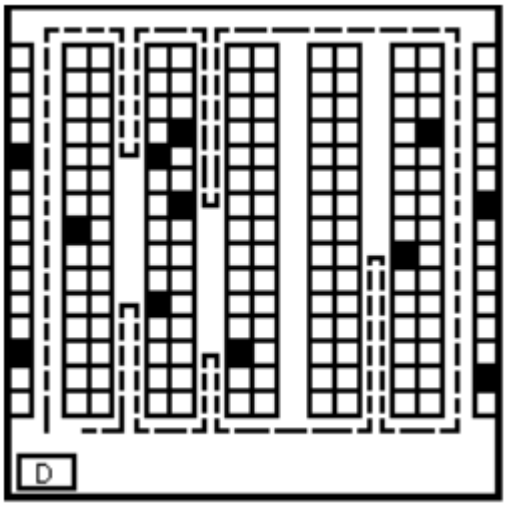
Picture 11 – Transversal picking route (picture taken from the lesson "Sistemi di Picking" of the Engineer Sabrina GRIMALDI)



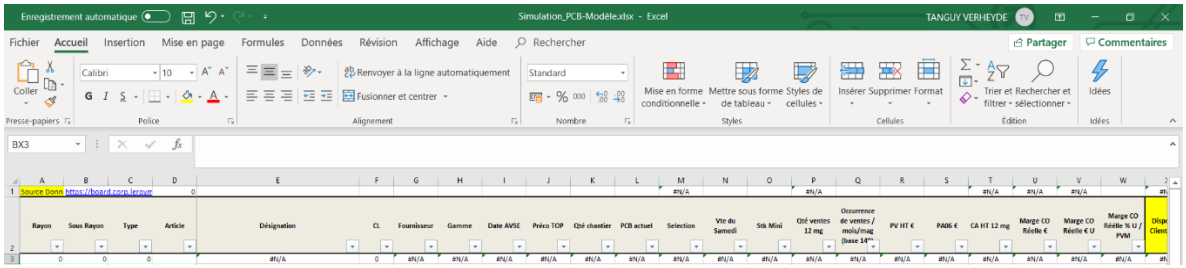
Picture 12 – Return picking route (picture taken from the lesson "Sistemi di Picking" of the Engineer Sabrina GRIMALDI)



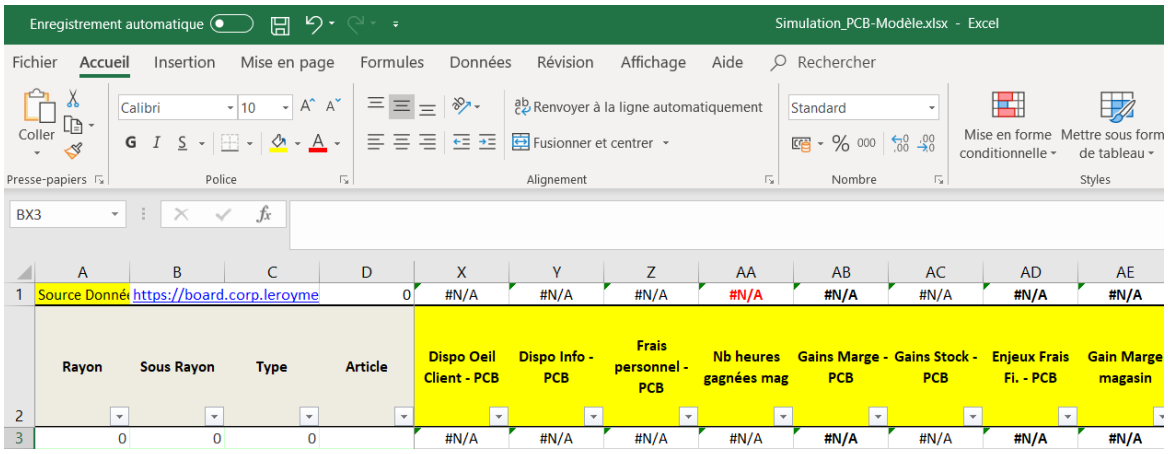
Picture 13 – Midpoint picking route (picture taken from the lesson "Sistemi di Picking" of the Engineer Sabrina GRIMALDI)



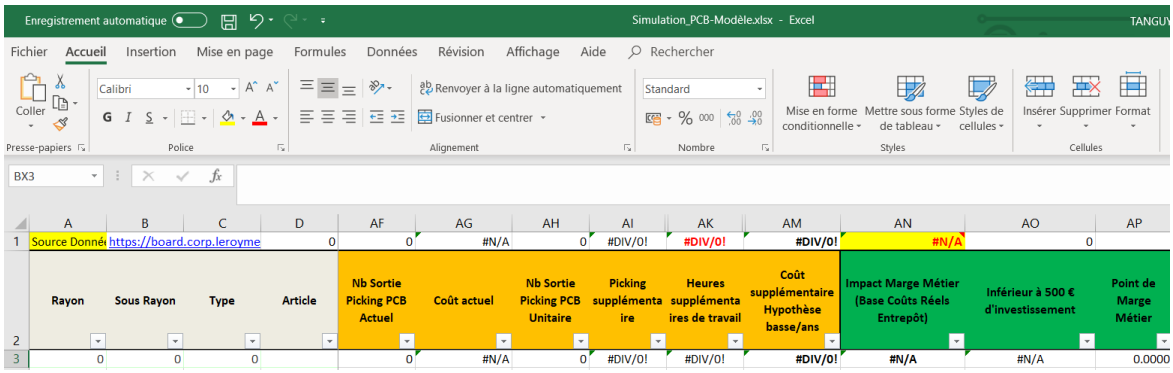
Picture 14 – Largest gap picking route (picture taken from www.erim.eur.nl):



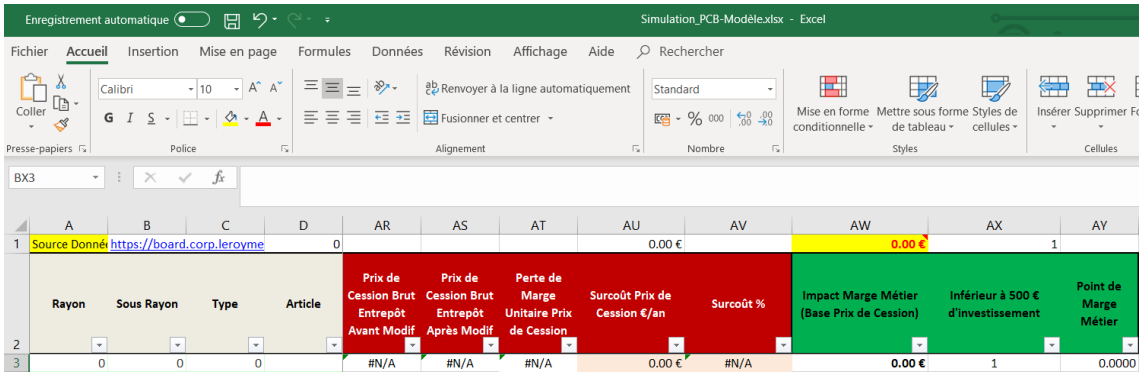
Picture 15 (picture taken from the Excel file Simulation_PCB_Modèle.xlsx)



Picture 16 (picture taken from the Excel file Simulation_PCB_Modèle.xlsx)



Picture 17 (picture taken from the Excel file Simulation_PCB_Modèle.xlsx)



Picture 18 (picture taken from the Excel file Simulation_PCB_Modèle.xlsx)

CRITERES							SELECTION : 4		
Financier Réel	Financier Théorique	Surcoût Théorique	Quantité	Priorisation au Reflux	Fragilité	Taille	Somme	%	Retenu
1	0	0	0	0	0	0	1	14%	0
1	0	0	0	0	0	0	1	14%	0
1	1	1	1	2	-1	0	Non		0
1	1	1	1	0	0	0	4	57%	0
1	1	1	1	0	0		4	57%	0
1	1	1	1	0	0		4	57%	0
1	0	0	1	2	0		4	57%	0
1	1	1	1	2	-1	0	Non		0
1	0	1	0	0	0	1	3	43%	0
1	1	1	1	2	-1	1	Non		0
1	1	1	1	0	-1	1	Non		0
1	1	1	1	0	-1	1	Non		0
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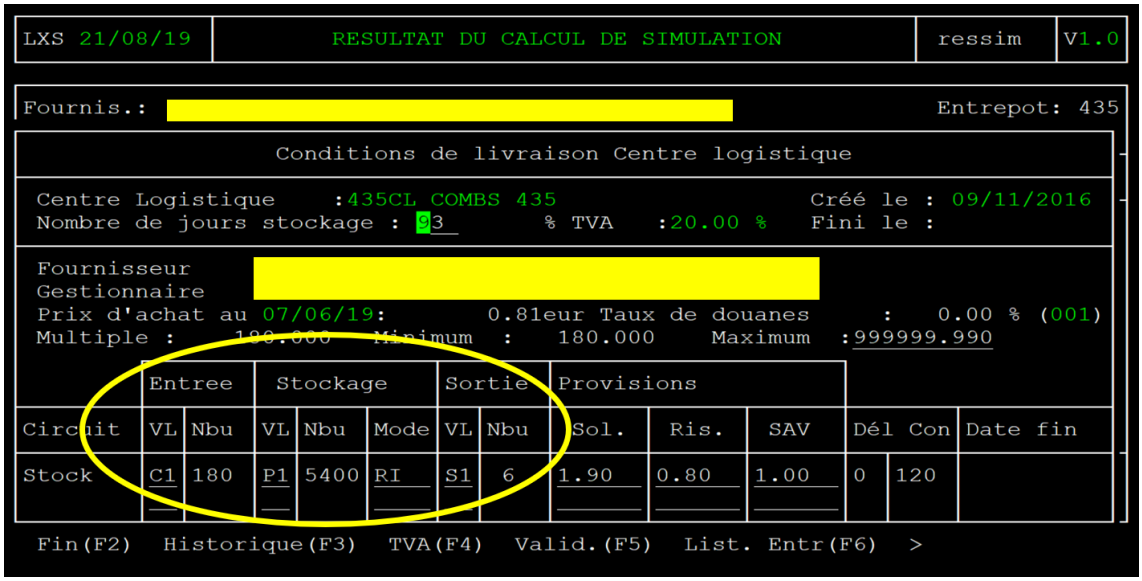
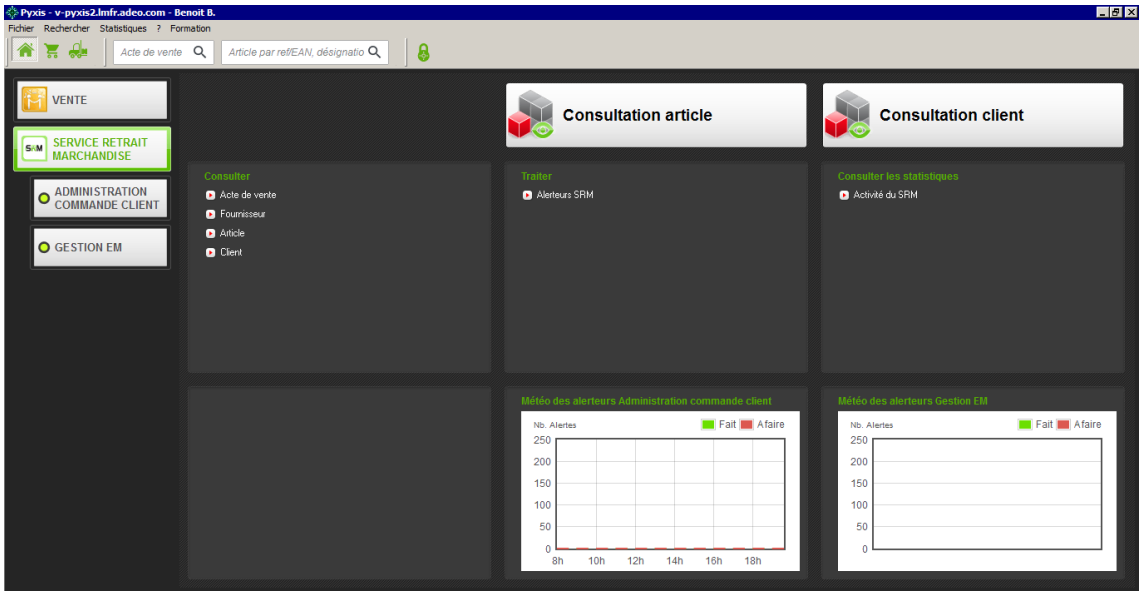
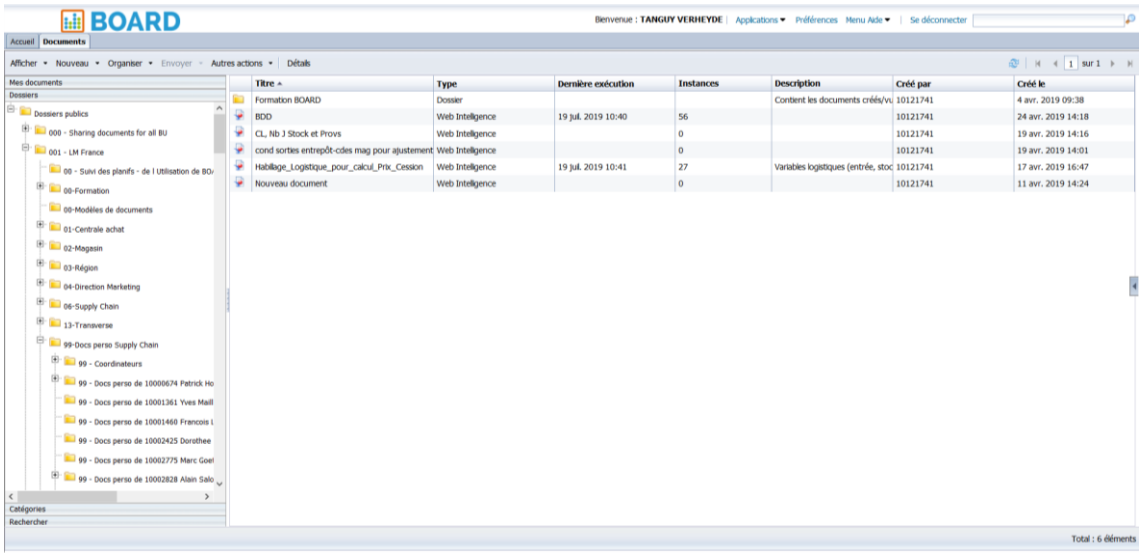
Picture 19 (picture taken from the Excel file Simulation_PCB_Modèle.xlsx)



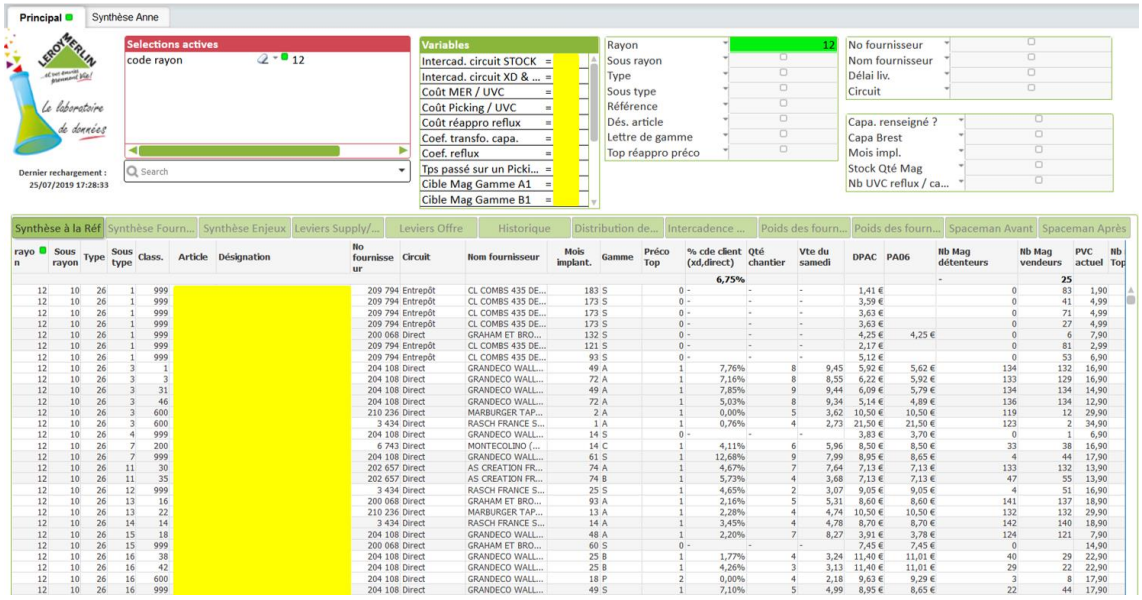
Picture 20 – PEGAS (picture taken from the software PEGAS)



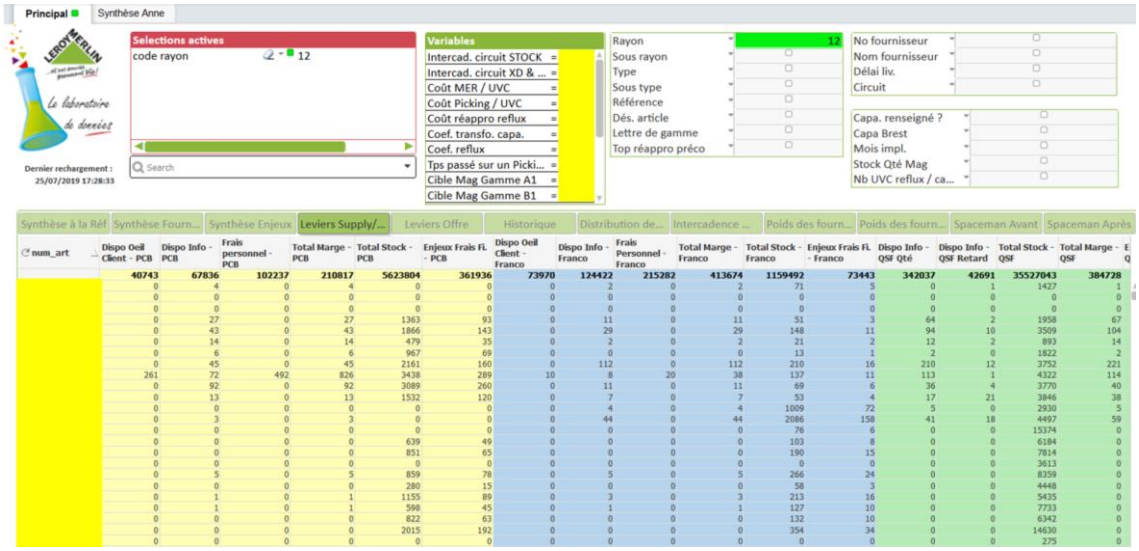
Picture 21 – PYXIS (picture taken from the software PYXIS)



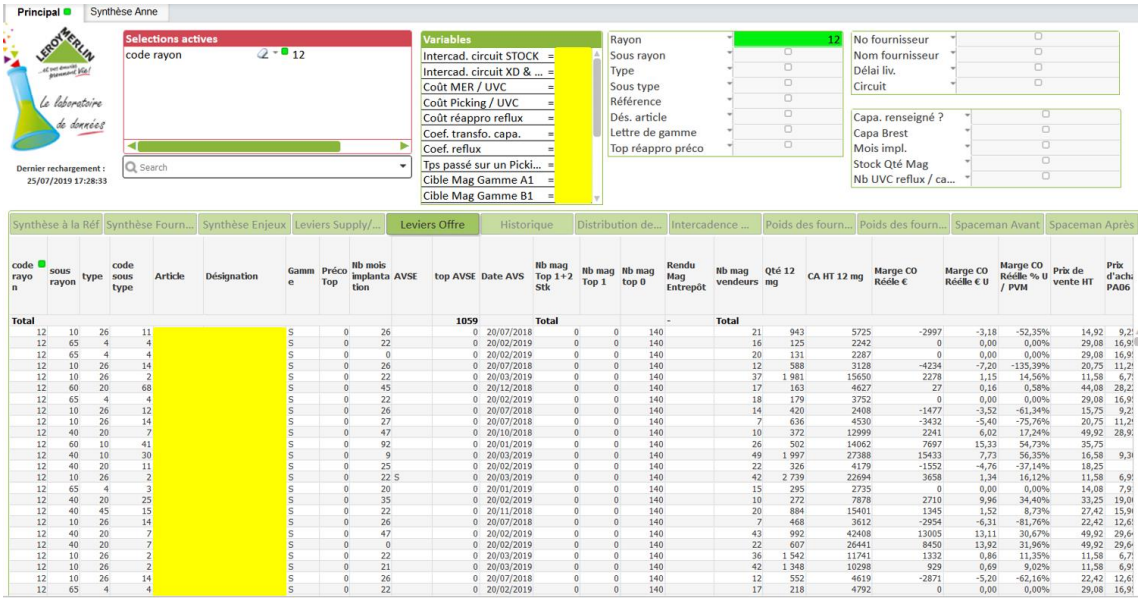
Picture 22 – BOARD (picture taken from the software BOARD)



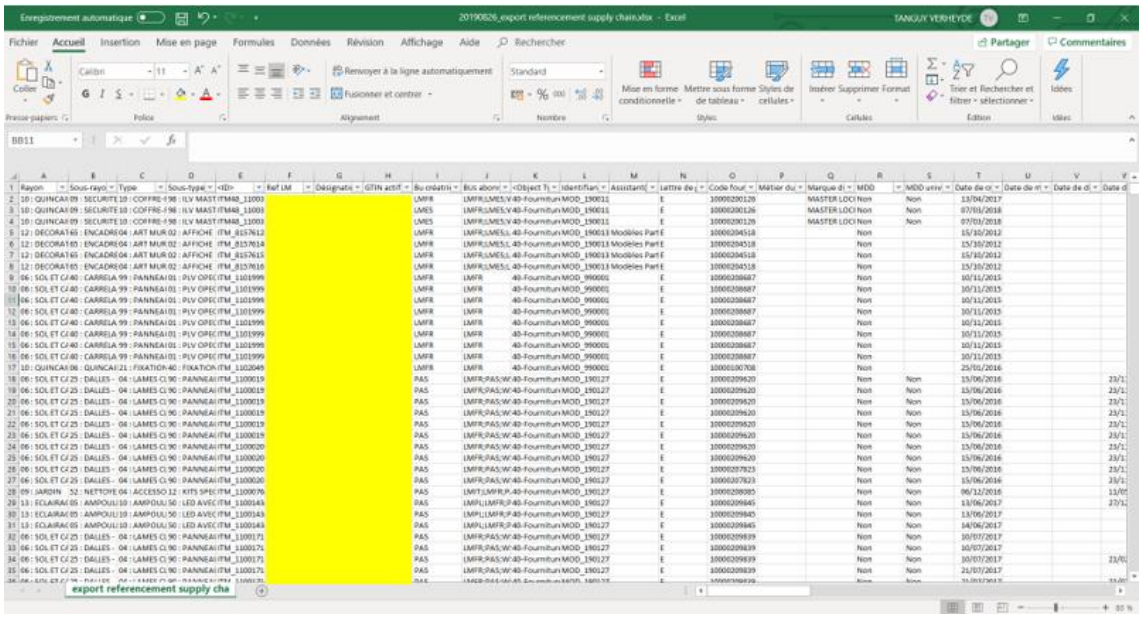
Picture 23 (picture taken from the software Qlikview)



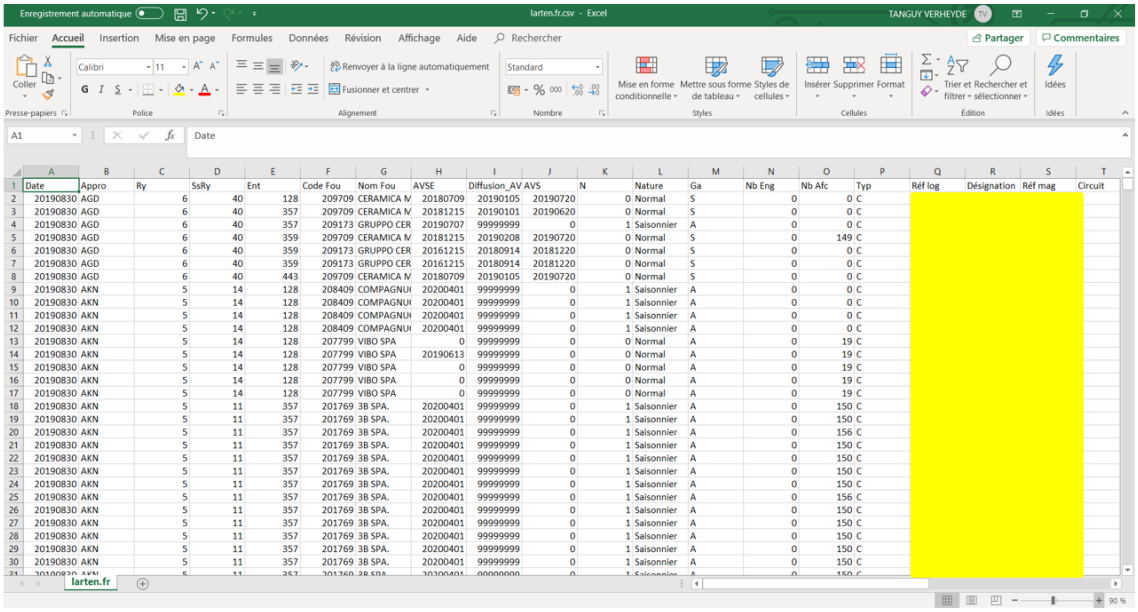
Picture 24 (picture taken from the software Qlikview)



Picture 25 (picture taken from the software Qlikview)



Picture 26 (picture taken from the Excel file Base_STEP.xlxs)



Picture 27 (picture taken from the Excel file larten.xlsx)

Script : Problématique du Reflux

L'Entretien

Introduction :

(Il faudrait qu'il soit filmé, demander le consentement de la personne.)

Dans le cadre de nos engagements quant au traitement des irritants, la réduction du reflux est une problématique que nous souhaitons résoudre puisque cela permettrait de supprimer des activités parasites vous impactant au quotidien.

Nous souhaiterions ainsi obtenir votre avis sur le reflux : en connaissez-vous beaucoup ? quel impact a-t-il selon vous sur votre travail au quotidien ? etc.

Questionnaire :

Pour cela nous vous demandons un peu de votre temps pour répondre aux questions suivantes :

Diriez-vous que votre périmètre de travail (rayons(s)) est impacté par le reflux ?

Quelles en sont les conséquences ?

- **Au niveau temporel/ investissement humain :** parler du temps que cela vous prend de rapporter la marchandise en zone de stockage, de la stocker correctement (ranger de manière logique, sûre pour le produit et sécurisante pour les employés, etc.) puis de réalimenter le rayon.
- **Au niveau financier :** pensez-vous que les pertes économiques liées à cet irritant soit grande ? sous quelles formes se manifestent-elles (perte, casse, vol, autre) ?

Comment la centrale pourrait-elle t'aider ?

Script: The overstock problem

The Interview

Introduction:

(It needs to be filmed, ask the person consent.)

Considering our promises regarding the subject of the daily struggles, the reduction of the overstocks is one of the principal things we want to deal with, because of all the non-added-value actions it creates every day.

We would like to record your statement on this issue. For example: do you face it a lot? What kind of impact does it have on your work? etc.

Questionnaire:

In order to do so, we just need a little bit of your time to answer the following questions:

Would you say that your work is impacted by overstock?

What are the consequences?

- **At a temporal level / human investment:** you can talk about the amount of time you take to bring back the products to the stocking area, to stock it in an efficiently and safely manner (for the product and for the other employees) and finally to refill the selling area.
- **At a financial level:** do you think that the store loses a lot of money because of this problem? What are the main reasons (a product lost, breakage, stealing, other)?

How can the headquarters services can help you?