

Mapping and Optimization of Customer Service and Planning processes

Raquel Oliveira Pinho

Dissertação de Mestrado

Orientador na FEUP: Prof. Jonas Henriques de Lima



Mestrado Integrado em Engenharia e Gestão Industrial

2022-10-26

Abstract

Supply Chains (SC) are essential enablers in a modern economy. As a result of technological and societal developments, SC systems are inserted in an environment that is changing quickly and fundamentally. As a result of this continuous environmental change, Supply Chains need to get digital, comprehend the processes and, most importantly, have the ability to build solid and loyal relationships among suppliers and customers. Thus, to reach these points, Supply Chains need to digitise the processes to get more intelligent and faster.

Based on this, Colep CP started a path whose goal is to profit from both plants' capacities and availabilities independently of physically working from Portugal or the Poland plant.

However, to join two different working methods, it is essential to go deep into both processes to see their differences, evaluate possible solutions and implement those that bring more value to the team and customers. Therefore, this project aims to reduce the time spent on manual and non-value tasks, go deep into the process models' representation, and identify and implement possible improvements.

Resumo

Mapeamento e Otimização dos processos de Customer Service e Planeamento

As Supply Chains (SC) são essenciais numa economia moderna. Como resultado de desenvolvimentos tecnológicos e sociais, os sistemas das SC estão inseridos num ambiente que está a mudar rápida e fundamentalmente. Como resultado desta contínua mudança ambiental, as Cadeias de Abastecimento precisam de se tornar digitais, ter uma compreensão dos processos e, o mais importante, ter a capacidade de faturar relações fortes e leais entre fornecedores e clientes. Assim, para alcançar estes pontos, as Cadeias de Fornecimento precisam de digitalizar os processos e tornar-se mais inteligentes e rápidas.

Foi com base nisto que a Colep CP iniciou um caminho cujo objetivo é beneficiar das capacidades e disponibilidades de ambas as fábricas independentemente de estarem fisicamente a trabalhar a partir de Portugal ou da fábrica da Polónia.

No entanto, as duas têm diferenças nos métodos de trabalho, sendo essencial aprofundar os processos das duas fábricas processos para ver as diferenças entre eles e eliminar ou criar outros novos. E é com este objetivo de reduzir o tempo despendido em tarefas manuais e não-valorosas e aprofundar a representação dos modelos dos processos e possíveis melhorias a serem feitas

Acknowledges

My journey during the last six years has been a roller coaster, with many ups and some downs, but in the end, the most enriching experience of my life. I grew up and learned some soft skills that nowadays are crucial for my profession. I take with me and implement a baggage full of knowledge in the most diverse areas, allowing me to follow different paths from now forward. However, the most crucial apprenticeship of all this journey is what it takes to reach a dream. It took a lot of perseverance, hard work, sleepless nights, some tears, and moments when nothing made sense anymore, but the desire to reach the end was more significant than any stone that gets in the way, and the only option I had was never to give up.

During these six years, many people crossed my way, and most of them had a crucial part in this journey, and I want to thank them.

First, I would like to thank Professor Ana Camanho. She never gave up on me, saw my potential besides my struggles, and believed in me like anyone else. Also, she confronted me many times and gave me wise advice I will take with me for the rest of my life. Another Professor I would like to thank for always showing a preoccupation with my journey is Professor Paulo Coelho. He believed I would achieve what I wanted, even when I did not believe in myself and like Professor Ana, his affection was comforting and busted my confidence.

Then I would like to thank Professor Jonas Lima for his guidance during this project, but most of all for his patience, comprehension, and help during these last months. This project was not easy because of the number of things I had on my hands besides this project, but he never gave up on me and this project. Also, I thank Professor Américo Azevedo for their guidance and for sharing their fantastic knowledge regarding Process Mappin and Optimization during my master's and now in this project.

Furthermore, I want to thank Professor Henriqueta Nóvoa and Professor Maria Carravilha for their support in this project, the advice and, most importantly, for believing in me. They gave me that boost to finish this project and reminded me that this path I started in 2016 is almost ending, so this is just another step forward.

I also thank Engineer Isabel Sousa and Engineer Gonçalo Castro from Colep CP. They believed in me from day one and gave me advice and guidance beyond what they were asked to do. They invested in me and this project and took me into their team in the warmest way possible. And what a team I was put into, an amazing one, and I want to thank to “supply chain ladies”, as I like to call them, for making this experience the most enriching one, for all the patience in teaching me the way things were done in there and for the good moments.

Also, I want to thank the friends I made in Colep CP outside my department, whom every day pushed me to make this project the best one. They were always there to hear, guide, and help but most importantly, they always believed in me.

Lastly, but most importantly, I want to thank my family and friends for always being there for me and believing in me since day one. A special thanks to my parents for allowing me to follow this path and showing me the importance of education. Also, for pushing me to be the best I can be and teaching me that if you want to reach something you wish, you must fight for it no matter what others might say or believe. To my sister, thank you for hearing me, believing in me, and making me laugh when I was down. To my boyfriend, I thank him for just being by my side. There are no words to express his love and patience during this journey.

If today I am what I am, I owe everyone there, not only on this journey but in my life since I was born. They made me grow and taught me lessons that have shaped my personality. So, thank you all for being by my side and always believing in me.

“Success is stumbling from failure to failure with no loss of enthusiasm.”

Winston S. Churchill

Table of Contents

1	Introduction.....	1
1.1	Project Framework.....	1
1.2	Colep Consumer Products.....	2
1.3	Project Objectives	3
1.4	Methodology	4
1.5	Master Thesis Structure.....	5
2	Literature Review	7
2.1	Supply Chain.....	7
2.1.1	Definition.....	7
2.1.2	Supply Chain Management	8
2.1.3	Supply Chain Resilience.....	9
2.1.4	Supply Chain Mapping	10
2.1.5	Digital Supply Chain	11
2.2	Business Processes.....	12
2.2.1	Definition and Types of Business Processes	12
2.2.2	Business Process Management (BPM).....	13
2.2.3	Process Map.....	14
2.3	Multilevel Process Modelling.....	14
2.3.1	Responsibility Matrix (RAS Model).....	15
3	Supply Chain As-Is Model.....	17
3.1	Contextualization	17
3.2	Organizational Chart.....	18
3.2.1	Departments involved in Supply Chain Process	22
3.3	Analysis of Supply Chain Processes	23
3.3.1	Main Processes of Supply Chain	23
3.3.2	Creation of New Customer and Delivery Address Codes	25
3.3.3	Upload New Orders Plan.....	26
4	Improvements Implemented and the respective Results	28
4.1	Uniformization of models Portugal and Poland	28
4.1.1	Problem explanation.....	28
4.1.2	Implemented solution	28
5	Conclusions and perspectives of improvements.....	31
	References	33
	Attachment A: Additional Information	37
	Attachment B: Processes RAS matrix and Fact sheets	43
	Attachment C: Improvements.....	46

Acronyms

ASCM	Association for Supply Chain Management
B2B	<i>Business-to-Business</i>
Colep CP	Colep Consumer Products
CSCMP	American Council for Supply Chain Management and Professionals
DSC	Digital Supply Chain
ERP	Enterprise Resource Planning
ICC	International Chamber of Commerce
ICS	Information & Communication Services
KPI	Key Performance Indicators
MRP	Materials requirements planning
OEE	Overall Equipment Effectiveness
RAR	Refinarias de Açúcar Reunidas
RAS	Responsibilities Matrix
SAP	System Applications and Products
SC	Supply Chain
SCM	Supply Chain Management
SCMp	Supply Chain Mapping
SCR	Supply Chain Resilience

Table of Figures

Figure 2.1 – Hierarchy of supply chains, logistics and transportation (Zijm et al., 2019).....	8
Figure 2.2 - Supply Chain process (Swaminathan, 2001).....	9
Figure 2.3 – Domains into which resilience capabilities fall (<i>Supply Chain Resilience for an Era of Turbulence</i> , 2020)	10
Figure 2.4 – PDCA cycle.....	13
Figure 3.5 – The three product categories that exist in Colep CP (Colep Consumer Products, 2022).....	18
Figure 3.6 - Supply Chain Organisational Chart (Own source)	19
Figure 3.7 – Supply Chain Process Map (own source)	24
Figure 3.8 - Responsibility Matrix for the process: Creation of New Customer and Delivery Address Codes (own source)	25
Figure 3.9 - Responsibility Matrix for the process: Upload New Order Plan (own source) ...	26
Figure A10 – Attachment A: Packaging Formats existing in Colep CP (Colep Consumer Products, 2022).....	37
Figure A11 – Attachment A: Form I50.M006.1 – Warehouse Master Data.....	38
Figure A12 – Attachment A: Form I50.M014.1 – Customer Master Data	39
Figure A13 - Attachment A: The Incoterms are a set of 11 individual rules issued by the International Chamber of Commerce (ICC) which define the responsibilities of sellers and buyers for the sale of goods in international transactions (International Chamber of Commerce, 2022).....	40
Figure A14 – Approaches that Build real-time Supply Chain Resilience (<i>Supply Chain Resilience for an Era of Turbulence</i> , 2020)	41
Figure A15 - Approaches that Build Strategic Supply Chain Resilience (<i>Supply Chain Resilience for an Era of Turbulence</i> , 2020)	41
Figure A16 – Benefits of BPM for Enterprises, Customers, Managers and other actors (Association of Business Process Management Professionals, 2013).....	42
Figure B17 - Responsibility Matrix.....	43
Figure B18 - Responsibility Matrix.....	44
Figure B19 - Responsibility Matrix.....	44
Figure B20 – Fact sheet	45
Figure B21 – Customer Creation Swimlane.....	45
Figure C22 – Reports Examples.....	46
Figure C23 – Macro created to automatize reports	47
Figure C24 – Development of converter	47
Figure C25 – New improvement in a transaction.....	47

1 Introduction

The Project depicted in this report arises within the scope of the course unit Dissertation, which urges in the second year of the Master in Engineering and Industrial Management.

The Project was developed in a Business Environment inside Colep's Consumer Products (Colep CP) Plant in Vale de Cambra. This company, previously known as Colep, was split into two legal entities on the first of July of 2021, Colep Consumer Products and Colep Packaging. After the split and considering that Colep has multiple plants worldwide, it urged the need to standardise and optimise the work between plants to have global departments instead of local ones. Since this is a complex process, it takes time and must be done gradually, so it was started with Portugal's and Poland's plants. Inside the Supply Chain (SC) department, this was started with the Customer Service team.

Considering this context, this chapter describes the project framework, the history of Colep CP, the objectives defined for this project, the methodology and a brief description of the main chapter.

1.1 Project Framework

Colep Consumer Products is a global contract manufacturing partner that provides creative end-to-end solutions in different Product categories such as Beauty and Personal Care, Home Care and Hygiene and Sanitise. It offers the highest quality products and supply chain solutions across four continents. Colep CP is a leading European aerosol and liquids manufacturer, and it has plants in Portugal, Poland, Germany, México, and Brazil.

Due to the split and the international context in which Colep CP is inserted, it urged the need to change from a work culture that promoted the individualised work of each plant, meaning that each plant has its working methods and norms, to uniform work culture. This aim is for the different plants to have the same way of thinking, the same way of working, the same norms and being able to work as one, even though they are physically separated.

It is with this aim in mind that Supply Chain departments from Poland and Portugal were joined into one single Department. Since joining teams is a very complex and dynamic process, it is not prudent to simultaneously join all supply chain teams from all Colep CP's plants. Therefore, it was started with the two departments previously referred.

If before Portugal had one Supply chain team to guarantee Vale de Cambra plant production and Poland another team for the Kleszczów plant, now there is only one global Supply chain team for both plants, making it possible for an employee in Portugal to buy the materials necessary for production in Poland and vice versa. However, with the rise of this new global Supply Chain team, it urges the need to normalise and standardise the processes, so every team member works by the same norms and in the same way.

The Supply Chain department is divided into four areas: Customer Service, Planning, Purchasing and Warehouse/Logistics. These areas are broader and more complex, so consequently, they cover a lot of macro processes, which in turn cover many micro-processes. Within this context, in 2021, various dynamic sessions were made with the Supply Chain employees from both Portugal and Poland. The main objectives of these sessions were to raise and map all the processes associated with the different areas, identify the main problems related to them, and determine what improvements could be made to solve or minimise those processes. To know what areas were more critical and which issues need to be solved first, a Risk Matrix was used.

Therefore, it is within this context that the current project, Mapping and Optimization of Customer Service and Planning Processes, appears.

1.2 Colep Consumer Products

Colep Consumer Products is a Portuguese company with 57 years of history, founded in 1965 by Ilídio Pinho in Vale de Cambra. The name Colep urges from the founder's family name, Costa Leite Pinho. Back then, Colep started its activity, in a small plant, as a metallic packaging manufacturer, especially metal packaging for cookies. It was only in 1975 that Colep began its activity in Contract Manufacturing, positioning itself as one of the few companies in the business of formulation, production, filling, and packaging.

Then in 1993, Colep made its first significant investment outside Portugal when acquiring S.C. Johnson's plant in Spain, creating a new company called "COLEP España – Embalajes u Productos Envasados, S.A.". At that time, COLEP showed its potential to grow into one of the best European companies in Contract and Metal Packaging Manufacturing. Furthermore, between 2000 and 2001, The RAR Group acquired COLEP from COLEP Holding due to that potential.

The RAR Group is a well-known Holding company that was started in 1962 with the company "RAR - Refinarias de Açúcar Reunidas, S.A.R.L.", an industrial sugar refining plant in Porto and created by João Macedo Silva. From the beginning until the early seventies, the company consolidated their business in the sugar market. Then until the early eighties, it started to acquire other companies with other activities to diversify its business. Colep was just one of those companies. Besides Colep and the initial company RAR Açúcar, nowadays, the RAR Group also holds companies such as Acembex, RAR Imobiliária and Vitacress, meaning this group has a business portfolio that goes from food to real state businesses.

From 2001 forward, the Colep company grew internationally like never before, starting in 2004 with the incorporation of ColepCCL from the merger of Colep and CCL Custom Manufacturing Europe to create Europe's most significant contract manufacturing company. In 2007, the RAR Group acquired the 40% stake of the CCL Industries previously held in ColepCCL, resulting in the total control of ColepCCL by the RAR Group.

In 2009 ColepCCL acquired the German company Czewo Full Filling Service GmbH, reinforcing ColepCCL's leading position in Europe in the contract manufacturing sector. However, the RAR group aimed to expand ColepCCL to other markets outside Europe, making Colep a multinational company. So, in 2010, ColepCCL entered the Brazilian market by acquiring 51% of Provider/Total Pack companies. Thanks to this partnership, a new aerosol-based consumer products production plant was launched.

Followed 2013, when Colep, that meanwhile in 2011 changed its name from ColepCCL to just Colep and set up an agreement for Manufacture and Technology with "One Asia Network" to cover the entire operations of both organisations in Asia, Australia, Brazil, and

Europe. This agreement aimed to develop and improve solutions for local and global clients by combining Know-how, Innovation, R&D, Quality, Operations and Security.

Also, in the same year, Colep achieved two more essential markets. The first market was reached by acquiring an industrial unit in Mexico, and the second was by entering a joint venture with a company in the United Arab Emirates. These multiple operations positioned Colep in the “Top 3” worldwide for the contract manufacturing field.

With a solid position in the market, Colep, in 2015, reached the majority controlling state by acquiring the remaining 49% of the Brazilian companies, strengthening their role in the Brazilian, but most notably, the global market. Due to this privileged position, Colep, 2016 started constructing a new plant in the industrial centre of Kleszczów, Poland, where two other industrial units existed. This unique unit was an investment dedicated to strengthening Colep position in an increasing segment of the contract manufacturing field, the Liquids and Cream segment. It started operating in 2018, and the production of the Zülpich plant in Germany was transferred to this new unit and the existing unit of Bad Schmiedeberg, also in Germany.

After all these investments, Colep started in 2020 to implement projects for increasing capacity in contract manufacturing of Aerosol products in Mexico and Liquids & Cream products in Poland. These projects aimed to provide adequate capacity for the increased demand in the North American and European markets.

Finally, on 1 July 2021, Colep announced the split of its businesses into two new companies, Colep Packaging and Colep Consumer Products. The Colep Consumer Products company was then presented as a global leader in the Personal Care, Beauty, and Homecare Markets, holding a leading position in providing contract manufacturing services for these European segments.

Furthermore, Colep CP’s focus was innovation, providing product solutions worldwide and original design manufacturing capabilities and offering its customers support with full-service manufacturing, supply chain and logistics, and ready-to-go solutions. High-end technological tools and experienced teams with vast knowledge in Aerosols and Liquids & Cream segments provide this.

1.3 Project Objectives

Based on the results obtained in the sessions referred on the sub-chapter and after discussing the primary purpose of this project, the following objectives and sub-objectives were identified:

- Standardize working methods for Customer Service and Planning areas between Portugal and Poland;
- Mapping the existing processes resorting to visual models that also show the tasks, the actors, the inputs, and the outputs associated;
- Optimize the time spent on reports and daily tasks;

Smaller and more specific objectives were defined based on the previous sessions made by Supply Chain Team to achieve the primary goals. Together, they led to the three points above, and those sub-objectives are:

- Analyse the defined processes and the improvements raised by Supply Chain Team in the previous sessions;
- Check if there are more opportunities for improvement in these two areas besides the ones determined in the sessions previously made;

- Identification, Reduction or Simplification, when possible, of non-value tasks related to the processes to increase the available time of the team to concretise value tasks;
- Standardize/Customize SAP customers reports;
- Reduce by 50% the time dispended to do reports for customers;

1.4 Methodology

Initially, this project was meant to have a duration of 18 weeks. However, due to the dimension and complexity of the project, it was necessary to increase the number of weeks to 34 weeks, meaning that the project was made from 2 March 2022 to 26 October 2022. Because of this increase, the initial plan had to be changed.

For the first three weeks of this project, it was necessary to learn more about Colep CP, from its history to its mission, which products are made in Colep CP, the customers Colep CP has, how the organisational structure is divided and the primary function of each department. To learn all these, various inductions were made with each department manager, and Engineer Isabel showed the plant in Vale de Cambra and each department inside the plant to provide contact with Colep CP's employees. It was meant to do the same thing in Poland after the first two months of this project. However, due to the war between Ukraine and Russia and considering that Poland is a neighbouring country of Ukraine, it was decided that this trip during this project was too risky to be done.

After this decision, the project had to be adapted to the new circumstances, so the mapping, standardisation and optimisation of Supply Chain processes were done for Portugal and Poland's Customer Service processes and only for Portugal Planning processes. Based on this, after the first three weeks and until week seven, the goal was to understand and analyse the work and information flows. To achieve this, there was an exhaustive reading of Supply Chain procedures and the Quality Manual, which describes the framework and main principles of the Colep CP Plant Quality Management System and its alignment with international standards. Besides, this Manual ensures that products and services provided can satisfy and exceed the expectations of customers and final consumers.

Afterwards, the process maps and improvements raised by the Supply Chain team were analysed from week seven to week eight. Then from week eight until week twelve, the team showed how the process works, which meant daily work of being side by side with the team to watch them work to understand how the tasks are being done and the problems they face, going deeper in the Customer Service and Planning daily tasks.

Based on this, from week twelve until week sixteen, all the reported information was analysed, and the process maps and flows based on a new approach were redone. Then it got easier to raise the main opportunities and gaps present in the processes, and based on the defined objectives of this project, the first improvements to be made were prioritised.

After this prioritisation, when possible, every two weeks from week sixteen until week twenty-eight, there was a meeting with the ICS team to expose what improvements needed to be done in SAP, the Enterprise Resource Planning (ERP) used in Colep CP. For these improvements, some were reached, and some were not because the process takes much time until the upgrades are achieved. This is because, besides the ICS team's availability to make those improvements, the Supply chain team also needs to test those improvements and check if the problem is solved. Moreover, during these weeks, this availability problem was worst because it was during the months of holidays, so the teams had more work on their hands. While

waiting for the conclusion of these SAP improvements, some tools were developed in Excel to help reduce the time it took the team to do some tasks.

In parallel, during these weeks, various video calls were made with the Customer Service team in Poland to understand if the processes analysed and done in Portugal were being done in Poland in the same way and, when not, how it was being done there. Additionally, during this period, the automatisisation of the reports, so the time it takes to do them decreases, was also being done in some clients chosen by the team as a priority. After the automatisisation, the team was taught how to do the reports with the new tools developed. Besides, the time previously measured before this change was measured again to know precisely the reduction of time obtained.

Finally, from week twenty-eight until week thirty-four, the thesis document was done and presented to the team.

1.5 Master Thesis Structure

This Thesis is divided into six chapters that contain the following information:

- 1) Introduction: In this first chapter it is described the project framework as well as the brief history of the company. Also, what it is intended to reach with this project, the methodology used and the document's structure.
- 2) Literature Review: This one presents the literature review for the tools and concepts used to develop this project based on the knowledge acquired during the Master.
- 3) Supply Chain As-Is Model: This chapter is the one that represents the organisational chart of the company and what are the main functions associated with each department, going into more detail about the Supply Chain department. Also, it describes how the work is being done through the presentation of process maps and which tools and systems are used to do the job. All of this is done with more detail for the Customer service and Planning area.
- 4) Improvements Implemented and the respective Results: All the improvements raised when analysing the previous As-Is Model are presented. Furthermore, it is defined which improvements are a priority and the leading solutions developed and thought to solve the main problems. As in chapter three, it was given priority to the improvements needed in the Customer Service and Planning area. The improvements started during this project are described in this chapter. The results obtained for the upgrades already finalised are presented based on the objectives proposed in chapter one.
- 5) Conclusions: Finally, in this chapter, there is a brief compilation of the essential things achieved by this project and what is needed to conclude some improvements as well as what can be done to achieve even better results than the ones obtained.

2 Literature Review

According to MacCarthy *et al* (2022), the 21st century revealed the fragile nature of global supply chains due to a series of events and new trends that together have been forcing companies to recognise that fragility so then improvements can be thought and achieve ensuring that supply chains gain resilience and security, two crucial characteristics that must be inherited in supply chains as the global economy changes.

Consequently, to achieve those characteristics and improvements, it urges the need to understand, be aware and know more about how things work and flow inside supply chains. In this context, mapping, standardisation, and analyses of processes help understand the present to gain the resilience necessary to face the future.

Therefore, this chapter reviews concepts and other studies associated with supply chains and processing modelling.

2.1 Supply Chain

Since this project is about mapping, analysing and improving the processes in a supply chain, it is essential to define what a supply chain is and then clarify four critical concepts related to it, Supply Chain Management (SCM), Supply Chain Resilience (SCR), Supply Chain Mapping (SCMp) and Digital Supply Chain (DSC).

2.1.1 Definition

From the first civilisations until today, such as Egypt, men needed to possess goods with value and well preserved, such as money, lands, food or livestock, to negotiate and exchange those values for others mainly necessary to survive and to be more prosperous. Therefore, societies back then needed to be able to transport and store those goods most effectively and efficiently to guarantee that they were offering the best ones, with a price reasonable enough to have high profits. Thus, to have higher profits, it was a common practice to store goods as close as possible to the source (Zijm *et al.*, 2019).

Subsequently, it is this primary necessity to exchange well-preserved goods with the minimum costs and displacements that, through time, led to the Supply Chain concept. The first time that related terms such as logistics and transportation were acknowledged in a book, stating the cruciality for reaching economic growth, was in the 18th century, by the philosopher Adam Smith (1776). Since then, supply chains have been an object of interest and of multiple studies that have led to different definitions.

However, in this project, it is considered two definitions from the most conceited associations of the supply chain, the Association for Supply Chain Management (ASCM) and the American Council for Supply Chain Management and Professionals (CSCMP):

- ASCM (“ASCM Supply Chain Dictionary | ASCM,” 2022):

Supply – “The quantity of goods available for use; The actual or planned replenishment of a product or component. The replenishment quantities are created in response to a demand for the product or component or in anticipation of such a demand.”

Supply Chain - “The network of suppliers that deliver products from raw materials to end customers through either an engineered or transactional flow of information, goods, and money.”

- CSCMP (CSCMP, 2013):

Supply Chain - “encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers.”

2.1.2 Supply Chain Management

Supply Chain Management is a recent concept that appeared in literature nearly forty years ago. It is often used as a synonym for Logistics management despite being two different concepts (Cooper et al., 1997).

According to ASCM (2022), the term Logistics “in a supply chain management context, it is the subset of supply chain management that controls the forward and reverse movement, handling, and storage of goods between origin and distribution points”. Therefore, Logistics Management is a “part of supply chain management that oversees the planning and execution of forward and reverse flows of goods and related information between points in the supply chain to meet customer requirements”.

Consequently, Logistics and Logistics management are not synonyms for Supply chain management but a part of it (Figure 2.1). Thus, it is relevant to define and clarify this context that despite being a recent one, it is one of the most important to conduct a business because it can help to reduce costs, improve the service provided to customers, make faster deliveries and most importantly it helps to prepare the supply chain to react faster to market demands and innovations (*Supply Chain Management and Operations Management - Florida Tech Online, 2022*).

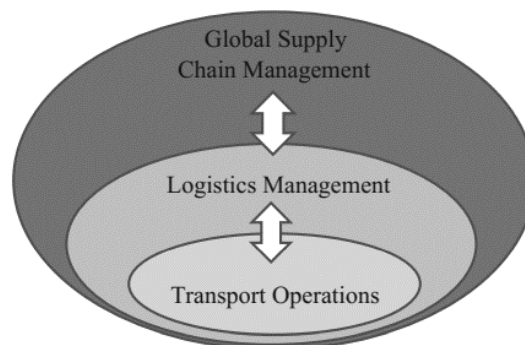


Figure 2.1 – Hierarchy of supply chains, logistics and transportation (Zijm et al., 2019).

So being according to ASCM (2022), supply chain management is “The design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronising supply with demand, and measuring performance globally”. Moreover, SCM includes “the

coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers” (Zijm et al., 2019).

Furthermore, when managed efficiently, SCM covers all processes, from the beginning, when the product is designed, until the end, when it is sold, made available to the customer and finally consumed. As represented in Figure 2.2, it is being included processes such as product design, procurement, planning and forecasting, production, distribution, fulfilment, and after-sales support (Swaminathan, 2001).

Additionally, it is highlighted that besides covering all these processes, it is also essential to integrate processes and functions within organisations inside supply chains to tie them up to each other and consequently tie their success to the chain as a whole, reinforcing that the real competition is not made company against company, but instead is supply chain against supply chain (Cooper et al., 1997).

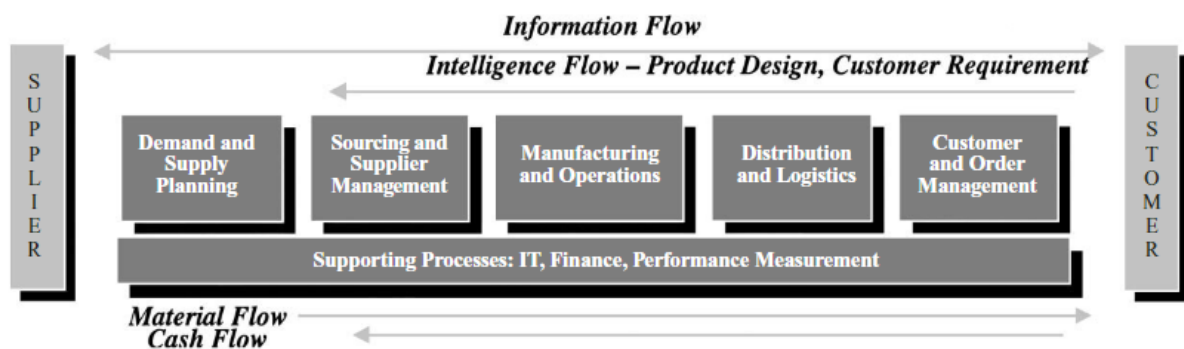


Figure 2.2 - Supply Chain process (Swaminathan, 2001).

2.1.3 Supply Chain Resilience

The first definition of Supply Chain Resilience appeared in the early twenties and was authored by Christopher and Peck (2004). They stated that resilience in a supply chain is the ability to return to its original state or move to a new one that is more efficient, effective, competitive and profitable. Back then, this resilience was an option for companies that wanted to prosper and gain an advantage over other companies. However, today it is not just an option. It must be recognised as a competitive advantage inherited in supply chains for companies that wish to succeed in a turbulent era where the risks they can face tend to intensify and not reduce. Without this resilience and adaptability, companies will not survive long-term (Noam Frankel, 2022).

The risks companies might face are diverse, ranging from trade and geopolitical tensions to cyber-attacks, pandemics, second-order social effects (such as unrest, conflicts and mass migration), resource depletion and climate changes. Related to this last topic, there is an increasing convergence between supply chain resilience and sustainability. Moreover, companies that are conscious about the impact their activities might have on the environment and try to differentiate from competitors by implementing sustainable and environmentally friendly measures are getting competitive among other companies, attractive to customers and are more resilient, which is proven by their better performance. (*Supply Chain Resilience for an Era of Turbulence*, 2020)

Covid-19 was a significant risk faced in the last three years that originated significant demand fluctuations and goods shortages due to lockdowns and the closure of borders (Moosavi et al., 2022). The pandemic exposed supply chains' fragility and vulnerability, forcing the importance of having an agile, resilient and smart supply chain (Fonseca & Azevedo, 2020). Furthermore, due to covid-19, awareness of supply chains was raised among businesses, the

public and investors who will be watching how companies strengthen their resilience in their supply chain, which will be a decisive factor for them to go forward in investing or not.

Another risk that recently appeared for supply chains, when most of them were rebuilding their strategies and starting to grow again after the pandemic, was the war started by Russia against Ukraine in February of this year. This war has weakened supply chains, especially in Europe, which has a dependency on both countries' natural gas, crude oil, vital agricultural commodities and metal commodities commercialised by Russia that are crucial to producing catalysers converters which are a significant component necessary to make cars (Jim Kilpatrick, 2022).

It is unquestionable the rising importance of having a resilient supply chain. However, it urges another question of how to measure this resilience. So to do it, companies must strengthen capabilities that fall into two similar domains defined as:

- **Real-time supply chain resilience:** *“is concerned with a company’s tactical capability to avoid, withstand, and bounce back from supply chain disruptions and recover to a ‘normal’ state of affairs”*. Companies must understand their supply chains’ dependencies and vulnerabilities to prevent potential problems. After acknowledging these, it is possible to take steps to mitigate the problems by responding to them with flexibility and agility.
- **Strategic supply chain resilience:** *“is an emerging concept that focuses on how companies adapt to a changing environment”*. As described in this subchapter, supply chains face frequent and more severe disruptions, so companies need to adapt their supply chain to this new reality. Similarly to the previous domain, the first step is to understand their vulnerabilities across an expanded risk horizon and create sustainable and circular strategies that lead to strong relationships across the value chain.



Figure 2.3 – Domains into which resilience capabilities fall (*Supply Chain Resilience for an Era of Turbulence*, 2020)

Additionally, in Attachment A is possible to explore more about this domain by presenting the risk-agnostic approaches that supply chain managers must consider first to strengthen supply chain capabilities to bounce back and recover (Attachment A, Figure A14) and then to bounce forward and adapt to a new normal (Attachment A, Figure A15).

2.1.4 Supply Chain Mapping

The last three years have shown the importance of Supply Chain Mapping as a risk-mitigation strategy. During the Covid-19 pandemic, most companies hardly faced the crisis's impacts. These companies had to work to survive, always trying to keep up with the news and

working diligently to secure their supply chains. Consequently, their response was reactive and uncoordinated.

However, a small minority of companies that before the crisis had invested in mapping their supply networks emerged better prepared because, instead of scrambling at the last minute, they had better visibility into their supply chains, meaning they had much information available in just a few minutes allowing them to prepare beforehand and so mitigate the possibility of a disruption (Thomas Y. et al., 2020).

According to ASCM, SCMP is “*drawing the processes or relationships that form an organisations business process*”(2022). However, Gardner and Cooper (2003), back then in 2003, gave a value significance to this concept. According to them, SCMP is not only related to representing the linkages and the supply chain members. An adequately made map is one that “*can enhance the strategic planning process, ease the distribution of key information, facilitate supply chain redesign or modification, clarify channel dynamics, provide a common perspective, enhance communications, enable monitoring of supply chain strategy, and provide a basis for supply chain analysis*”. Furthermore, they explain why SCMP is essential, and the reasons are:

- To link corporate strategy to supply chain strategy since a map of easy understanding and well-illustrated enhances the environmental scanning process of strategic planning;
- To store and distribute critical information for supply chain survival in a dynamic environment since it alerts planners of possible constraints in the system;
- To help visualise the supply chain and identify the areas that need to be deeply analysed;
- To display channel dynamics;
- To help define the perspective of the supply chain integration effort;
- To lead to a common understanding of the SC;
- To provide better communication between firms, functions, and corporate units;
- To monitor SC integration progress;
- To orient new individuals or firms to their role in the SC;
- To improve supply chain management procedures.

There is no doubt about the importance of SCMP. However, many companies have not done it because it takes a lot of labour and time to do this effectively. So, most companies continue to rely on human intelligence, which represents a risk since when employees who know this information leave, change roles or retire, the knowledge goes with them most of the time. It can take years for the new employees to have the necessary information.

Therefore, SCMP is an intensive and challenging result to achieve, but there is no way to go around it since the value of the map has been revealing itself as more significant than the cost and time to develop it (Thomas Y. et al., 2020).

2.1.5 Digital Supply Chain

The Digitalization of supply chains is a recent concept that has been discussed in the last decade in academic literature associated with terms such as Smart Supply Chain, Digital Supply Chain, Supply Chain 4.0 or Self-thinking Supply Chain. Many advances in communication and computing technologies have highlighted how this last decade has transformed the world from analogue to digital.

According to ASCM (2022), Digitalization is “*the process of delivering digital media, such as music or video files, by electronic means from the point of origin at the content provider*”

to the destination with the consumer. Similar to how a physical item must go through a supply chain process in order to mature from components to a consumable product, digital media must pass through various stages in processing before they can be enjoyed by a consumer via a smartphone, tablet, computer, television, or other device". When associated with supply chains, it is recognised *"that traditional supply chains configured to distribute physical goods or services can be enhanced via technology—such as computers and other connected devices, the internet of things, and related sensors—and digital content. For example, real-time monitoring of equipment can allow companies to proactively schedule maintenance or replace parts."*

Thanks to today's digital technologies, Supply chains are no longer just a tool for resource management, logistics and optimisation. They are also a tool to help attain situational awareness and context-sensitive decision-making to become customer-driven, personalised agile, and responsible. Consequently, this digitised supply chain increases efficiencies and leads to improved customer experience and revenue growth, making this *"a wonderful time for supply chain professionals to stand up and become part of the corporate strategic agenda"* (Rogers et al., 2017).

However, to survive and grow in this digital world, companies must adopt agile digital supply chains that must have the following characteristics:

- **Connected:** Enabling communications among interconnected devices, systems and processes;
- **Informed:** Leveraging the expanded information sources available in today's world;
- **Smart:** Incorporating high-speed, in-memory, advanced analytics to drive real-time insights;
- **Automated:** Adopting robotics and other automation technologies to improve productivity and reduce costs.

2.2 Business Processes

Business Processes (BP) are vital in determining companies' quality, innovation and efficiency. To stand, companies must compete with their business process (Gošnik & Stubelj, 2022). Consequently, it is necessary to know more about this concept to understand its meaning and the advantages of the associated tools.

2.2.1 Definition and Types of Business Processes

Before presenting the definition of BP, it needs to be clear what a process is. It is a set of activities (actions, operations or decisions) executed through a sequence in response to a trigger event with a corresponding valued result (Azevedo, 2021).

Therefore, a process can be anything from something simple to a large complex industrial process, and in the last case, the representation of the processes leads to solid communication since it gets easier to analyse the process (Johansson & Nafisi, 2020).

Taking into consideration the process definition, it can be defined what the BP is and, according to Gošnik and Stubelj (2022), the business process is a set of comprehensive, logical and dynamic activities connected between each other to enable a company in the economic environment it is inserted, to have a defined business outcome preferably a successful one.

Furthermore, according to the Association of Business Process Management Professionals (2013) and Faria (Faria A., 2020), there are three types of processes:

- **Core Processes:** The processes linked to the company mission so the company can deliver value to customers. These processes can be known as Primary processes besides the Core processes denomination, and those references are because of the critical representation of these processes in the essential activities. Additionally, at each step, this process adds value to the preceding step.
- **Support Processes:** These are those that, although not within the value chain, are required to execute the core process successfully. The main difference between the core processes is that the support processes do not deliver value to customers directly and are often linked to functional areas.
- **Management Processes:** These processes are behind the organisation's significant decisions since they are designed to ensure, monitor and control business activities. They are the processes responsible for ensuring that the goals of the support and core processes are achieved. They can be classified into two management processes: the strategic processes (e.g., preparing an activity plan and budget) and the operational processes (e.g., planning daily production).

2.2.2 Business Process Management (BPM)

It is known that BPM can bring significant benefits to organisations, for example, process transparency, process standardisation, and employee communication, among many others (Malinova & Hribar, 2014). So, it gets relevant to understand what Business Process Management is. According to ASCM (2022), it is *“A business discipline or function that uses business practices, techniques, and methods to create and improve business processes. BPM is a holistic approach to the use of appropriate process-related business disciplines to gain business performance improvements across the enterprise or supply chain. It promotes business effectiveness and efficiency while striving for innovation, flexibility, and integration with technology.”*

Moreover, according to the Association of Business Process Management Professionals (2013), Business Process Management should be made according to a cycle that addresses the planning, design, implementation, execution, measurement, control, and continuous improvement of business processes. The vast majority of Business Processes can be mapped according to the PDCA cycle. PDCA stands for Plan, Do, Check, Act (Figure 2.4).



Figure 2.4 – PDCA cycle

As indicated by the cycle's name, this cycle is composed of four phases described as follows:

- **The Plan Phase:** This phase aims to ensure that business process context and internal process design align with the company's strategic objectives. Success in this phase is achieved if it gets clear the contribution that the process outputs

have to the customer value proposition and if the process design used leads to the company's performance expectations.

- **The Do Phase:** The goal for this phase is to deploy the process per the specifications developed in the previous phase and then bind the process to the operations.
- **The Check Phase:** This phase aims to measure process performance and compare the obtained results with the performance expectation defined in the Plan phase. Examples of performance measures categories are: Timeliness (e.g., cycle time, delivery on date schedule); Product Quality (e.g., Number of defective products, Volume of rework); Service Quality (e.g., Responsiveness, Service reliability); Cost (e.g., Labor cost, Material cost); Customer satisfaction (e.g., Product and service expectations achieved).
- **The Act Phase:** In this phase, it is evaluated the process performance and based on it, companies react accordingly. This phase assures the maintenance of the process integrity despite the environmental instability and countless changes. Additionally, this phase ensures that performance goals are met over time.

Moreover, Attachment A, Figure A16 presents the benefits of BPM for the four stakeholders group considered most relevant: Enterprise, Customer, Management and Actor.

2.2.3 Process Map

Considering the objectives of this project, it is crucial to understand what is a Process Map and its importance of it to an organisation. Process Map is one of the first steps organisations must do to identify the problems and implement improvements. The Map allows stakeholders to visually acquire a better understanding of the processes under study.

According to Malinova and Mendling (2013) "Process maps provide an aggregated visual overview of all processes of an organisation. They facilitate basic understanding of the way an organization operates, without necessarily going into details. It has been reasoned that an obvious communication flow between processes contributes to a good understanding of business process models, hence enabling a higher success rate than one that is harder to interpret due to hidden process dependencies".

Furthermore, Oakland (2008) stated that "Process mapping and flowcharting are very important first steps in improving a process. The flowchart 'pictures' will assist an individual or team in acquiring a better understanding of the system or process under study than would otherwise be possible. Gathering this know-ledge provides a graphic definition of the system and of the improvement effort. Process mapping, is a communication tool that helps an individual or an improvement team understand a system or process and identify opportunities for improvement".

Additionally, to construct a Process Map, it is necessary to gather information about the important activities that take place in a process and be able to decide how much detail and how many tasks should be included.

2.3 Multilevel Process Modelling

Multilevel analysis and modelling are fundamental principles in engineering. It means decomposing a complex system into several simpler subsystems that can be easily analysed separately. It is applied when analysing any other complex engineering system: be it a machine or a complex business process (Faria A., 2020). This Model has three levels as follows:

- **1st level:** represents the main phases of the macroprocess and aims to understand who are the various actors present in each of the phases, as well as their milestones. The milestones correspond to the goal to be achieved at the end of each of these phases. This may be an output or a task to be completed and represents the end of the phase. It is represented using responsibility matrices.
- **2nd level:** Corresponds to a modelling of the workflow within each of the phases identified in the previous level. Allows us to understand the sequence of tasks performed and by which of the intervening parties. Each phase is represented by an individual diagram that can be a swim diagram or a flowchart.
- **3rd level:** the most detailed level of the process and provides information about the instructions of a given task, almost like a “receipt” that it must be followed when performing the task. This level can take the form of a diagram like the previous level, pictures text or tables. This element helps in clarifying how to perform a given task, which errors to avoid and which aspects should be taken into account by the task actor.

2.3.1 Responsibility Matrix (RAS Model)

This matrix defines the following three main roles for the actors involved in the processes (Faria A., 2020):

- **Responsible:** is the one that executes or coordinates the work (typically, the technician) is a task-oriented designation that applies to the person (or people) completing the work. A whole team can be responsible for the execution of one task.
- **Approves:** The actor/s that approve is responsible for the timelines and quality of the result. Can delegate the work and is typically the last to review the steps taken until the result.
- **Supports:** The ones who support provide information, analysis, and other support to the person responsible.

3 Supply Chain As-Is Model

Based on the project objectives defined in chapter one of this document, it was essential to watch how things were being done in the department and analyse all the processes because a prerequisite to improve them is to have sufficient knowledge of the current status (Arkilic I. Guven and Reijers, 2013).

Therefore, throughout this chapter, it is explained in more detail the processes, the areas responsible and that participate in them, the inputs and outputs associated, and the tools used on it. Also, it is described the organisational structure inside Colep CP. Only when modelling the current situation, gets possible to identify shortcomings and potential improvements (Schwegmann Ansgar and Laske, 2003).

3.1 Contextualization

Before introducing the organisational chart and the description of the processes, it is essential to contextualise some relevant things associated with this project. To start with, it is necessary to know who is the final customer and for Colep CP, it is Retailers and Independent Brands, which means that Colep CP is a business-to-business (B2B) company. Then, it is crucial to describe what products Colep CP offers customers.

Since Colep CP is a contract manufacturing company, it offers the customer two options. The first is the possibility of manufacturing in Colep CP's facilities aerosol and liquids whose formulas are developed by customers. For this, Colep CP offers multi technologies and robust processes which ensure products are made in compliant and safe facilities across the globe to meet the highest demands and fully adhere to industry standards.

The other one is a solution in growing that consists of providing customer aerosol and liquids finished formulations, as well as customised ones, developed by the research and development department inside Colep CP. For this, it is offered the development of aerosols and liquids from concept to wholly tested products, providing formula and packaging expertise, regulatory compliance, and sustainable solutions. This is possible due to Colep CP's global presence and a strong network of partners and quality suppliers. Furthermore, due to the experience of Colep CP's chemists and a vast database of more than one thousand formulations, it is possible to offer on-trend, agile developments and implemented product solutions across the facilities.

Based on the two options referred to in the previous paragraphs, the products Colep CP offers are divided into three product categories, as shown in Figure 3.5.



Figure 3.5 – The three product categories that exist in Colep CP (Colep Consumer Products, 2022).

Furthermore, the product can be an aerosol or a liquid classified as cosmetic or non-cosmetic. This classification is the base to identify the lines in facilities meaning the line can produce cosmetic aerosols, non-cosmetic aerosols, cosmetic liquids, and non-cosmetic liquids. The non-cosmetic lines cannot produce cosmetic products, and vice-versa due to the high-quality standards Colep follows, which is also required from customers.

Some examples of cosmetic aerosol products are shower foams, mousses, and deodorants. For cosmetic liquids, an example is shower gel. Examples of non-cosmetic aerosols can be shoe care or cleaning products. This last example can also be an excellent example of non-cosmetic liquids products. It is possible to have some products like air fresheners that, in practical terms, are non-cosmetic products but can be produced in cosmetic lines based on the defined quality standards. It is known in Colep CP as a hybrid product. Besides being able to make all the products referred to in this paragraph, Colep CP offers customers a wide variety of packaging formats, as can be seen in Attachment A, Figure A1.

Finally, indicating what Enterprise Resource Planning (ERP) system is being used in SC is relevant. An ERP system includes programmes that help automate and manage business processes for all core business areas. In SC, the main one is System Applications and Products (SAP) software. SAP software provides multiple business functions that help manage complex business processes by allowing employees access to real-time insights across the company. Through this, it is possible to accelerate the workflow, improve operational efficiency, raise productivity, increase profits and enhance customer relationships.

3.2 Organizational Chart

As previously mentioned in the subchapter Project Framework, Colep CP has existed since the first of July of 2021 and has been gradually joining Vale de Cambra and Poland plants' departments. The organisational structure has been changing slowly from the beginning of the project until the end, so the chart described in this subchapter represents the most recent structure.

To begin with, the department nowadays is known as Supply Chain Europe Department and has two Senior Managers that report to the Chief Operations Officer. Both Senior Managers are responsible for two of the four areas of the Department. One Senior Manager is responsible for the Planning and Customer Service areas. It is important to reinforce that this project was done in these two areas, so the processes analysed in deep detail are the ones related to these areas. However, to understand all the processes inside the department, the other areas are briefly described in the process map and responsibility matrix. These other areas are the Purchasing and Logistics ones, and the other Senior Manager is responsible for them.

Considering this, the department's organisational chart is represented below in Figure 3.6. In this chart, it is possible to see the positions in the department, the number of people in each position and the country from which the employees in that position are working. Based on this chart, it is relevant to clarify the main functions for each area and the Senior Managers

because the employees under these functions are the main actors in the processes described in this chapter, highlighting that it is given more enface on Senior Manager, Planner and Customer Service roles.

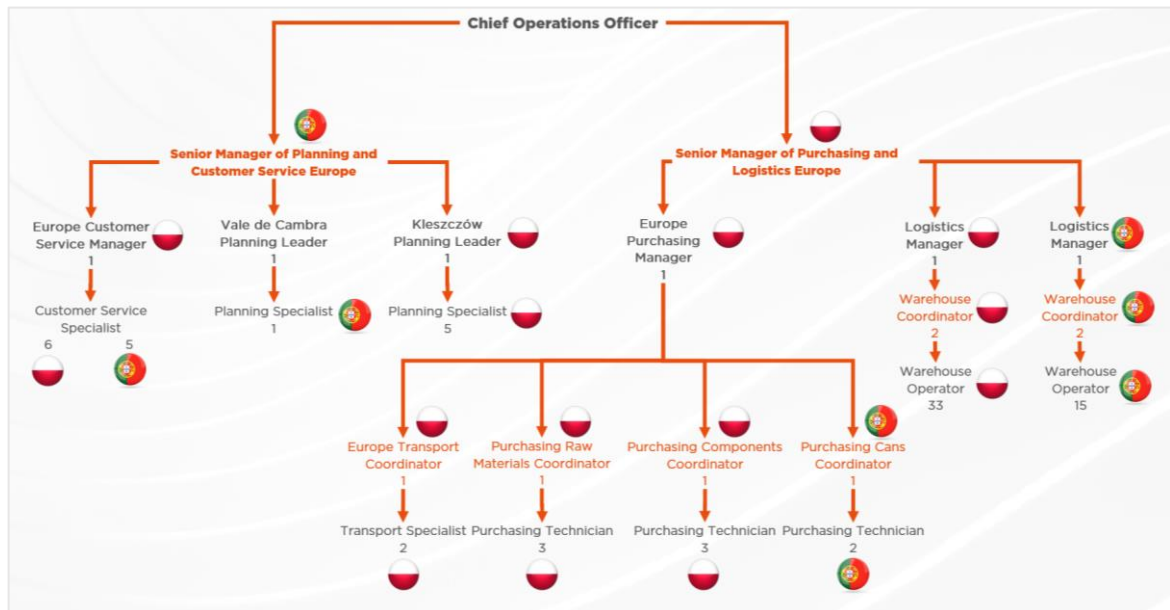


Figure 3.6 - Supply Chain Organisational Chart (Own source)

Senior Manager Function

Supply chain managers are crucial for the global economy and their companies' growth, and in Colep CP, this is no different. The Supply chain's manager is the one that interacts with all organisational levels in order to deliver the best to the customer (Rossetti & Dooley, 2010).

They are present from the urging of the customer's new demand project until customers get the desirable finished goods. Additionally, they engage in the design, planning, execution, control, and supervision of supply chain activities entailing the responsibilities associated with their role, which means they are not there only to make the process flow but to be part of the solution when problems appear. Furthermore, their primary goals are to create value, increase company competitiveness, leverage logistics, synchronise supply with demand, and measure the performance during the al process.

Their main functions in Colep CP are:

- Planning sales and operations, including forecasting;
- Material requirements planning;
- Production planning;
- Manager customer issues;
- Align supply chain activities such as planning, sourcing, production, and delivery with demand;
- Manage issues in the supply and availability of material;
- Measure operational and financial performance;
- Identify and mitigate risks.

Customer Service Function

The customer service team is the customer's voice inside Supply Chain. They are responsible for addressing customers' needs, inquiries and requests to deliver a product to the customer at the time specified by the customer ("ASCM Supply Chain Dictionary | ASCM," 2022).

Customer Services are the face of Colep CP for the customer, meaning that depending on how they relate with customers and satisfy customers' requirements and expectations, they can influence Customer retention and sales increase and attract new business. Furthermore, customer service is nowadays a critical differentiator between companies, a prerequisite for customers and a vital force to generate profits (Melović et al., 2015).

Based on this, the main functions of Customer Service in Colep CP are:

- Collect customer information (required in forms I50.M006.1 and I50.M014.1 attached in Attachment A, Figure A11 and Figure A12);
- Receive the customer's new order plan to upload it into the system;
- Analyze if the new order plan complies with Service Level Agreement before saving the plan in the system;
- Confirm to the customer if the new order plan is going forward after Planning Analysis;
- Every time the customer wants to make changes in the order plan, for example, anticipate or postpone some productions, Customer Service is responsible for communicating that to Planning by giving them all the required information and, after the planner's analysis, is responsible for informing if those changes are possible to the customer (Rush Order Process);
- Guarantee that customer has the Finished products. Depending on the incoterms (represented in Attachment A, Figure A13), customer service can be responsible or not for the FP expedition and for guaranteeing that the Customer has the products in the Delivery Address they choose;
- Guarantee customer is satisfied with the service level given and that customer's expectations are exceeded;
- Give customers all required information through reports.

Planner Function

Planners are fundamental in Supply Chain, and their function is considered the most critical activity for supply chains (Flöthmann et al., 2018). Without the proper development and execution of strategy made by planners, companies would not survive for long (*Planning in Supply Chain Management - ExploreSCM*, n.d.).

Planning in the supply chain is about satisfying customer demand most efficiently. This means producing what the customer wants at a minimum cost and delivering it on the required date. The Planner needs to see if it is possible to produce based on materials availability, line capacity and available workforce. Therefore, a good Supply Chain plan is based on customer demand forecast, Materials requirements planning (MRP), Key Performance Indicators (KPI), data analysis, Stock availability and Enterprise Resource Planning (ERP).

The planner's primary functions are to:

- Validate and update the new order plan in the ERP system based on materials availability and lines capacity;
- Approve orders anticipations, postponements, or cancellations and act accordingly to the situation;
- Give Purchasing team the list of materials necessary to buy to produce on time;

- Follow-up daily Plan to avoid unpredictable events;
- Analyze a medium/long run considering customer forecast period demand;
- Calculate and analyse the indicators associated with planning in the supply chain to analyse and measure what was made, what results were obtained and what can be done to improve.

Purchaser Function

The purchaser is the one that interacts with other organisations to guarantee that the necessary goods and services are provided on time for production to start. Subsequently, the purchaser's role is essential for a company that wishes to succeed since more than half of companies' turnover is spent on supplies.

There are two types of purchasing the strategic sourcing and the operative procurement. The first is related to supply planning, supplier selection and contracting, while the second is about material ordering, expediting and paying (Schiele, 2019). Colep CP has these two types of purchasing. The first one is made by the Procurement department, whose function will be explained in the following subchapter (3.2.1). The second purchasing type is the one made inside the Supply chain area, and the Purchasers main functions are as follows:

- Contribute to sales and operations planning;
- Create forecasts and make them visible to suppliers;
- Perform material requirements planning;
- Align demand with sourcing activities;
- Place orders on suppliers based on demand;
- Schedule the orders deliveries and guarantee all documentation is issued;
- Identify shortages in suppliers and search for alternatives to mitigate risks of failing production;

Logistics Function

Logistics in the supply chain is related to the inbound and outbound movement of raw materials, components and finished products. Therefore, this area includes all the inbound and outbound processes to and from warehouses as well as reception, dispatching and storage procedures, including the issuing and analysing of all the documentation necessary to expedite and receive, respectively (Zijm et al., 2019).

Considering the previous paragraph, it must be highlighted that the logistics area is complex, with many manual tasks associated with the flow of materials and goods. Due to that, the number of employees in this area is higher than in the other areas, and employees have different roles implying more levels in the organisational structure under this area. However, this area is not the main subject of study in this project, so the following main functions are related to the logistics managers and coordinators:

- Coordinate inbound and outbound shipments;
- Provide input into logistics, transportation, and distribution strategy development;
- Manage transportation documentation;
- Schedule operational tasks, such as receipting, picking, packing, and shipping;
- Balance demand management with capacity;
- Supervise the warehouse operation from unloading of inbound shipments to picking and staging of outbound shipments;
- Assist in maintaining the security of the warehouse.

- Ensure the optimal utilisation of space through warehouse consolidation;
- Assure the integrity of the inventory and assist in conducting physical inventories;
- Support the warehouse Key Performance Metrics (KPI);

3.2.1 Departments involved in Supply Chain Process

Supply Chain is a department covering multiple areas that help to make the production process happen. However, this department does not work alone to achieve the standards that Colep CP and its customers defined. It needs other departments' support to deliver the best and supports other departments in which, and without SC's support, the work can not be done correctly. Some of those departments appear in the following sub-chapters as actors within the SC processes and can have different roles. Such departments are:

- **Engineering:** It guarantees that Colep CP has the right equipment to produce. Otherwise, they need to evaluate with suppliers what improvements can be made in machines or check new possibilities market offers related to more effective machines or equipment to try to achieve customers' desires while always considering Colep CP's budget and goals.
- **Operations:** This is the department that works closest to SC because, after the Planner's weekly production plan, the Operations department is responsible for scheduling the daily production based on indicators such as OEE and keeping SC informed on production status. Moreover, in case of appearing problems that put production at risk, it is this department's function to work on the best solution, so production does not stop.
- **Technical:** It is responsible for specifying, by working closely with customers, some characteristics products need to surpass customers' wishes and fulfil international and Colep CP's standards. Moreover, they are responsible for the trials that need to be done in order to start producing. Logically when a line is stopped due to trials, it cannot produce customer necessities, so the Planner must know when and for how long trials will occur, in which lines and what materials will be necessary.
- **Quality:** This department ensures that everything that enters is inside and ultimately leaves Colep CP is accordingly to the quality standards defined. These standards are very demanding since most products are cosmetic ones, so if something is not ok, the consequences are indeed inflicted on the customer.
- **Service Management:** Three functions constantly interact with the SC team in this department. The Project Managers are responsible for implementing the new project until the first production. Only then the production plan responsibility passes to Planners. However, to keep going with production after the first one, Planners must have everything available and planned, so communication with Project Managers is crucial.
There is also the Account, and Key Account Managers that deal with financial activities associated with each customer, from invoices to prices passed to the customer.
- **Continuous improvement:** The role of this department is to continuously question how things are being done and why, what are the advantages and problems inherited and afterwards work to have the correct answer. They are responsible for continuously finding the best solutions to improve employees' way of working, companies' metrics, and the positive impact of everyone's actions.
- **Procurement:** The department responsible for guaranteeing Colep CP has a reliable and efficient supplier network. They must search for which supplier offers

the best components or raw materials, at the best price, with the highest quality, on time and in the quantities requested.

- **Sales:** The commercials inside the sales department are responsible for selling Colep CP's products and services, based on plant capacity and availability, in the market so new projects and new customers can be achieved.

3.3 Analysis of Supply Chain Processes

To analyse the processes more deeply, the company's process map was created, which provides a vision of all the processes described in section 3.3.1. Then for each process, correspondent responsibility matrices and process sheets were made showing the existing Micro processes inside each main process and the actors relevant to those micro processes (Attachment B).

This analysis allowed to know which processes and the Micro correspondent processes, Customer Services, and planners intervene directly and their role inside those phases. For some of these micro-processes, it was necessary to have more detailed information, so a swim lane model was created and then analysed.

The detailed analysis of the swim lanes tasks highlighted which tasks could be improved, which followed a team discussion to define the steps necessary to achieve the improvements. These opportunities were, in some cases, the standardisation of procedures in the Portuguese and Polish units and, in other cases, the automation of tasks that were performed manually and were very time-consuming.

In this chapter, there are three sections. Section 3.3.1 presents the company's global process map in detail. Then in the 3.3.2 and 3.3.3 sections, it is presented as an example of two responsibility matrixes for the following processes: Creation of new Customer and Delivery Address Codes; and Upload of New Orders Plan.

3.3.1 Main Processes of Supply Chain

As previously mentioned in chapter two, the approach followed during this project which consists of mapping the processes inside the SC department, is the best way to decompose a complex system into several simpler subsystems that can be analysed separately and more attractively visible, allowing stakeholders to quickly identify the workflow necessary to create value for the customer.

Even though the processes that must be analysed in detail are for the customer's service and planning area, to better understand the workflow that triggers the processes in these areas, it gets relevant to represent the main phases of the SC department. For that, a Process Map (Figure 3.7) was made to identify the main phases of the processes inside the department.

However, some considerations must be well-thought-out before analysing the main phases in more detail. The first is related to the timeline represented. This timeline was made to know when it starts and ends the primary phases. Additionally, it highlights the phases that depend on each other, meaning that when two phases are in the same horizontal line, the trigger to start the next phase is the end of the previous one.

Moreover, the phases that are in parallel are the ones that occur at the same time. In an era when demand gets more volatile and uncertain, and customers get more demanding because they want the products made with a minimum cost, with high quality and in the shortest time possible, it is important to have fewer dependence processes between them. Thus, in figure 3.7, it is possible to see that some phases are parallel, which means they are being executed

simultaneously. The phases represented in dashes are those not executed by SC but need SC support to be executed and conducted effectively and efficiently.

Furthermore, the main phases were classified as Core, Management or Support. Based on the explanation given in chapter two for each possible classification, most of the processes were considered core processes. Without these processes, no value is added to the chain since they are directly related to the product's creation, development, and delivery to the customer. Then, it was identified two support processes that help to add value to the core processes.

Finally, there are multiple management processes inside the department. However, only was considered the ones related to the areas under study.

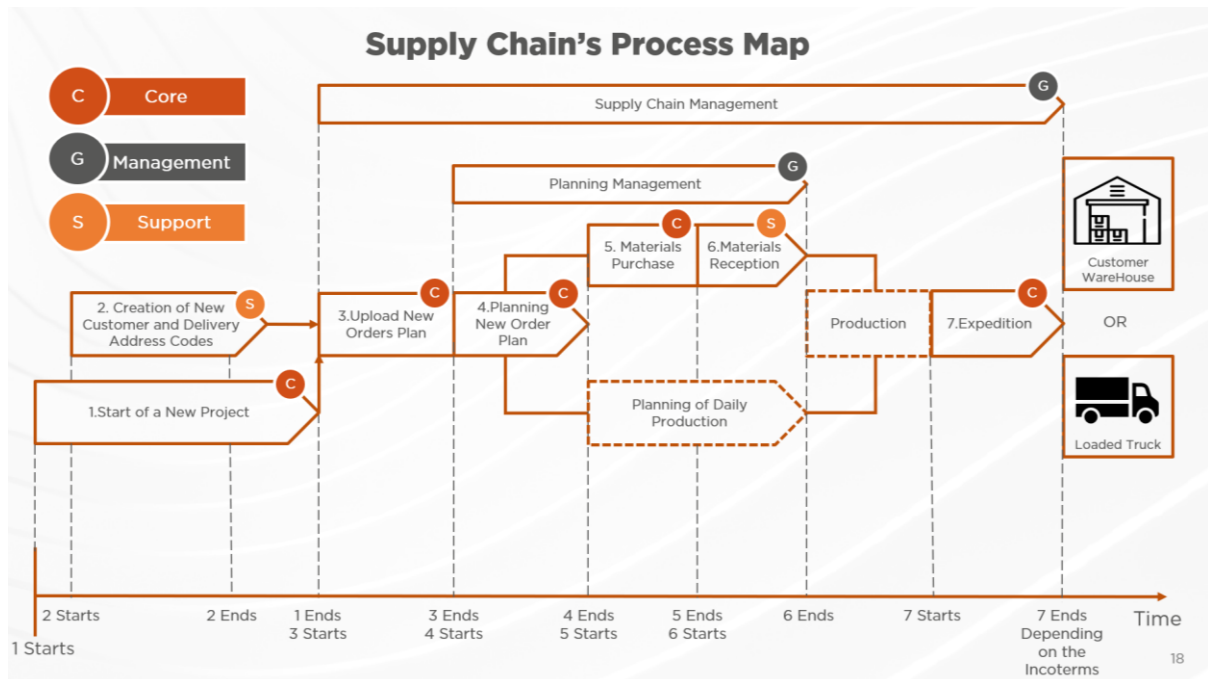


Figure 3.7 – Supply Chain Process Map (own source)

In a brief description, the workflow inside the SC department starts with the implementation of a new project. A project can be a new customer, a new product for an existing customer, or improvements in products already being produced. For example, if a customer wants to produce an aerosol in a smaller can with a smaller diameter, it originates a new project. During this phase, it is necessary to collect or actualise the customer information and the addresses for which products are going. When all information, documentation and technicalities are defined, and in the ERP system, the customer can send the file with the orders they demand.

When a customer with a customer service allocated to him sends a new plan with the orders they want within a timeline, customer service will analyse the plan given by the customer and upload the plan in the system.

Afterwards, the planner will analyse the possibility of producing the orders on time and in the quantity demanded based on materials availability and plant capacity. If confirmed, the planner informs customer service, who in return informs the customer.

Then it urges the need to let purchasers know what orders were confirmed so they can buy what is necessary to make the orders. They scheduled delivery dates based on warehouse availability and suppliers' lead times. When inside Colep CP, the warehouse team is responsible for receiving the goods (e.g., raw materials, cans) and storing them in the appropriate places after a quality check-up.

Forehead, every time an order is produced, it is necessary to have the product available to fill in the lines. For that, the warehouse team must collect from the warehouse and deliver the corresponding necessary materials in the pre-weighting area. Then they must transport other production components such as cans, valves, caps and others to the supermarket area at the beginning of each line. Without these deliveries from the Warehouse team, production cannot happen.

Finally, when finished goods are ready, they are placed in the appropriate space inside the supermarket. The warehouse team is responsible for automatically picking up the goods and storing them in the locations by SAP. Forwards, customer service schedules a day for the goods to be loaded and sent to customers.

3.3.2 Creation of New Customer and Delivery Address Codes

At the same time Project managers start and implement a new project, customer services' have the responsibility of collecting all customer information's, validated it and make sure it is available in the system after passing this information to the data base team. The Responsibility Matrix for this Main processes was made as in Figure 3.8.

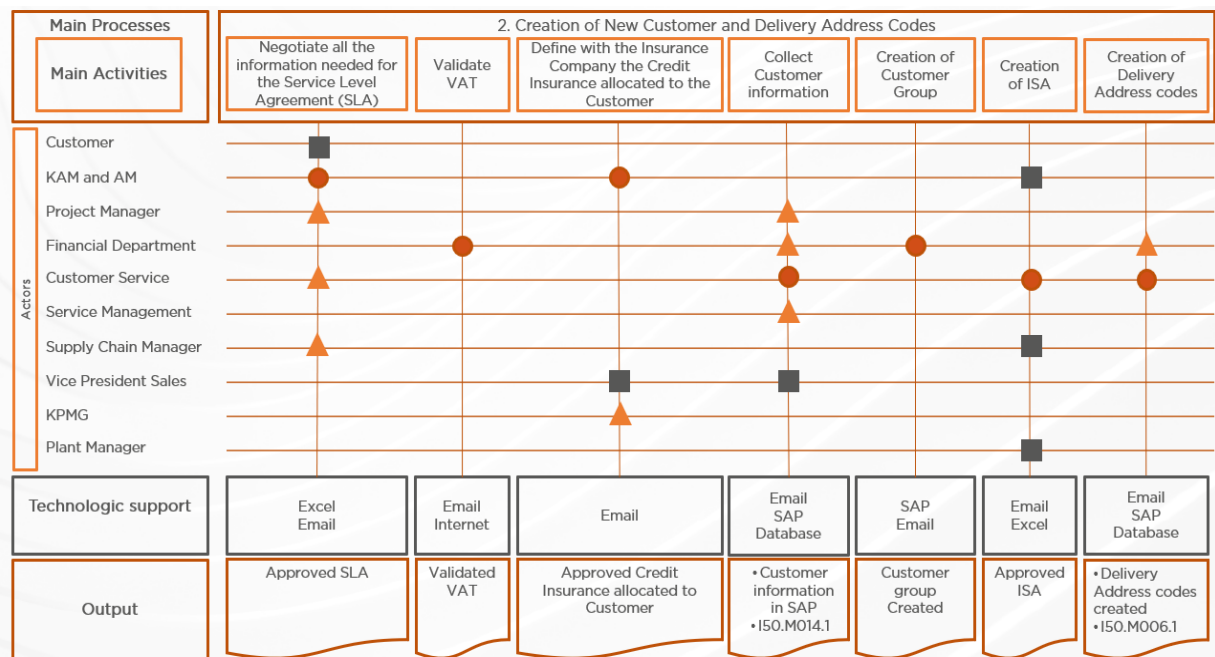


Figure 3.8 - Responsibility Matrix for the process: Creation of New Customer and Delivery Address Codes (own source)

3.3.3 Upload New Orders Plan

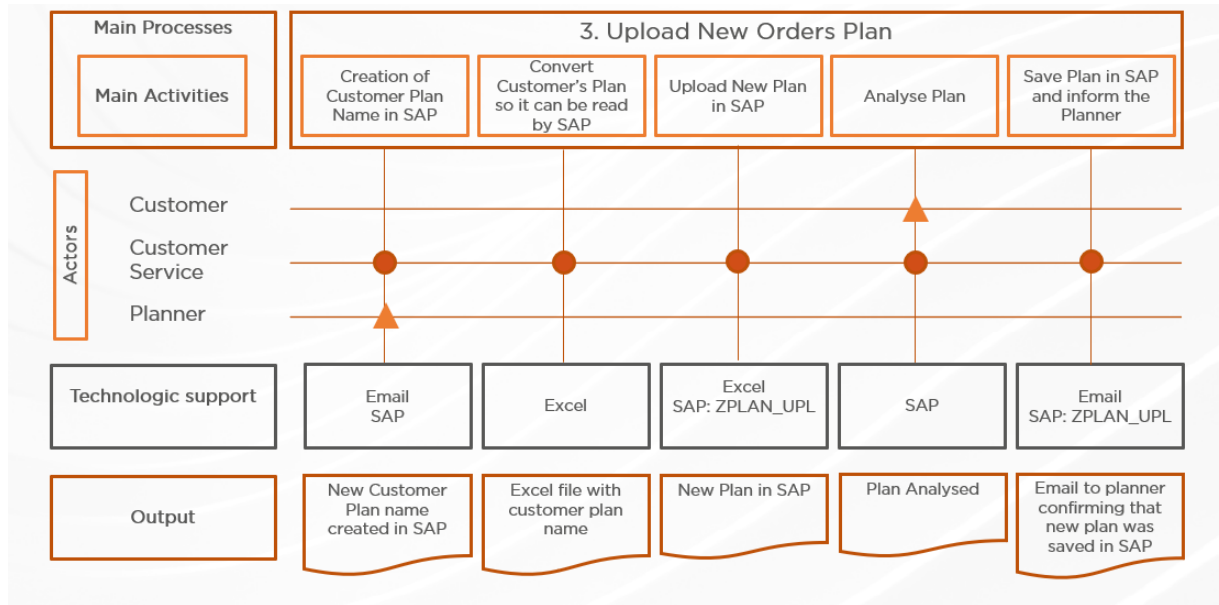


Figure 3. 9 - Responsibility Matrix for the process: Upload New Order Plan (own source)

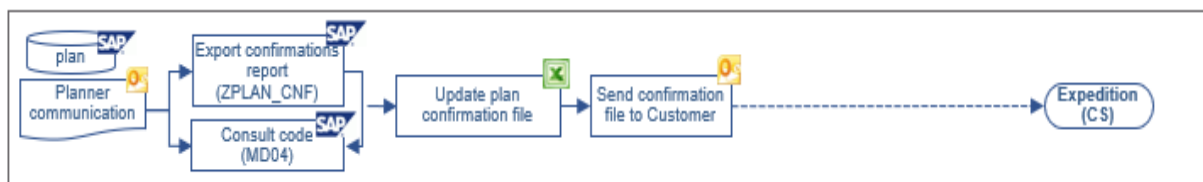
4 Improvements Implemented and the respective Results

The analysis of the models after the as-is survey allowed us to identify several improvements, many of which were implemented as part of this dissertation. In the following sections, we will describe some of these improvements. In the appendix, we list all the implemented improvements.

4.1 Uniformization of models Portugal and Poland

4.1.1 Problem explanation

Analysing the swimlane model of the plan confirmation by the teams allowed us to establish different procedures between both teams. While in Portugal, the plan update was automatic, in Poland, there was a sharing of excel files.



4.1.2 Implemented solution

The customer service team detected some errors when they were confirming the plan to the customer.

To keep you updated, some changes were made by the iCS team regarding Zplan_CNF. iCS improve this transaction by adding a new line after the backlog line. This new line reflects all comments made in the field Deviation Text that are fulfilled by planners when it is necessary.

This change was made so customer service team does not have to go inside MD04 one by one to now the Reason for Deviation (which requires much time when they have plans with many codes).

So, with this development, the error detected more than once is this: The Deviation Text field does not match the Reason for Deviation in transaction MD04.

Example: The Deviation Text says that the deviation is due to Material 61-17282, that will only be available in W29. However, the field Reason for Deviation is written 002 which means that the deviation is due to Line capacity.

After checking, the real reason of the deviation it is due to line capacity, meaning the field Reason for Deviation is correct but the Deviation Text field it is not and it has to be correct because in the transaction Zplan_CNF the field that appears is the Deviation Text .

Like this the information is in the system available for everyone.

The planners who used to work with excel files don't have duplicated work because, SAP is the only place to be fulfilled by them.

Customer Service team does not need to check one by one the reason of deviation.

With this change, confirmations must be done in SAP, meaning that Planners fulfil comments inside production orders. CS will extract confirmation from SAP by using zplan_cnf.

This improvement was already tested and it is working well.

5 Conclusions and perspectives of improvements

An overall analysis of Colep CP's business processes was carried out and in deep analysis of the sub-process in which the Customer service and planning units are most directly involve. The results of this analysis were shared with the company's teams from Portugal and Poland. From the teams' discussions important opportunities for improvements were identified. As described in Chapter 4, those opportunities were successfully implemented in the context of this dissertation. Chapter 4 describes two improvements, whereas Attachment C presents information on other implemented improvements.

These improvements have already produced positive results that translated into significant efficiency gains.

In addition to the improvements described in this document, others have been identified and are expected to be implemented in the upcoming months.

References

- Arkilic I. Guven and Reijers, H. A. and G. R. R. H. M. J. (2013). How Good Is an AS-IS Model Really? In P. la Rosa Marcello and Soffer (Ed.), *Business Process Management Workshops* (pp. 89–100). Springer Berlin Heidelberg. https://link.springer.com/chapter/10.1007/978-3-642-36285-9_11
- ASCM Supply Chain Dictionary | ASCM. (2022). In *ASCM: Vol. Seventeenth Edition*. <https://www.ascm.org/learning-development/certifications-credentials/dictionary/>
- Association of Business Process Management Professionals. (2013). *BPM CBOK : version 3.0*. ABPMP.
- Azevedo, A. (2021). Process Thinking in Engineering Education. *2021 IEEE Global Engineering Education Conference (EDUCON)*, 1110–1115. <https://doi.org/10.1109/EDUCON46332.2021.9454142>
- Christopher, M., & Peck, H. (2004). Building the Resilient Supply Chain. *The International Journal of Logistics Management*, 15(2), 1–14. <https://doi.org/10.1108/09574090410700275/FULL/PDF>
- Colep Consumer Products. (2022, November 7). *Product categories*. https://Colep-Cp.Com/Contract-Manufacturing/Aerosol_liquids/.
- Cooper, M. C., Lambert, D. M., & Pagh, J. D. (1997). Supply Chain Management: More Than a New Name for Logistics. *The International Journal of Logistics Management*, 8(1), 1–14. <https://doi.org/10.1108/09574099710805556/FULL/XML>
- CSCMP. (2013, August). *cscmp-glossary*. https://cscmp.org/CSCMP/Academia/SCM_Definitions_and_Glossary_of_Terms/CSCMP/Educate/SCM_Definitions_and_Glossary_of_Terms.aspx?hkey=60879588-f65f-4ab5-8c4b-6878815ef921
- Faria A., J. (2020). *Business Process Management*.
- Flöthmann, C., Hoberg, K., & Wieland, A. (2018). Competency requirements of supply chain planners & analysts and personal preferences of hiring managers. *Supply Chain Management*, 23(6), 480–499. <https://doi.org/10.1108/SCM-03-2018-0101/FULL/PDF>
- Fonseca, L. M., & Azevedo, A. L. (2020). COVID-19: Outcomes for Global Supply Chains. *Management and Marketing*, 15(1), 424–438. <https://doi.org/10.2478/MMCKS-2020-0025>
- Gardner, J. T., & Cooper, M. C. (2003). STRATEGIC SUPPLY CHAIN MAPPING APPROACHES. *Journal of Business Logistics*, 24(2), 37–64. <https://doi.org/10.1002/J.2158-1592.2003.TB00045.X>
- Gošnik, D., & Stubelj, I. (2022). Business process management and risk-adjusted performance in SMEs. *Kybernetes*, 51(2), 659–675. <https://doi.org/10.1108/K-11-2020-0794/FULL/PDF>

- International Chamber of Commerce. (2022, November 10). *Incoterms*. <https://iccwbo.org/publication/incoterms-2020-practical-free-wallchart/> .
- Jim Kilpatrick. (2022). Supply chain implications of the Russia-Ukraine conflict. *Deloitte Insights*. <https://www2.deloitte.com/uk/en/insights/focus/supply-chain/supply-chain-war-russia-ukraine.html>
- Johansson, A., & Nafisi, M. (2020). Process mapping in industry - the self-centred phenomenon and how it effects continuous improvements. *Procedia CIRP*, 93, 718–723. <https://doi.org/10.1016/J.PROCIR.2020.03.046>
- Maccarthy, B. L., Ahmed, W. A. H., & Demirel, G. (2022). *Mapping the supply chain: Why, what and how?* <https://doi.org/10.1016/j.ijpe.2022.108688>
- Malinova, M., & Hribar, B. (2014, June). *A FRAMEWORK FOR ASSESSING BPM SUCCESS*. https://www.researchgate.net/publication/262211522_A_Framework_for_Assessing_BP_M_Success
- Malinova, M., & Mendling, J. (2013, July 1). The Effect Of Process Map Design Quality On Process Management Success. *ECIS 2013 Completed Research*. https://aisel.aisnet.org/ecis2013_cr/160
- Melović, B., Mitrović, S., Djokaj, A., & Vatin, N. (2015). Logistics in the Function of Customer Service – Relevance for the Engineering Management. *Procedia Engineering*, 117(1), 802–807. <https://doi.org/10.1016/J.PROENG.2015.08.255>
- Moosavi, J., Fathollahi-Fard, A. M., & Dulebenets, M. A. (2022). Supply chain disruption during the COVID-19 pandemic: Recognizing potential disruption management strategies. *International Journal of Disaster Risk Reduction*, 75, 102983. <https://doi.org/10.1016/J.IJDRR.2022.102983>
- Noam Frankel. (2022, May 24). *Make Supply Chain Resilience a Competitive Advantage*. *ASCM Insights*. <https://www.ascm.org/ascm-insights/make-supply-chain-resilience-a-competitive-advantage/>
- Planning in supply chain management - ExploreSCM*. (n.d.). ExploreSCM. Retrieved December 6, 2022, from <https://explorescm.com/planning-in-supply-chain-management/>
- Rogers, B., Maguire, E., Nishi, A., Gagnon, R., Kurata, K., Chin, S., & Thompson, W. (2017). *Forbes Insights: Digital Supply Chain—Are You Leading the Pack?* https://www.forbes.com/forbesinsights/cognizant_supply_chain/index.html
- Rossetti, C. L., & Dooley, K. J. (2010). JOB TYPES IN THE SUPPLY CHAIN MANAGEMENT PROFESSION. *Journal of Supply Chain Management*, 46(3), 40–56. <https://doi.org/10.1111/J.1745-493X.2010.03197.X>
- Schiele, H. (2019). Purchasing and Supply Management. In *Operations, Logistics and Supply Chain Management* (pp. 45–73). Springer Science and Business Media B.V. https://doi.org/10.1007/978-3-319-92447-2_4
- Schwegmann Ansgar and Laske, M. (2003). As-is Modeling and Process Analysis. In M. and R. M. Becker Jörg and Kugeler (Ed.), *Process Management: A Guide for the Design of Business Processes* (pp. 107–133). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-540-24798-2_5
- Smith, A. (1776). *An Inquiry Into the Nature and Causes of the Wealth of Nations*. https://books.google.pt/books/about/An_Inquiry_Into_the_Nature_and_Causes_of.html?i=d=C5dNAAAcAAJ&redir_esc=y

- Supply Chain Management and Operations Management - Florida Tech Online*. (2022). Florida Tech. <https://www.floridatechonline.com/blog/process-improvement/supply-chain-management-vs-operations-management/>
- Supply chain resilience for an era of turbulence*. (2020). <https://www.ascm.org/supply-chain-resilience/>
- Swaminathan, J. M. (2001). Supply Chain Management. In *International Encyclopedia of the Social & Behavioral Sciences* (pp. 15281–15285). Elsevier. <https://doi.org/10.1016/B0-08-043076-7/04280-7>
- Thomas Y., C., Rogers, D., & Vakil, B. (2020, March 27). *Coronavirus Is a Wake-Up Call for Supply Chain Management*. Harvard Business Review. <https://hbr.org/2020/03/coronavirus-is-a-wake-up-call-for-supply-chain-management>
- Zijm, H., Klumpp, M., Heragu, S., & Regattieri, A. (2019). Operations, Logistics and Supply Chain Management: Definitions and Objectives. In *Lecture Notes in Logistics* (pp. 27–42). Springer Science and Business Media B.V. https://doi.org/10.1007/978-3-319-92447-2_3/FIGURES/2

Attachment A: Additional Information

Our Packaging Formats



Figure A10 – Attachment A: Packaging Formats existing in Colep CP (Colep Consumer Products, 2022)

REQUEST TO DATABASE		Page: 1 of 1
Customer Master Data		Revision: 1
		Data: 07.11.2019

Request to:	<input type="checkbox"/> Create new SAP code <input type="checkbox"/> Update existing SAP code:	*
Requested by:		Request Date:
Company/Sales.Org.:		*

Central Data

* Customer Name:	
* Search Term:	
* Street / House No.:	
District:	
* Postal Code:	
* City:	
Region:	
* Country:	
* Communication Language:	
Phone Number:	
Fax Number:	
* VAT/TAX Number:	
CNPJ Number(BR):	
State Tax Number(BR):	
Municipal Tax Number(BR):	
Contact Person:	
Contact Phone Number:	

Local Data

* Key Account Manager:	
* Account Manager:	
* Customer Segment:	
* Customer Group:	
* Payment Terms:	
* Currency:	
* Incoterms:	
* Account Assign. Group:	
* Tax Classification:	
Bill-to Party:	
Payer:	
Ship-to Party:	
Others:	

Customer SAP Code: Date:

Created/Changed by: Date:

Financial Data

* Contact for payment:	
* Position:	
* Phone Number:	
* Fax Number:	
* E-mail:	
* Bank Name:	
* Bank Address:	
* SWIFT / BIC CODE:	
* IBAN / CLABE:	
* Credit Ins. Limit:	
* Credit Inform. Date:	
* Credit Limit:	

Created/Changed by: Date:

* - mandatory data

Remarks:

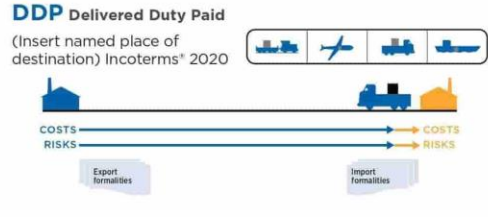
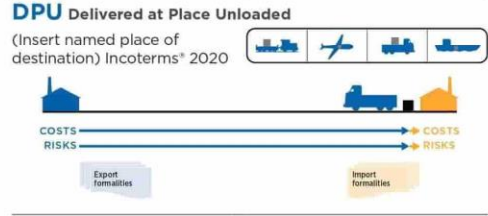
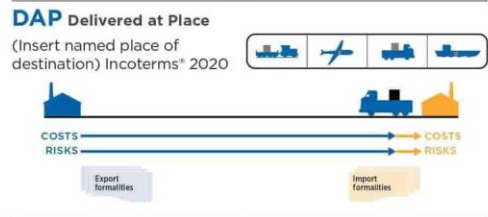
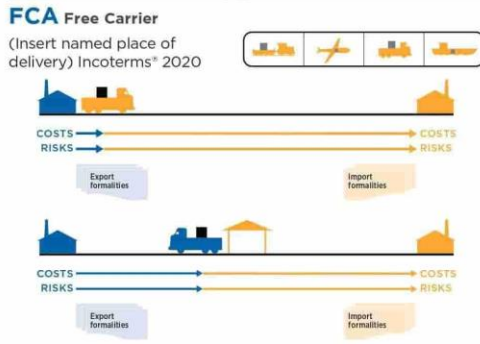
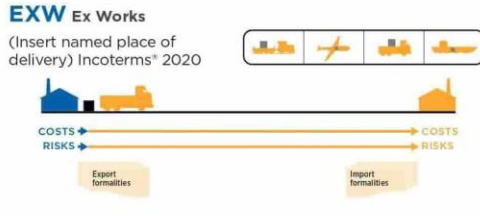
Figure A12 – Attachment A: Form I50.M014.1 – Customer Master Data



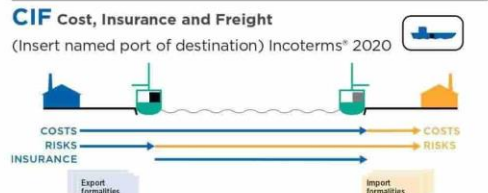
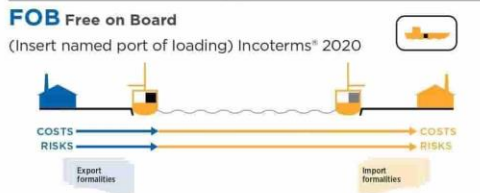
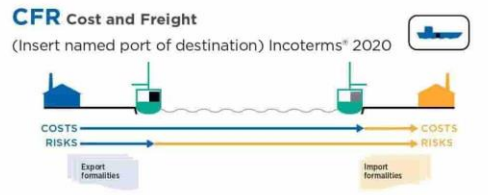
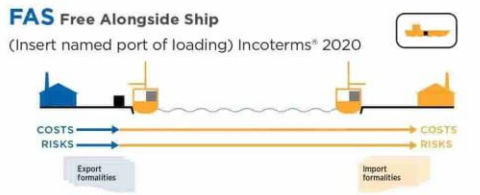
TRANSPORT OBLIGATIONS, COSTS AND RISKS

Blue indicates seller's Gold indicates buyer's Green indicates mixed or shared

RULES FOR ANY MODE OR MODES OF TRANSPORT



RULES FOR SEA AND INLAND WATERWAY TRANSPORT



WARNING: This chart is not intended to be used alone, and should always be used in conjunction with the Incoterms® 2020 rule book.
© 2019 International Chamber of Commerce (ICC) All rights reserved. No part of this work may be reproduced, copied, distributed, translated or adapted in any form or by any means (whether graphic, electronic or mechanical, and including without limitation photocopying, scanning, recording, taping, or by use of computer, the internet or information retrieval systems) without written permission of ICC through ICC Services, Publications department. "Incoterms" is a registered trademark of the International Chamber of Commerce.

Figure A13 - Attachment A: The Incoterms are a set of 11 individual rules issued by the International Chamber of Commerce (ICC) which define the responsibilities of sellers and buyers for the sale of goods in international transactions (International Chamber of Commerce, 2022).

Table 1 Approaches that Build Real-Time Supply Chain Resilience	
Supply Chain Mapping	Mapping suppliers will help both in identifying vulnerabilities and in mounting a quick response to disruptions. To maintain a competitive edge, supply chain leaders need to leverage emerging technologies, beginning with the use of analytics to enhance anticipation and response.
Develop Agility	Even the best planning may not be enough once a crisis strikes. Responding to rapidly changing market conditions and needs during a disruption will require agility in planning, on factory floors, in product innovation, and in customer service. Companies that can quickly pivot into adjacent or wholly different industries will have a competitive advantage.
Collaborate with Suppliers	A company's resilience often depends on the resilience of its suppliers. Larger firms can help suppliers collaborate over joint stress tests and contingency planning. They can also help suppliers, some of whom may be small or medium enterprises, to stay solvent in a crisis by honoring contracts and helping suppliers maintain liquidity with tools like reverse factoring. Buyers who are supportive partners to their suppliers typically benefit from enhanced visibility of upstream supply chains, early warning of potential risks, and preferential treatment during a disruption.
Build supply chain risk management maturity	A commitment to resilience needs to be integrated into supply chain management, with buy-in from corporate leaders and a risk-aware culture. Mature organizations prepare for disruptions, updating business continuity plans and conducting regular scenario analysis to create greater understanding of vulnerabilities and hidden risks in their supply chain as well as to enable more rapid decision-making in the face of disruption.
Shore up financial resilience	A fundamental aspect of resilience is the ability of company finances to absorb a shock, a point made clear by covid-19. Facing looming demand uncertainty with economies locked down around the world, many companies are building up their reserves to weather the storm. Larger firms may have the clout to increase their financial resilience at the expense of smaller suppliers, but they will need those suppliers to be healthy when demand returns. ⁶

Figure A14 – Approaches that Build real-time Supply Chain Resilience (*Supply Chain Resilience for an Era of Turbulence*, 2020)

Table 2 Approaches that Build Strategic Supply Chain Resilience	
Learning	Firms must learn from the supply chain disruptions which they and their peers face and apply the lessons to strengthen their tactical and strategic capabilities. After recovering from a disruption, it may be tempting to return to business as usual. Although conducting a root cause analysis, adapting existing processes, and implementing changes require resources and bandwidth, they can be important investments in resilience to be recouped over time.
Commit to mitigating and tackling long-term risks	Companies should expand their risk horizons and develop awareness of their strategic vulnerabilities and exposures. They might use methods including trend analysis or scenario forecasting to anticipate how macroeconomic shifts or a transition to a low carbon economy might impact them. Companies can set targets for their supply chains with regard to waste recovery, recycling, greenhouse gas reduction, or other key indicators of their environmental and social impact. Goal-setting is not enough – companies should collect and report the data they need to regularly assess their progress towards their goals, including scope 3 carbon emissions.
Manage dependence on ecosystem services	This starts with assessing the dependence of key suppliers on natural systems and resources, such as forests or groundwater, and understanding their exposure to risks associated with environmental degradation. Steps can then be taken to reduce dependence or ensure sustainability.
Build long-term supply chain partnerships	Strong relationships with supply chain partners are key to remaining competitive, as businesses work to adapt to strategic risks. In addition to joint innovation and supplier development programs, this can involve supplier collaboration for circularity, and support for suppliers to access finance and expertise in order to invest for resilience— whether by adapting or moving physical infrastructure, or decarbonizing to minimize reputational damage and future carbon costs.
Collaborate externally	Addressing strategic risks affecting supplier communities often requires multi-stakeholder collaboration, including pre-competitive collaboration to raise standards and lobby governments for better regulation or enforcement. The transition to circular business models, which include making use of waste streams as inputs and reverse logistics to enable product takeback, relies on productive partnerships within and across sectors as well as educating users about their role in building circularity, sustainability, and resilience.

Figure A15 - Approaches that Build Strategic Supply Chain Resilience (*Supply Chain Resilience for an Era of Turbulence*, 2020)

Benefits of BPM for the			
Enterprise	Customer	Management	Actor
Clear ownership for continuous improvement	Improved processes will positively impact customer satisfaction	Making sure that all the activities realized along a process add value	Security and awareness for actors
Agile response to measured performance	Mobilizing staff on stakeholders expectations	Optimizing performance all along the process	Better understanding of 'the whole picture'
Performance measurement benefits cost and quality	Keeping control on commitments to the customer	Improved planning and projections	Clarifying the requirements of a workplace
Monitoring improves compliance		Overcoming the obstacles of departmental borders	Defining precisely the appropriate set of tools for actors
Visibility, understanding, and change readiness improve agility		Facilitating internal and external benchmarking of operations	
Access to information simplifies process improvement		Organizing alerts levels in case of incident and analyzing the impacts	
Assessing process costs facilitates cost control and reduction			
Competence, consistency and adequacy			
Sustaining the knowledge			

Figure A16 – Benefits of BPM for Enterprises, Customers, Managers and other actors (Association of Business Process Management Professionals, 2013).

Attachment B: Processes RAS matrix and Fact sheets

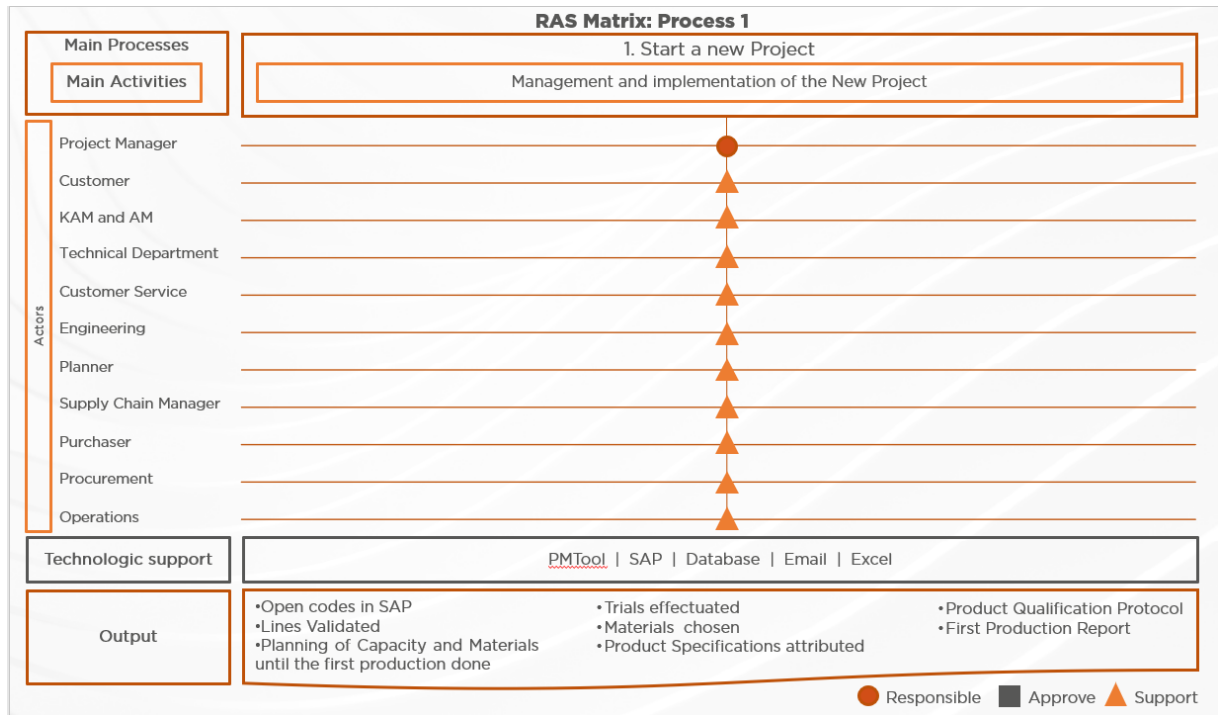


Figure B17 - Responsibility Matrix

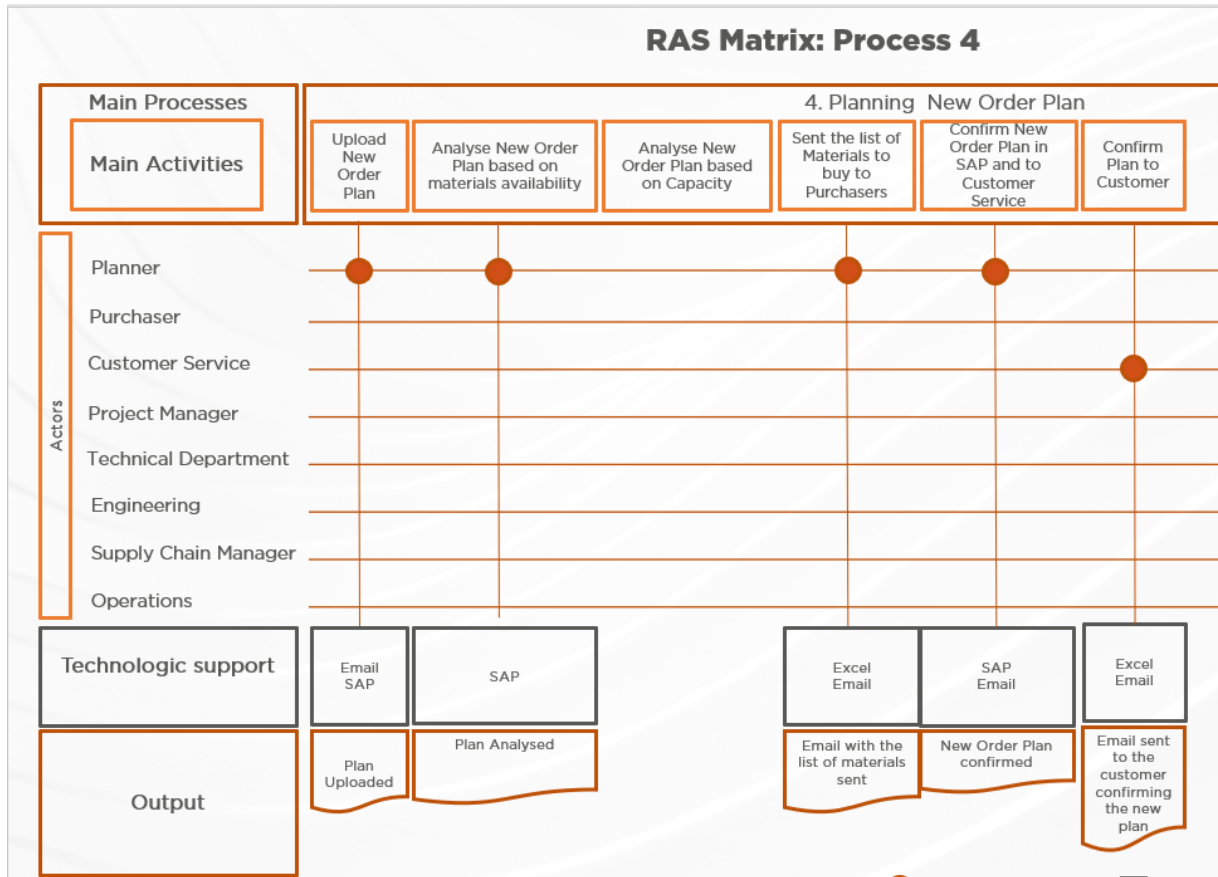


Figure B18 - Responsibility Matrix

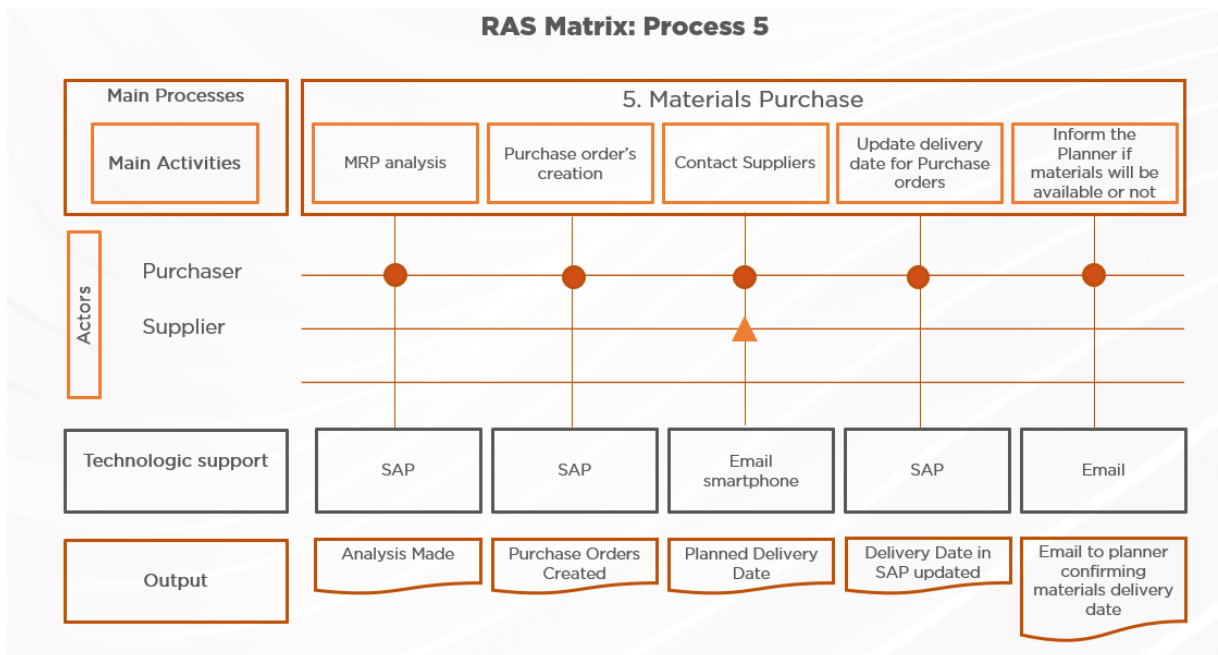


Figure B19 - Responsibility Matrix

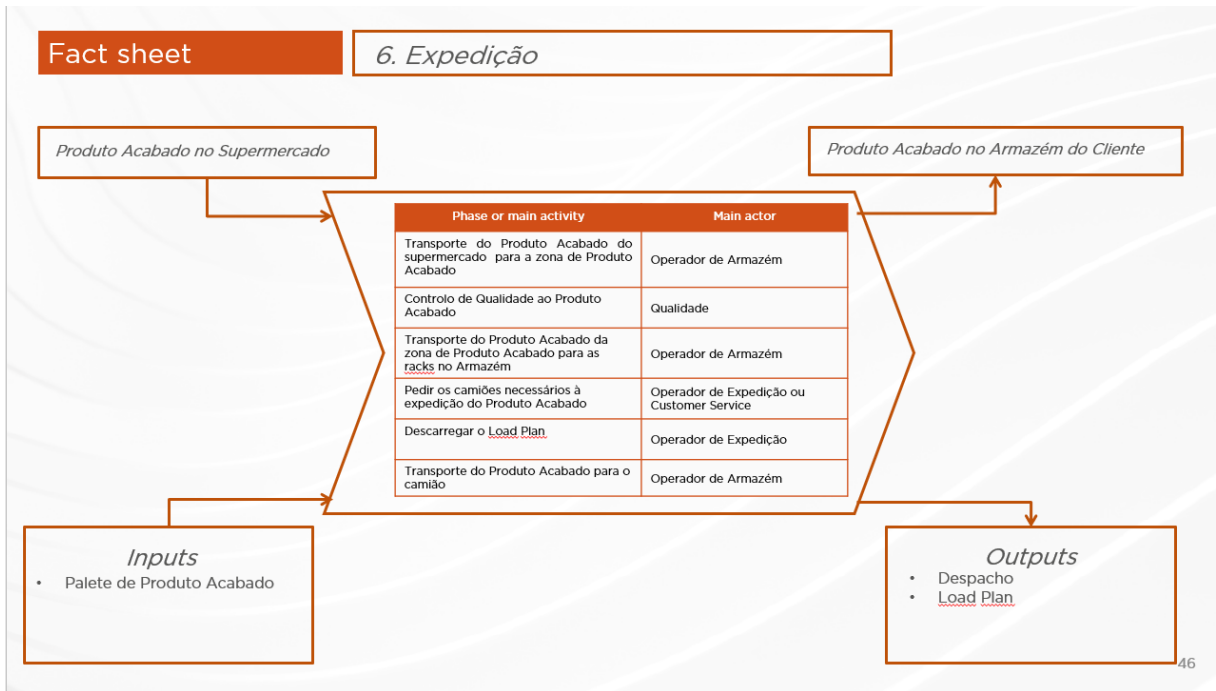


Figure B20 – Fact sheet

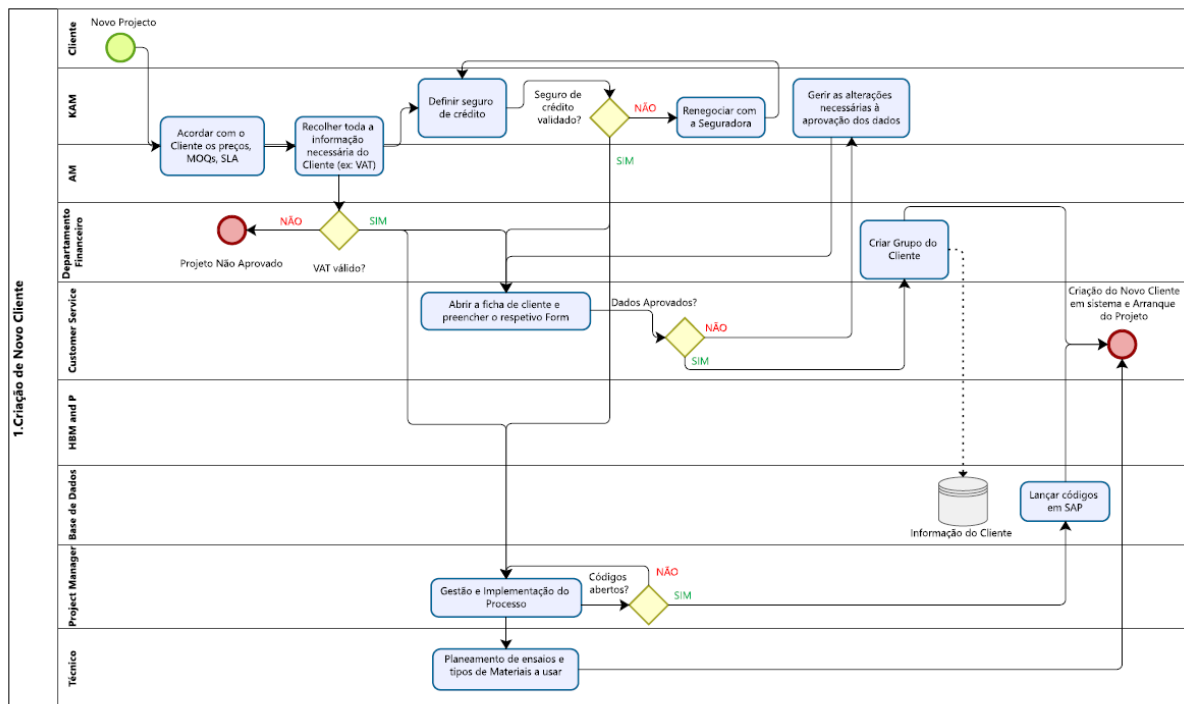


Figure B21 – Customer Creation Swimlane

Attachment C: Improvements

Reports	Current SAP transactions used	Frequency	Description
Stock Survey	Ana Soares / Account Manager/ MD04/Excel	Spot	Stock we have indoors for customer materials and stock related to Purchase orders in suppliers
Stock Survey	Ana Soares / Account Manager/ MD04/Excel	Spot	Stock we have indoors for customer materials and stock related to Purchase orders in suppliers
Quantity and batch numbers report			Needed to create Delivery Notes by
SSCC labels	Prepared using Excel by Pawel Szostek. It is possible for SAP to support it but it is not available now.	Needed after production that is planned on spot	Kaufland requires those numbers to identify the pallet.
Stock Survey	File received from Planner	Upon customer's request or cancellation/change of components/lack of demand	Stock we have indoors for customer materials and stock related to Purchase orders in suppliers
None			
Stock Survey	Ana Soares / Account Manager/ MD04/Excel	Spot	Stock we have indoors for customer materials and stock related to Purchase orders in suppliers
Spend Report	VF05	Monthly	See for Finished goods what was shipped and prices
Stockage	File received from planner	Monthly	For materials they have indoors, 3 months or above of stockage is observed.
CTP Report	mb51	Weekly and Monthly	What was order and confirmed to customer vs what was produced
Stock Survey	Ana Soares / Account Manager/ MD04/Excel	Spot	Stock we have indoors for customer materials and stock related to Purchase orders in suppliers
Pallet ship - Invoicing	Excel	Quarterly	The cost of pallets cheap are not included in the Finished good price and every 3 months this report is sent to the customer with the number of pallets that were shipped and to where they were shipped so then invoices can be made
Stock Survey	Ana Soares / Account Manager/ MD04/Excel	Spot	The stock we have indoors for customer materials and stock related to Purchase orders in suppliers (normally the customer asks for this report when the code is cancel)
Stock Report /Expiry date	ZSTOCK_SLOWMOVERS/MD04/Excel	Monthly	Stock we have indoors for all materials plus the expiry date
CvD	Ana Soares / Zprod_plan/Excel	Monthly	Line capacity and volumes allocated to the customer vs volumes allocated to other customers
Left over report	MD04, wld, zsd_inv_cond, MM03, ls26+ stock cans	It depends form new project, customer request (spot report)	Leftover (quantity and value)
Forecast transportation Demand	MD04, ls26, zoust_stockpal	Weekly	How many trucks were planned per week and destination (this report tries to avoid truck delay)
			Coverage of CS and bulk for pallets

Figure C22 – Reports Examples

