SINCE 1998

FRESH MARKET

PROCESS MANAGEMENT

2022/2023

NOVA IMS Information Management School

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INTRODUCTION

The purpose of this report is to document the **process management** of **Fresh Market**, a Portuguese supermarket, and present **improvements** that were identified during the analysis of the business process.

Online market sales are rapidly growing in the general market context, and **Fresh Market** is no exception. Thus, the scope of this project is to understand, analyze and redesign the **process** of preparing and delivering an order made through the **supermarket website.**

We will start by identifying the process, model the AS-IS business process, perform qualitative and quantitative analysis and purpose a TO-BE process model, with the appropriate improvements.

For this project we will the **methodology** chosen was the **BPM (Business Process Management) lifecycle,** which we will detail in the next section.

THEORETICAL FRAMEWORK

Because a large portion of Fresh Market's sales are done through the website, that is the area that the supermarket is focused on improving.

To achieve such improvements, we will follow the **BPM Lifecycle** approach, that is represented in the following image:

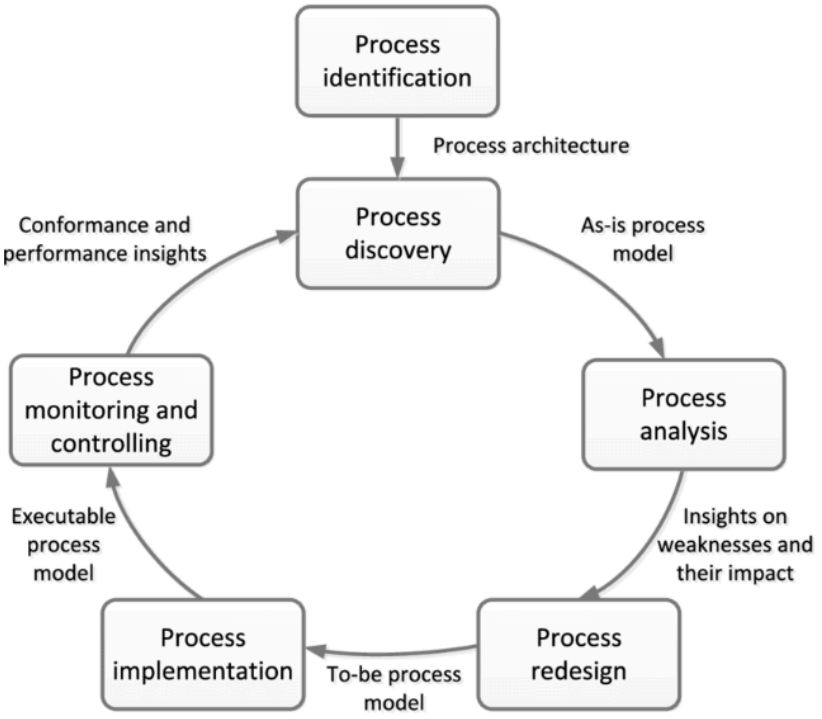

Fig.1 - BPM Lifecycle by Dumas, et al.(2013)

In each phase, we will consider events, objects actors, decision points, tasks and the outcomes that are related to the process.

During the process discovery phase, we will resort to the **Business Process Model Notation (BPMN)** to model the process. We will have as a tool the **Bizagi Modeler**, that will also be used during the process analysis.

The expected outcomes are:

- Reduced costs;
- Reduced turnaround times:
- Reduced error rates.

The Process Implementation and Process Monitoring and Controlling phases are outside of this report's scope.

ORGANIZATIONAL STRUCTURE

Fresh Market

The Lisbon-based supermarket is structured in the following way:

- **Total number of employees:** more than 100;
- **Total number of stores:** 10;
- **Employees to be considered in this study's process:**

Fig. 2 - Human Resources

Role	Responsabilities	Monthly Wage	Number of employees
Manager	Order Organization Order Completion	1100 €	1
Staff	Order Picking	850 €	3
Packager	Order Packaging	700 €	2
Cashier	Pick-up Order	750 €	2
Courier	Home delivery Order	750 €	7

PROCESS DESCRIPTION

The **Process Identification** was already achieved and presented in the business case, and it was concluded that the process is:

Preparing and delivering an order made through the supermarket website.

Process description is a part of the **Process Discovery** and is the following:

This process begins with an event, which is an order being received at Fresh Market's website. This is part of the Order organization step, that involves the manager accessing and printing the order description from the website and then distributing the documents through the the staff. The staff proceeds to receive the document, get a shopping cart and collect all the possible items (might deal with missing items) and delivers the shopping cart to a packager. The packager puts the products in plastic bags (paying attention to glass products or liquid content) and prepares the order for delivery. Once the order is ready to deliver, the manager updates the supermarket system, generates and prints the invoice. Now that the order is ready for delivery, the customer chooses between the Pick up order or Home Delivery order. If the customer chooses Pick up order (20% of the cases), the cashier receives the bags and delivers to the customer with the correspondent invoice. Else, the customer chooses Home delivery order (80% of the cases) and the couriers receive the bags, drive to the customer's address and deliver the order with the invoice.

We will consider these five problems that were already identified upfront:

Regarding the customer dissatisfaction:

1. Delay of home deliveries;
2. Missing products;
3. Exact delivery date;

Regarding the staff dissatisfaction:

4. Lack of efficiency because of manual collection of order's items;

Regarding the supermarket:

5. Reducing usage of paper and plastic shopping bags.

Assumption For Model Simplicity:

For client to do a website order, he/she must have a profile account, with email, home address, phone number and fiscal information.

AS-IS MODEL

To complete the BPM's lifecycle's **Process Discovery** we modeled the current process.

The following figure represents the flow of the process's main activities, where each activity is a sub-process with its own activities, gateways and events.

AS-IS Model Level 1

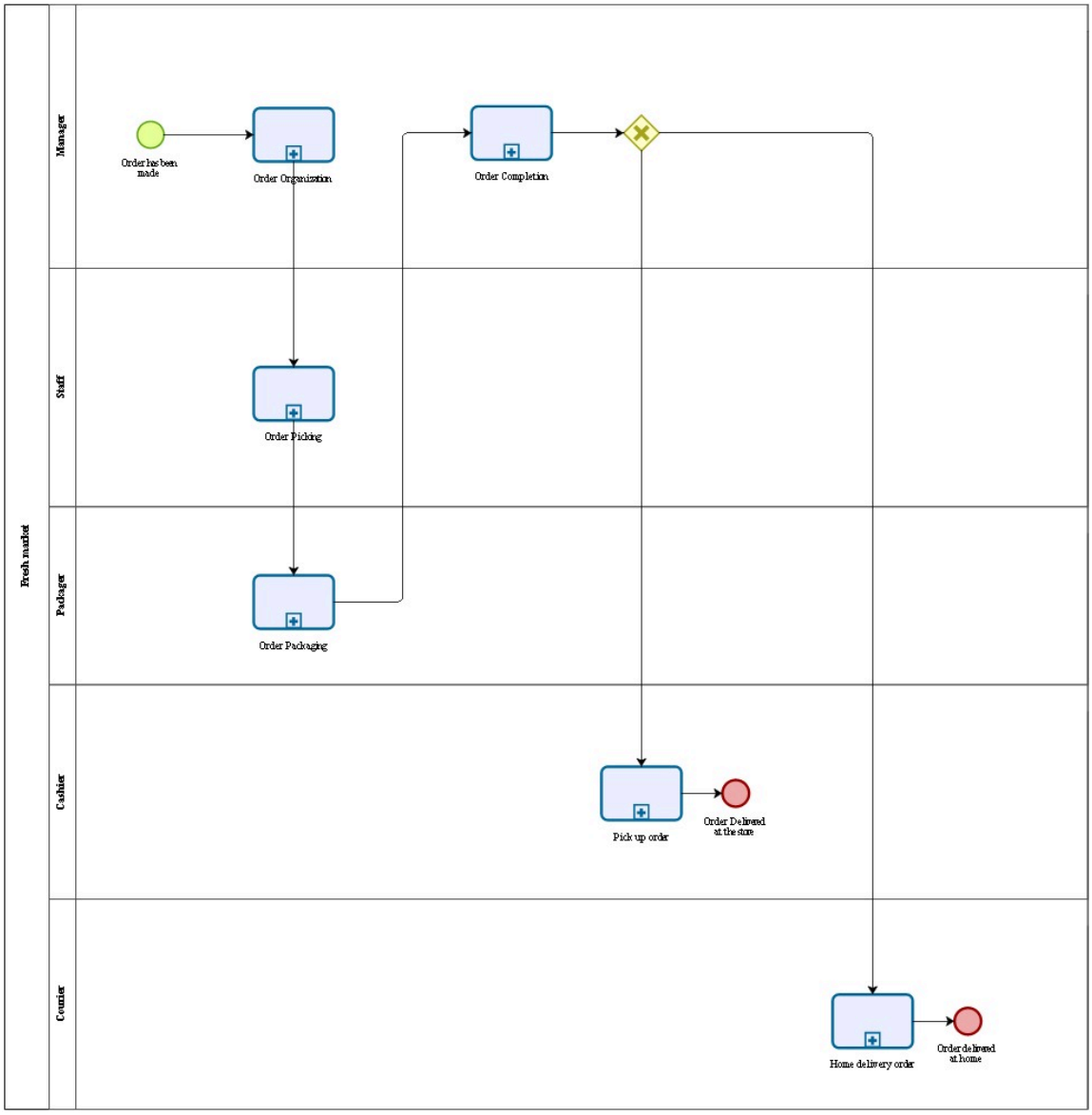

Fig.3 - AS-IS Model Level 1

Order Organization AS-IS Model

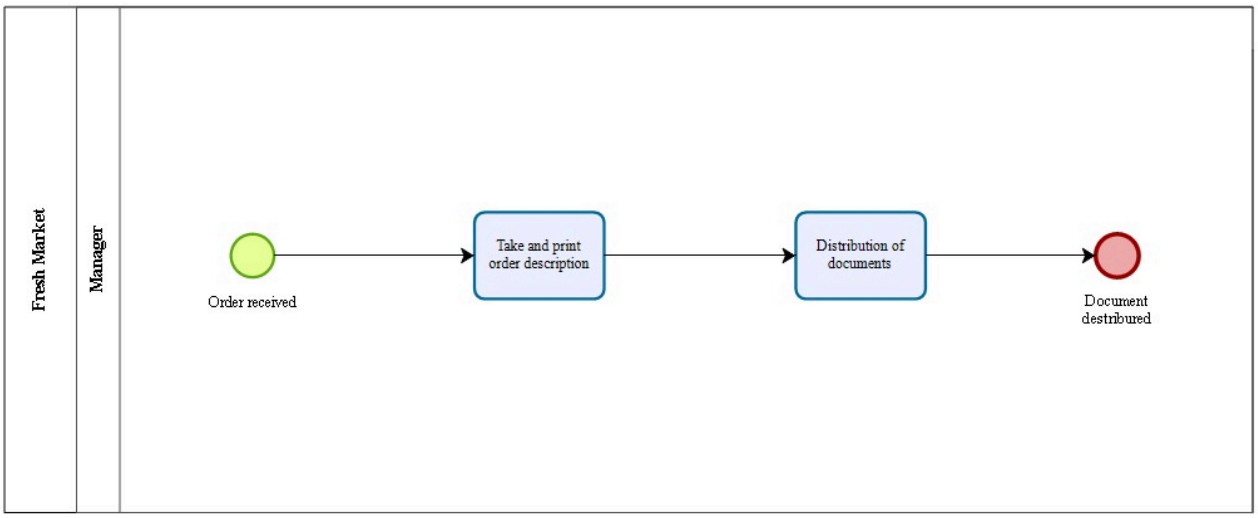

Fig.4 - Order Organization Level 2

This is the first sub-process, the manager checks the website for received orders, prints the order description and distributes the according documents through the staff.

Average time per order: 5 minutes

Order Picking AS-IS Model

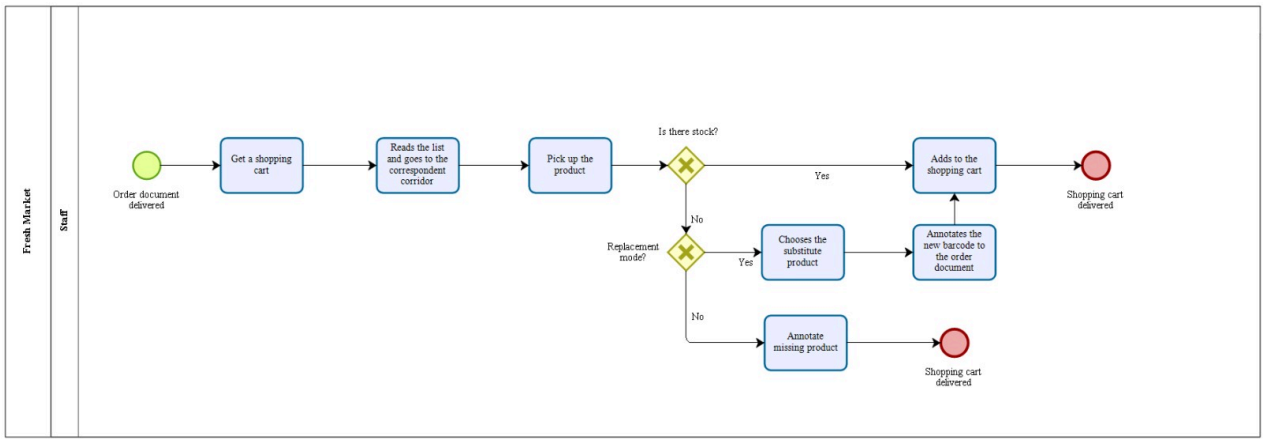

Fig.5 - Order Picking Level 2

In this sub-process the a member of staff receives the order document, gets a shopping cart, reads the list, goes to the product's corresponding corridors. When picking up the product, checks if there is stock available. If so, adds products to shopping cart and delivers it. Otherwise, checks if the customer chose replacement mode and if so, chooses the substitute product and annotates the new barcode, adds to shopping cart and delivers it. If there is no replacement mode, annotates the missing products and delivers cart.

Average time per order: 15 minutes

Order Packaging AS-IS Model

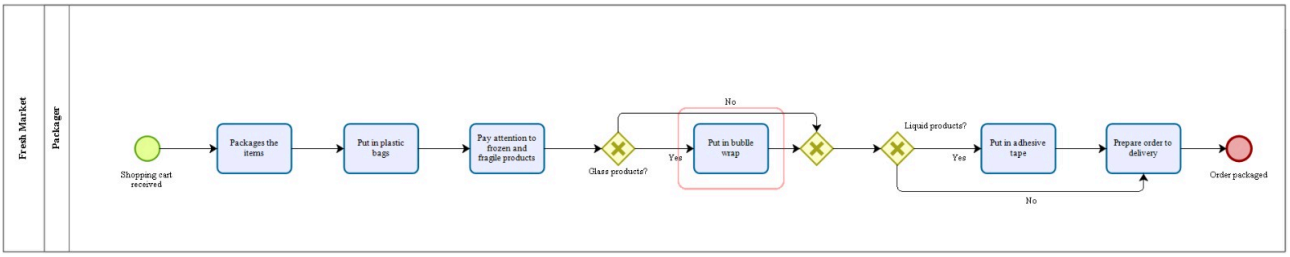

Fig.6 - Order Packaging Level 2

This sub-process starts with the shopping cart being received by the packager that proceeds to pack the items and put them in plastic bags, while paying extra attention if products need bubble wrap (glass products) and/or adhesive tape (liquid products). When is finished, the order is packaged and ready for delivery.

Average time per order: 7 minutes

Order Completion AS-IS Model

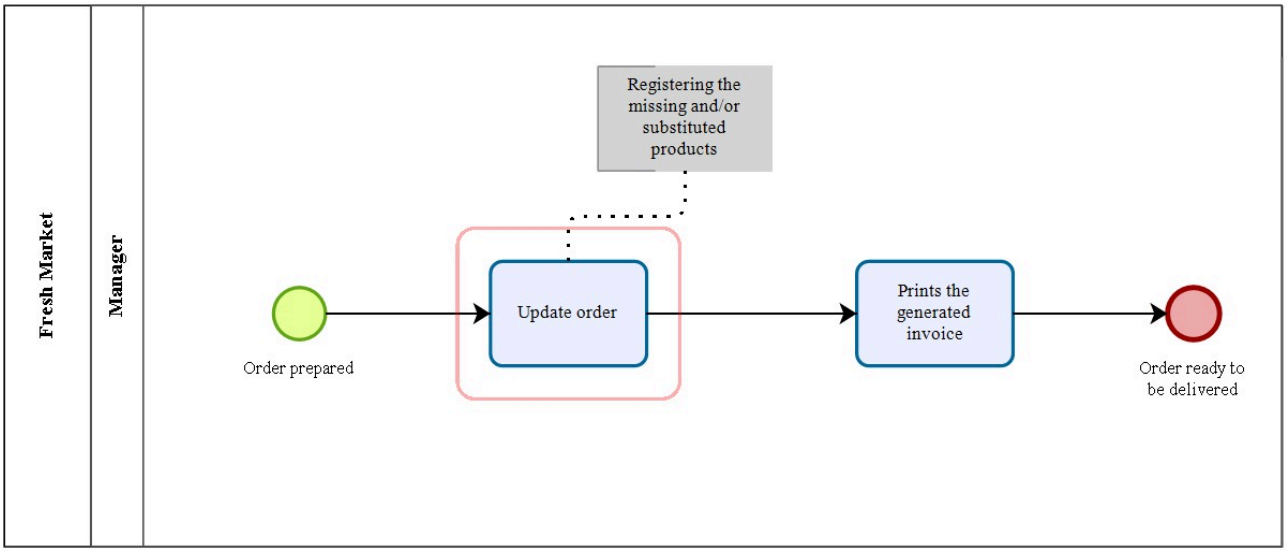

Fig.7 - Order Completion Level 2

The order is prepared, so the manager proceeds to update the order, in case of missing and/or substitute products, and prints the generated invoice. This sub-process ends with the order being ready to be delivered.

Average time per order: 2 minutes

Pick-Up Order AS-IS Model

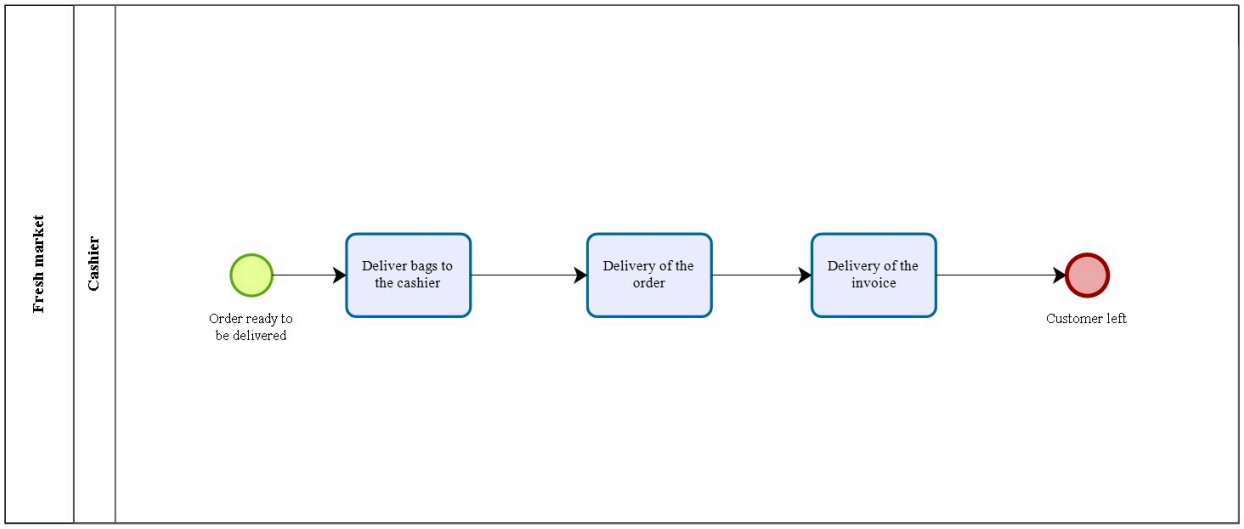

Fig.8 - Pick-Up Order Level 2

This sub-process happens in case the costumer chooses to Pick-Up order in the store. When the order is ready to be delivered, the cashier receives the bags and delivers the order and corresponding invoice to the customer. If this happens, the customer leaves and the process finishes.

Average time per order: 7 minutes

Home-Delivery Order AS-IS Model

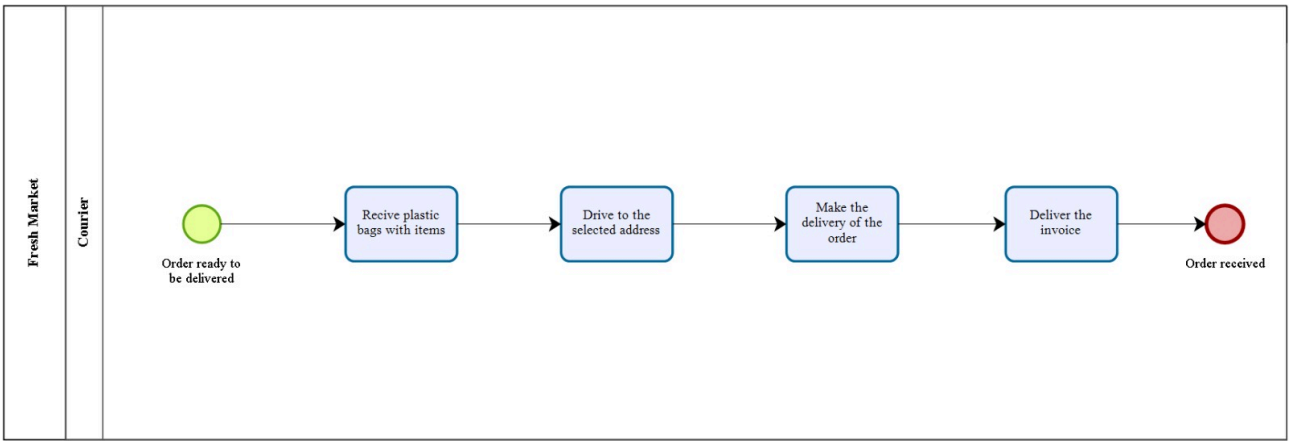

Fig.9 - Home Delivery Order Level 2

This sub-process happens in case the costumer chooses to Home-Delivery order. When the order is ready to be delivered, the Courier receives the bags, drives to the customer's selected address and delivers the order and corresponding invoice to the customer. If this happens, the order is received and the process finishes.

Average time per order: 25 minutes

QUALITATIVE ANALYSIS

Qualitative analysis is a part of the BPM Lifecycle's Approach, that corresponds to the **Process Analysis** phase.

This section's main objectives are:

1. To identify and eliminate wasteful steps, through:
   - Value Adding Analysis
   - Waste Analysis
2. Understand, organize and prioritize problems, through:
   - Issue Register
   - Root-Cause Analysis - Why why diagram

Value Adding Analysis

Here we split the process's main tasks into steps and classify them we can understand which ones are unnecessary and should be eliminated.

The classification has the following logic:

- Value Adding (VA) - steps that contribute to positive outcomes;
- Business Value Adding (BVA) - steps that do not directly bring value to costumer but are necessary to the overall process;
- Non-Value Adding (NVA) - do not add value to the process and can be altered or eliminated.

Fig.10 - Value Adding Analysis

Sub-Process	Steps	Classification	Performer
Order Organization	Take and print order description	NVA	Manager
	Distribution of documents	NVA	Manager
Order Picking	Get a shopping cart	BVA	Staff
	Reads the list and goes to the correspondent corridor	NVA	Staff
	Pick up the product	VA	Staff
	Check for stock	BVA	Staff
	Check for Replacement Mode	BVA	Staff
	Chooses the substitute product	VA	Staff
	Annotate missing product	BVA	Staff
	Annotates the new barcode to the order document	BVA	Staff
	Adds to the shopping cart	VA	Staff
Order Packing	Packages the items	VA	Packager
	Put in plastic bags	NVA	Packager
	Pay attention to frozen and fragile products	BVA	Packager
	Check for glass products	BVA	Packager
	Put in bubble wrap	BVA	Packager
	Check for liquid products	BVA	Packager
	Put in adhesive tape	NVA	Packager
	Prepare order to delivery	VA	Packager

Fig.10 - Value Adding Analysis (Continuation)

Sub-Process	Steps	Classification	Performer
Order Completion	Update order	BVA	Manager
	Prints the generated invoice	NVA	Manager
Pick Up Order	Deliver bags to the cashier	BVA	Cashier
	Delivery of the order	VA	Cashier
	Delivery of the invoice	VA	Cashier
Home Delivery Order	Recive plastic bags with items	NVA	Courier
	Drive to the selected address	NVA	Courier
	Make the delivery of the order	VA	Courier
	Deliver the invoice	VA	Courier

Waste Analysis

Here we identify the waste that can happen during or between steps and categorize it into three possibilities:

- **Move** (**transportation** - of objects; **motion** - of resources)
- **Hold (inventory** - instance waiting of resource; **waiting** - resource waiting for instance)
- **Overdo (defects**- repetition; **over-processing** - unnecessary perfectionism; **overproduction** - running instances that do not add value to the process)

Fig. 11 - Waste Analysis

Process	Activity	Waste Category	Waste Type
Order Organization	Take and print order description	N/A	N/A
	Distribution of documents	Overdo	Overprocessing
Order Piccking	Get a shopping cart	Move	Motion
	Reads the list and goes to the correspondent corridor	Overdo	Overprocessing
	Pick up the product	Move	Motion
	Check for stock	Overdo	Overprocessing
	Check for Replacement Mode	Overdo	Over-production
	Chooses the substitute product	Overdo	Over-production
	Annotate missing product	Overdo	Overprocessing
	Annotates the new barcode to the order document	Overdo	Overprocessing
	Adds to the shopping cart	N/A	N/A
Order Packing	Put items of orders in plastic bags	N/A	N/A
Order Completion	Update order	Move	Transportation
	Prints the generated invoice	Overdo	Overprocessing

Fig. 11 - Waste Analysis (Continuation)

Process	Activity	Waste Category	Waste Type
Pick Up Order	Deliver bags to the cashier	N/A	N/A
	Delivery of the order	N/A	N/A
	Delivery of the invoice	Overdo	Overprocessing
Home Delivery Order	Receive plastic bags with items	N/A	N/A
	Drive to the selected address	N/A	N/A
	Make the delivery of the order	N/A	N/A
	Deliver the invoice	Overdo	Overprocessing
	If order is not successfully delivered:		
	Recive plastic bags with items	N/A	N/A
	Drive to the selected address	N/A	N/A
	Try to deliver the order	N/A	N/A
	Drive back to the store	Overdo	Defect
	Store orders not possible to deliver	Overdo	Defect
	On the next day, Recive plastic bags with not possible to deliver orders	Overdo	Defect
	Drive failed deliveries to the selected address	Overdo	Defect
	Deliver the order	Move	Transportation

Issue Register

With this analysis we identify an organize issues that might contribute to the business performance with the objective of prioritizing them.

Fig. 12- Issue Register

Issue	Priority	Description	Data and Assumptions	Qualitative Impact	Quantitative Impact (per day)
Incorrect Order		Staff picks incorrect products	45 orders per day where 5% have incorrect products and 50% want refunds with orders having on average 30€ worth of products	Customer dissatisfaction and poor brand reputation	45 * 0.05 * 0.5 * EUR 30 = **EUR 33.75**
Customer doesn't show up		The customer ends up not coming to pick up the order	45 orders per day where 20% are pick up and 10% of those customers don't show up with orders on average of 30€	Restock the products that weren't picked up causing staff frustration	45 * 0.2 * 0.1 * EUR 30 = **EUR 27**
Wrong Address		The customer gives the wrong address for the home pick up	45 orders per day where 80% are home pick up and 10% of those customers give a wrong address and 50% want refunds with orders having on average 30€ worth of products. Plus, an average of 10€ worth of gas	Contact the customer to get correct address and then drive there, causing staff frustration customer dissatisfaction, and more costs	45 * 0.8 * 0.1 * 0.5 * EUR 30 + EUR 10 = **EUR 64**
Non-compliant of Home Delivery		Deliveries sometimes arrive late to some addresses, up to 30 minutes, in some cases there is no one home to receive the goods due to the delay	45 orders per day where 80% are home delivery and only 10% of those customers give a wrong address and 50% want refunds with orders having on average 30€ worth of products. Plus, an average of 10€ worth of gas	Customer dissatisfaction due to the non-compliant of home delivery schedules	45 * 0.8 * 0.1 * 0.5 * EUR 30 + EUR 10 = **EUR 64**

Fig.12 - Issue Register (Continuation)

Missing Products		Sometimes there are some missing products in the orders	45 orders per day where 5% have missing products and 20% want refunds with orders having on average 30€ worth of products	Customer dissatisfaction and poor brand reputation	45 * 0.05 * 0.2 * EUR 30 = **EUR 13.5**
Delivery Date Information		Customers would like to be informed about the exact delivery date	N.A.	Customer dissatisfaction	N.A.
Collecting Items of Orders		Staff is dissatisfied with lack of efficiency when collecting products, being very manual and prone to errors	N.A.	Staff dissatisfaction and frustration	N.A.
Invoices and Plastic Bags		Supermarket spends a lot of money in paper and plastic bags and wants to reduce their usage to reduce costs and help the environment .	45 orders per day with an average of 3 plastic bags and 1 invoice per order costing on average 0.1€	Helps the environment which increases brand reputation	45 * 0.1 = **EUR 4.5**

Why-Why Diagram

This type of diagram helps understand and detail whats are the causes of the previously identified issues.

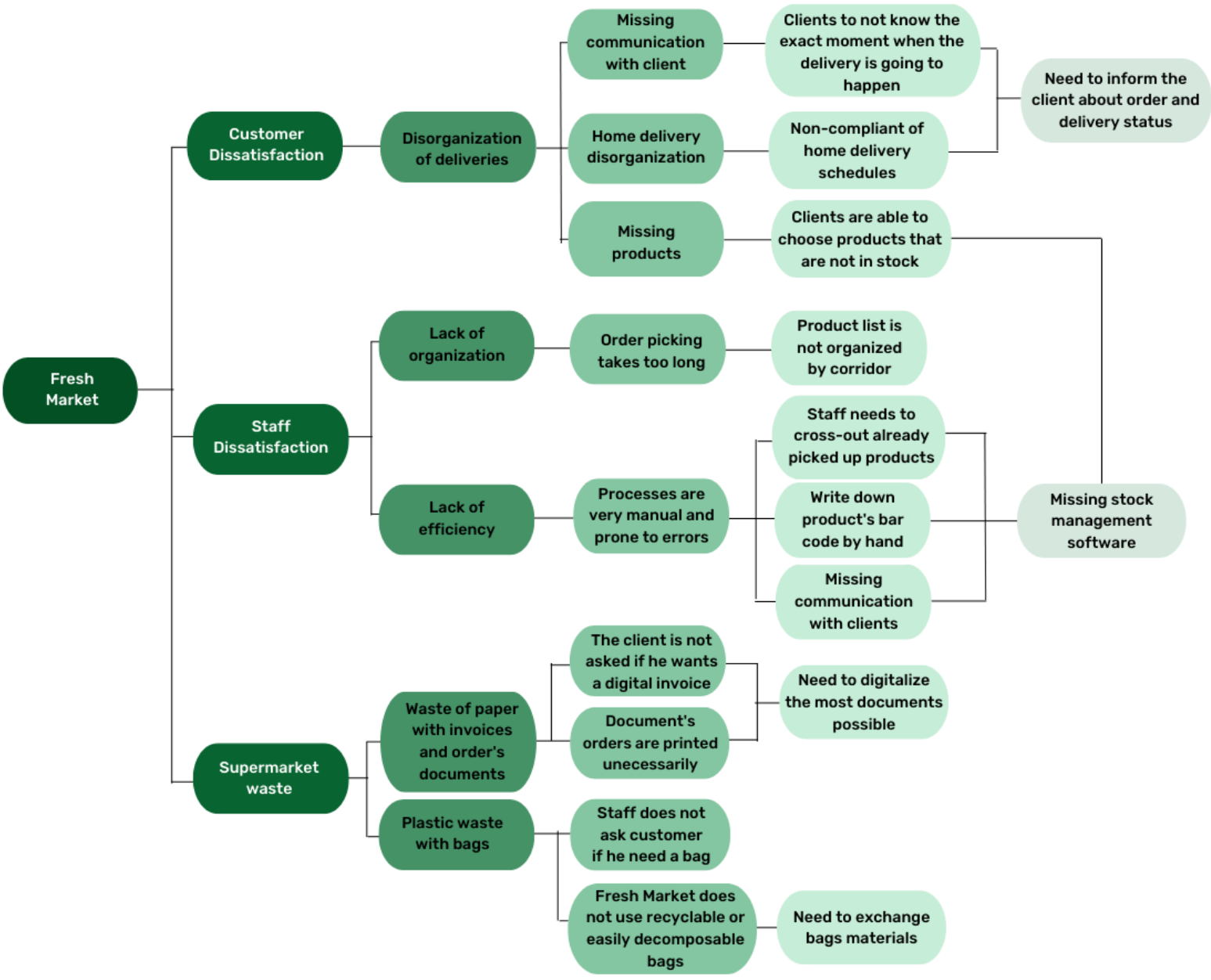

Fig.13 - Why-Why Diagram

QUANTITATIVE ANALYSIS

Quantitative Analysis is also a part of the BPM Lifecycle's Approach, that corresponds to the **Process Analysis** phase.

In this section we use the Bizagi Modeler as a tool to perform a Simulation of different scenarios that could happen within the process.

Data Considered For The Analysis:

- ***Average number of website orders per day:*** 45 orders
- ***Number of of working hours per day:*** 8 hours
- ***Percentage of Pick-Up orders:*** 20%
- ***Percentage of Home-Delivery orders:*** 80%
- ***Mean Arrival per minute (Y) =*** 45 / (8*60) = 0,09375 clients per minute
- ***Mean Interval Arrival Time (1/Y) =*** 1 / 0,09375 = 10,(6) clients every minute

This analysis will provide a quantification of the process's performance.

Simulation

Fig. 14 - Resource Utilization

Resource	Utilization AS-IS	Utilization AS-IS (What If)	Utilization TO-BE	Utilization TO-BE (What if)
Manager	72.19 %	50.46 %	33.87 %	32.92 %
Packager	35.34 %	35.59 %	28.16 %	27.37 %
Cashier	5.80 %	16.96 %	10.22 %	17.00 %
Courier	42.82 %	43.13 %	45.41 %	28.47 %
Staff	51.70 %	52.07 %	35.60 %	34.61 %

AS-IS

In this scenario, our team looked to the times and resources that were available, putting them in the simulation view, making sure everything was according to the project description. With that, we started by creating the process validation, which focused on the start event, where we inputted the Max Arrival Count, which would be the same for every scenario (45).

After that, we focused on the time analysis, where we chose the different types of time analysis. In the start event, the type that was chosen was the Poisson Distribution, where we applied the following formula:

$$Total\ Time = 8*60 = 480$$

$$Mean\ Arrival\ Rate\ (\lambda) = \frac{Max\ Arrival\ Count}{Total\ Time} = \frac{45}{480} = 0.09375$$

$$Mean\ Inter-Arrival\ Time = \frac{1}{\lambda} = \frac{1}{0.09375} \approx 10.67$$

After getting that value, we chose the time analysis types for the tasks, which were almost all the Normal Truncated Distribution, since the mean does not fluctuate too much. Despite, the tasks Order Picking and Home Delivery Order used the Negative Exponential Distribution, since they could present a bigger fluctuation in the mean time than the others.

Lastly, we inserted the resources to each task, according to the project description document.

Fig. 15 - Scenario 1 (AS-IS)

Name	Instances completed	Instances started	Avg. time (m)	Total time (m)	Avg. time waiting for resource (m)	Total time waiting resource (m)
Fresh market	45	45	51.7589586445154	2329.15313900319		239.643274894543
Order has been made	45					
Exclusive Gateway	45	45				
Order delivered at home	36					
Order Delivered at the store	9					
Order Organization	45	45	5.8652992052641	263.938464236885	0.782698651660509	35.2214393247229
Order Picking	45	45	16.7265769678071	752.695963551318	1.0504293300597	47.2693198526866
Order Packaging	45	45	7.75235415955876	348.855937180144	0.609639758820679	27.4337891469306
Order Completion	45	45	4.77867541571354	215.040393707109	2.56569557072752	115.456300682738
Pick up order	9	9	5.85873039302912	52.7285735372621	0	0
Home delivery order	36	36	19.3303835219576	695.893806790475	0.396178496874004	14.2624258874641

AS-IS - WHAT IF

After running the AS-IS simulation, we decided to make a couple of change in the time and resource analysis, in order to improve the total time and resource usage, when compared to the AS-IS simulation.

In order to do that, in the tasks entitled Order Organization and Order Completion, we chose another resource, Cashier, to help the manager, which decreased the resource usage of the manager and, with that, also decreased the total time of the process.

Fig. 16 - Scenario 2 (AS-IS What If)

Name	Instances completed	Instances started	Avg. time (m)	Total time (m)	Avg. time waiting for resource (m)	Total time waiting resource (m)
Fresh market	45	45	48.572387765008	2185.75744942536		96.2475853167069
Order has been made	45					
Exclusive Gateway	45	45				
Order delivered at home	36					
Order Delivered at the store	9					
Order Organization	45	45	5.08260055360359	228.717024912162	0	0
Order Picking	45	45	16.9828207084945	764.226931882252	1.30667307074713	58.8002881836209
Order Packaging	45	45	7.77409361049455	349.834212472255	0.631379209756466	28.412064439041
Order Completion	45	45	2.21297984498602	99.5840930243708	0	0
Pick up order	9	9	5.85873039302912	52.7285735372621	0	0
Home delivery order	36	36	19.1851837110293	690.666613597056	0.250978685945694	9.03523269404499

TO-BE

After running the AS-IS What If simulation, we decided to make a couple of change in the time and resource analysis, in order to improve the total time and resource usage, when compared to the AS-IS What If simulation.

In order to do that, we decreased the mean time of the tasks, since, with the technological implementations and elimination of tasks that we propose, this would be more automated and would need less time to be completed.

Fig. 17 - Scenario 3 (TO-BE)

Name	Instances completed	Instances started	Avg. time (m)	Total time (m)	Avg. time waiting for resource (m)	Total time waiting resource (m)
Fresh market	45	45	35.1733312467157	1582.79990610221		25.5708762713363
Order has been made	45					
Exclusive Gateway	45	45				
Order delivered at home	36					
Order Delivered at the store	9					
Order Organization	45	45	2.08260055360359	93.7170249121617	0	0
Order Picking	45	45	10.4507650918316	470.284429132421	0	0
Order Packaging	45	45	5.71167567573269	257.025405407971	0.200828873407145	9.03729930332153
Order Completion	45	45	2.21297984498602	99.5840930243708	0	0
Pick up order	9	9	5.09615181672921	45.8653663505629	0.00506720977170024	0.0456048879453022
Home delivery order	36	36	17.12009964652	616.323587274719	0.457999224446375	16.4879720800695

TO-BE - WHAT IF

Lastly, in the What if scenario of the TO-BE simulation, there was only one change that was made. That change was in the decision of the Level 1, where we altered the percentages of home delivery orders and of the pic up order.

This was change from 20% of pick-up orders to 40%, which happened because of the increase of prices of plastic bags, that were given during home delivery orders. This increase in price made more customers decide to go to the Fresh market, in order to pick up their orders which, subsequently, decreased the total time and resource usage.

Fig. 18 - Scenario 4 (TO-BE What If)

Name	Instances completed	Instances started	Avg. time (m)	Total time (m)	Avg. time waiting for resource (m)	Total time waiting resource (m)
Fresh market	45	45	31.497069249846	1417.36811624307		9.08290419126683
Order has been made	45					
Exclusive Gateway	45	45				
Order delivered at home	25					
Order Delivered at the store	20					
Order Organization	45	45	2.08260055360359	93.7170249121617	0	0
Order Picking	45	45	10.4507650918316	470.284429132421	0	0
Order Packaging	45	45	5.71167567573269	257.025405407971	0.200828873407145	9.03729930332153
Order Completion	45	45	2.21297984498602	99.5840930243708	0	0
Pick up order	20	20	5.49465192073912	109.893038414782	0.00228024439726511	0.0456048879453022
Home delivery order	25	25	15.4745650140546	386.864125351364	0	0

PROCESS REDESIGN

After concluding the **Process Analysis** we purpose the following changes for the future process model:

1. **Heuristic 9 - Automation**

   To automatize a part of the management of the lifecycle of an order, the implementation of a Order Management System with the following features:

   1.1. Inventory and warehouse management, to avoid missing products;

   1.2. Tracking system with the various stages of the order, for the client to know the expected delivery date;

   1.3. Record inventory levels to help predict maintain appropriate stock, thus helping to avoid missing products;

   1.4. Integration of a customer database, with the client's information and orders, to be accessible to Fresh Market's workers, eliminating the need to print and distribute order descriptions, reducing time and motion wastes and the usage of paper.

2. **Heuristic 3 - Triage**

   Giving the customers the option to bring their own **reusable bags to pick-up** the order at the store, in order to reduce the usage of shopping bags.

3. **Heuristic 8 - Communication optimization**

   Couriers automatically **remind customer by message** (to phone number) when leaving the store with the estimated time of arrival of the destination, so the customer can adjust to the exact time of delivery and remember them to be home, avoiding the need to repeat the process.

4. **Heuristic 7 - Resource optimization**

   Lay-off people: 3 couriers, because the overall TO-BE process's average time significantly decreased, and consequently the home-delivery average time's also decreased, so we concluded even with 3 less couriers, the orders would be delivered more efficiently and with less costs.

5. **Heuristic 7 - Resource optimization**

   Cashiers had the lowest **resource utilization** in the quantitative analysis while the manager had the highest one, therefore one of the cashiers will be available to assist the manager, in case it is necessary.

Assumptions For Model Simplicity:

With the new system, the invoices are sent to the customer's email, instead of being printed and delivered with the order.

All of the website orders are picked from the warehouse.

In a Home-Delivery Order, if the customer is not at home, the courier returns to the supermarket and stores the order, and attempts to deliver the next day.

TO-BE Model

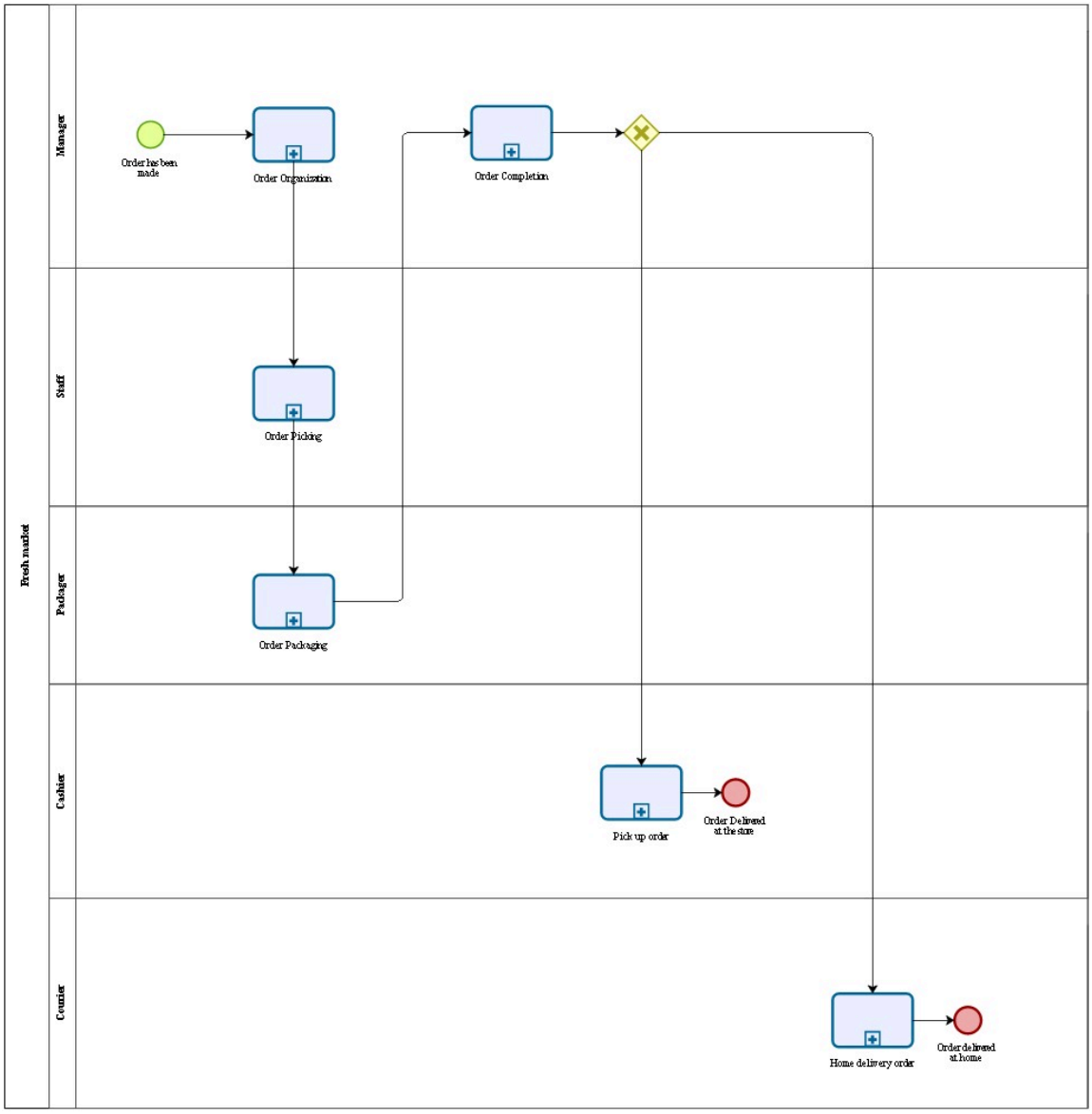

Fig. 19 - TO-BE Model Level 1

The flow of the sub-processes stays the same in the TO-BE model, the differences will happen inside each sub-process.

Order Organization TO-BE Model

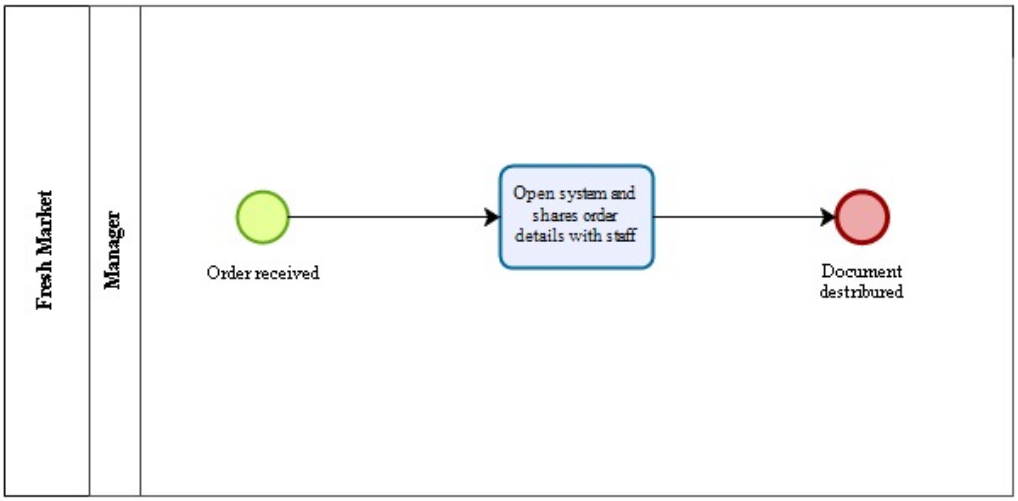

Fig. 20 - Order Organization Level 2

The manager opens the system, and it automatically checks his schedule and shares the order details with the staff. The automation of this process saves on average 3 minutes per iteration.

Average time per order: 2 minutes

Order Picking TO-BE Model

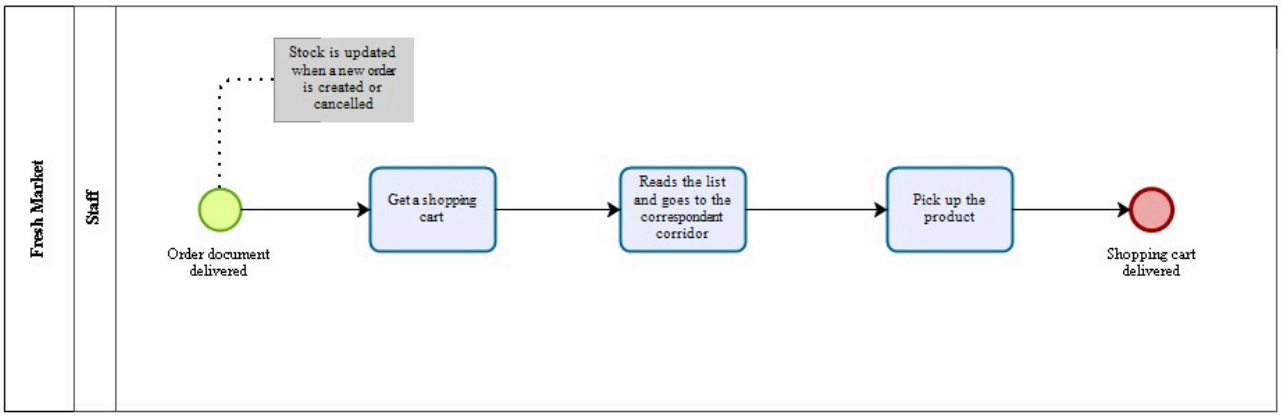

Fig. 21 - Order Picking Level 2

The staff gets a shopping cart to put the products of the order, then they pick the products accordingly by going to the correspondent corridor. After reaching the correct corridor they put the product in the shopping cart. The stock is automatically updated when a new order is created or cancelled, this way we can always keep a real time inventory making it easier to manage and eliminating the need to deal with missing products.

Average time per order: 10 minutes

Order Packaging TO-BE Model

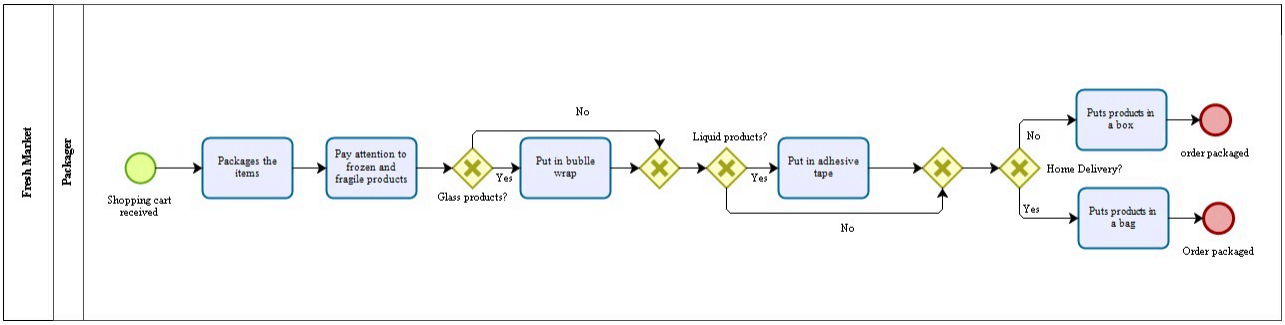

Fig. 22 - Order Packaging Level 2

The only difference in this is sub-process from the current one, is that now if the order is not home-delivered the packager puts the items in a box, so the customer can user their own recycling bags.

Average time per order: 7 minutes

Order Completion TO-BE Model

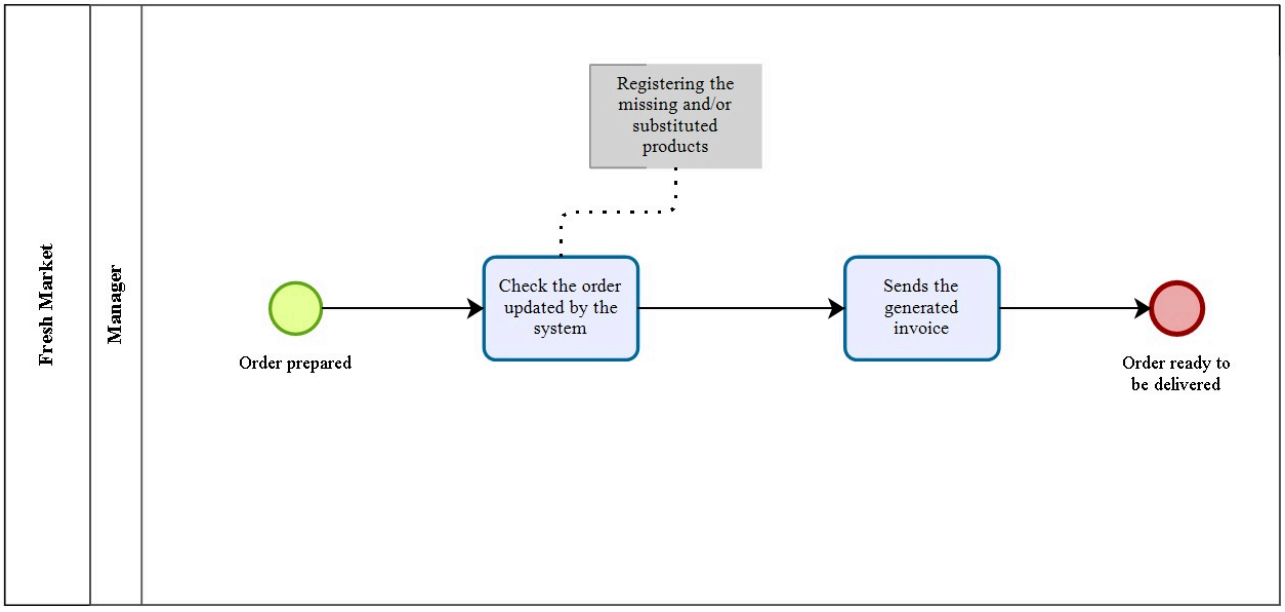

Fig. 23 - Order Completion Level 2

The manager checks the order that was already updated by the new system and send the generated invoice for the customer's email, instead of printing it.

Average time per order: 2 minutes

Pick-Up Order TO-BE Model

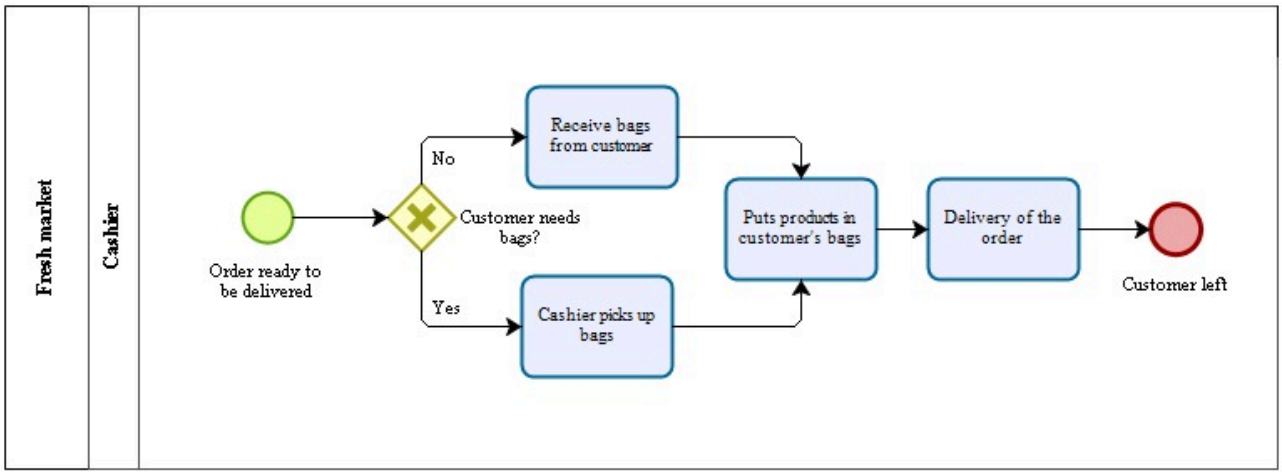

Fig. 24 - Pick-Up Order Level 2

The system now checks if the user wants a plastic bag for their products, this way, the company is saving money and also being proactive towards a more environmentally friendly attitude, which increases the brand reputation. Then the cashier puts the products in the bag and delivers the corresponding order.

Average time per order: 2 minutes

Home-Delivery Order TO-BE Model

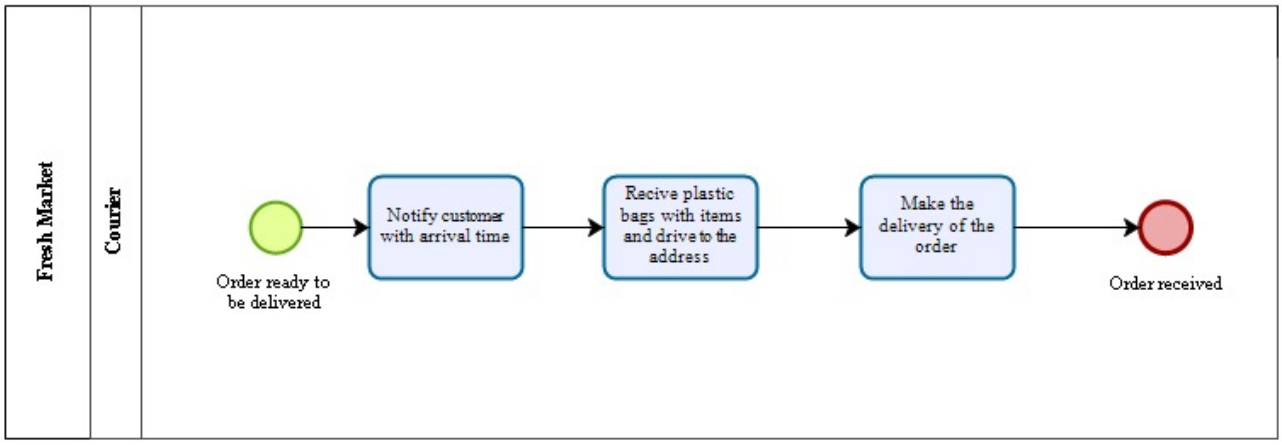

Fig. 25 - Home-Delivery Level 2

The couriers receive the plastic bags and drive to the correspondent address in order to deliver the order and the invoice. With the new system, the couriers take less time to receive the order, since they will already be ready to departure when the Order Packaging process is done, decreasing the mean time in 3 minutes.

Average time per order: 2 minutes

FINANCIAL ANALYSIS

Annual Costs of TO-BE:

Fig. 26 - Annual Costs in TO-BE

Resource	Quantity	Monthly Wage	Monthly	Annualy
Manager	1	1100,00 €	1100,00 €	13 200,00 €
Staff	3	850,00 €	2550,00 €	30 600,00 €
Packager	2	700,00 €	1400,00 €	16 800,00 €
Cashier	2	750,00 €	1500,00 €	18 000,00 €
Couriers	3	750,00 €	2250,00 €	27 000,00 €
Information System			**Monthly**	**Annualy**
			5834,00 €	70 008,00 €
			Total per Month	**Total per Year**
			14 634,00 €	175 608,00 €

TO-BE's Hardware costs (only happen on 1st year):

Cost per tablet = 400 €

Total costs = 400*8 = 3200 €

TO-BE's Estimation of Savings in Paper and Plastic:

Fig. 27 - Estimation of savings

Resource	Quantity in AS-IS per day	Variance of quantity per day in TO-BE	Cost per unit	Monthly Savings	Annual Savings
Paper (% of atm rolls)	7,5	-100%	0,40 €	90,00 €	1080 €
Paper (sheets)	45	-100%	0,05 €	67,50 €	810 €
Plastic bags	100	-30%	0,04 €	36,00 €	432 €
				Total per Month	**Total per Year**
				193,50 €	2322 €

CONCLUSION

We believe that we were able to understand and model the process and ultimately approach the process's main problems and inefficients, while proposing a solution more aware of environmental and financial costs.

With this being said there were some limitations found throughout the development of this report.

Limitations:

- Some of the data considered in the Process Analysis and Financial Analysis had to rely on our team's assumptions, as we were not provided with some data such as average value of orders (in €), average number of shopping bags and paper usage, average consumption values of gas in home-delivery (in €), etc;

- It was outside of our team's responsibility to determine which specific Information System should be implemented, as we only determined the functionalities it must have to improve Fresh Market's performance.