Universidad del Rosario

Digitalization of export documents as a paperless trade strategy implementation

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Maastricht, Netherlands

2022

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Trabajo de Grado

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2022

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Glosario

BSC	Boston Scientific Corporation
PT	Paperless Trade
DCs	Distribution Centers
PTL	Pick to light
CMR	Convention on the Contract for the international carriage of goods by Road
EU	European Union
DGF	DHL Global Forwarding

Resumen

El departamento de Tráfico de Boston Scientific Kerkrade supervisa toda la documentación de los envíos nacionales e internacionales. Actualmente, el departamento cuenta con una cantidad considerable de documentos en papel que pueden generar múltiples errores o problemas en el proceso de envío. De acuerdo con la investigación teórica realizada, la digitalización de los procesos en papel mejoraría la eficiencia del proceso, aumentaría la precisión y accesibilidad de los datos, impulsaría el proceso de despacho de aduanas y evitaría perder el rastro de la información, entre otras ventajas del comercio sin papel. Se investigó este concepto junto con sus beneficios y desventajas para luego analizar la situación actual con el fin de crear una solución para evitar el uso de papel en un proceso en el departamento de Expedición para finales de 2022.

Una vez investigado con el equipo de tránsito cuál era la situación actual, fue sugerido por parte del coordinador de tránsito la implementación del sistema Pick to Light. Una alternativa a la implementación de un comercio sin papel en el despacho, la alternativa fue estudiada y descartada debido a que la zona de recolección en Expedición no es adecuada para las características requeridas para la implementación del sistema con base en la investigación bibliográfica.

Con el objetivo de implementar el comercio sin papel en el departamento de Tráfico se revisaron todos los procedimientos relacionados con los documentos en papel y se encontró un claro espacio de mejora en los dos principales procesos productores de papel, que son el envío de la lista SAP para expedición y el número de documentos de exportación producidos para los envíos internacionales. En la investigación de campo, se contactó a los interesados indagando sobre la situación actual y las posibilidades de digitalización de documentos de exportación, también se investigó los requisitos y restricciones actuales para la digitalización de la lista SAP en el departamento de Expedición. Una vez investigadas las posibilidades, se propusieron dos escenarios diferentes y con respecto a cada solución utilizando criterios específicos en una matriz de decisión se concluyó que la solución más adecuada para BSC era la digitalización de documentos de exportación que presentaba un costo estimado de € 1.111,25 y brinda la oportunidad de ahorrar alrededor de 31.227 hojas de papel para los próximos 5 años junto con todos los beneficios de la implementación del comercio sin papel.

Palabras clave

Comercio sin papel, documentos de exportación, departamento de tráfico, Departamento de Expedición, Transportador, Expedidor, SAP, Recolección a luz.

Abstract

The traffic department at Boston Scientific Kerkrade oversees all the documentation for domestic and international shipments. Currently, the department counts a considerable number of paper-based documents which can lead to multiple errors or issues in the shipment process. According to the theoretical investigation done the digitalization of paper-based processes would improve the process efficiency, increase the data accuracy and accessibility, boost the customs clearance process, and avoid losing track of information, among other advantages of the paperless trade. This concept was investigated along with its benefits and disadvantages to then analyze the current situation in order to create a solution to turn an actual process at Expediting into paperless for the end of 2022.

Once investigated with the traffic team which was the current situation it was suggested by the Traffic coordinator the implementation of the Pick to Light system. An alternative to implementing a paperless trade at expediting, alternative was studied and discarded because the Expediting picking zone is not suitable for the characteristics required for the system implementation based on the literature review research.

Aiming to implement paperless trade in the Traffic department it was reviewed all the procedures related to paper-based documents and it was found a clear room for improvement in the two major paper producer processes, which are the Sending the SAP list to expediting and the number of export documents produced for the international shipments. In the field research, it was contacted the stakeholders inquiring about the current situation and digitalization possibilities for export documents, also was researched the current requirements and restrictions

for the digitalization of the SAP list at the expediting department. Once researched the possibilities, it was proposed two different scenarios regarding each solution were using specified criteria in a decision matrix it was concluded that the most suitable solution for BSC was the digitalization of export documents presenting an estimated cost of € 1,111.25 and providing the opportunity of saving around 31.227 paper sheets for the following 5 years along all the benefits of the paperless trade implementation.

Keywords

Paperless trade; export documents; Traffic department; Expediting department; Carrier; forwarder; SAP; pick to light

1. Research set-up

1.1 Introduction

The purpose of this chapter is to present the company and researcher objectives, the methods applied and the reasons why this research work was done. Initially, it is mentioned the company profile is followed by the problem statement, the current situation of the company, the desired situation, and the difference between them named “gap”. Immediately afterward are stated the company goal, researcher objectives and questions, justification of methods, and at the end of the chapter the research limitations.

1.2 Company profile

Boston Scientific was founded on June 29 of 1979, with the objective of bring accessibility to lower-trauma and cost medical options to patients. “Today, we continue our legacy of delivering meaningful innovation to meet patient needs around the world and deliver economic value to our customers” (Boston Scientific, 2022). The company follows the slogan “We advance science for life” providing multiple alternatives and solutions for patients around the world with innovative products which pursue the objective of reduce the cost of healthcare.

Currently the enterprise count with 78 different product categories in their portfolio divided by six businesses which are: Endoscopy, Interventional Cardiology, Neuromodulation, Urology and Pelvic health, Peripheral Interventions, and Rhythm Management. Additionally, there are 38,000 Boston Scientific employees across six continents among the different facility types of the company as Headquarters, Manufacturing Plants, Customer Fulfillment Centers and Institutes of advancing Science. Boston Scientific performance had led them to win multiple awards and recognitions which are mainly separated by the categories of Innovation, Corporate & Industry leadership, Workplace leadership and Global Citizenship. The company strive proceeds its values which are stated as the following:

- Caring: We act with integrity and compassion to support patients, customers, our communities, and each other.
- Meaningful Innovation: We foster an environment of creativity to transform new ideas into breakthrough services and solutions that create value for patients, customers and employees.
- High Performance: We strive for high performance to benefit our patients, clinicians and shareholders.
- Global Collaboration: We work collaboratively to pursue global opportunities that extend the reach of our medical solutions.
- Diversity: We embrace diversity and value the unique talents, ideas, and experiences of our employees.
- Winning Spirit: We adapt to change and act with speed, agility, and accountability to further improve patient care.

(Boston Scientific, 2022)

This paper research will focus on the Traffic and Expediting departments at BSC Kerkrade. The Traffic department, currently integrated for five persons, is in charge of creating the export documentation needed to process shipments which can be directed to customers, service of taxi, returns, marketing, and capital equipment shipments. Traffic also oversees the dangerous goods shipments because those sorts of shipments require dedicated transport.

On the other hand, the Expediting department is in the lead in creating the 'Best Way' shipments. This department oversees the collecting process and the end of the conveyor, the order pick-up, and the creation itself of the pallet which is going to be shipped.

Net sales per region in 2021 were distributed as:

(In millions)

- U.S: $6,901
- EMEA: $2,518
- APAC: $2,070
- Latin America and Canada: $386

On the other hand, the full year net sales by business for 2021 was reported as:

(In millions)

MedSurg

- Endoscopy: $2,141
- Urology and Pelvic health: $1,583

Rhythm and Neuro

- Cardiac Rhythm management: $2,019
- Electrophysiology: $365
- Neuromodulation: $909

Cardiovascular

- Interventional Cardiology: $3,038
- Peripheral interventions: $1,820

1.3 Problem statement

Currently, the Traffic and Expediting Departments at BSC in Kerkrade are developing multiple processes on paper-based. This paper-based information regards processes or export documents that must be done to expedite the products to the customers. Paper usage can lead to inefficiencies and create operational and financial complications as losing track of information, increasing the task times, increasing costs, and the possibility of the occurrence of human errors such as miss-keying information, picking the wrong order, and the potential loss of paper while is manually handled between departments. Additionally, these departments issue on average around 1000-1500 sheets of paper a day, thus, it reduces the company's environmental responsibility.

1.3.1 Current Situation

The shipping process involves multiple tasks that must be done before delivering the order to the carriers. The Traffic and Expediting departments daily issue and exchange different documents such as lists, CMRs, skid labels, invoices, and returns forms, among others. Those documents are usually printed and manually delivered by the project leaders. BSC is an enterprise that has not stopped growing in the last years, and with the company, the number of shipments delivered by day is expected to continue growing in the following years.

As mentioned, for each order the traffic department issue printed documents that are delivered to the Expediting department and some of them are delivered finally to the carrier. This printed paperwork represents thousands of papers printed weekly, which reduce environmental responsibility of the company, increase costs and open the gate of the opportunity of making human errors.

1.3.2 Desired Situation

The company would like to reduce the amount of paper that heads through the Traffic and Expediting departments. The digitalization of these processes would lead the company to achieve better performance rates for the time required to create shipping and export documents also it would reduce costs, and reduce time spent on operational tasks to increase the department's efficiency. Considering the workload had been increasing in the last years and the Traffic department deals with the same number of people. The digitalization would save operational time in tasks as the delivering paper information manually between the departments and the forwarder or scanning and archiving documents.

1.3.4 Gap

BSC executes multiple paper-based processes which are standardized for the employees working in the Traffic and Expediting departments. The company currently does not count with an implementation plan to modify these processes and upgrade the efficiency levels of different tasks improving the exchange of information among both departments with new standardized processes. Because of this, it is needed to research the task procedure for processes that involve high amounts of paper used to create upgrade alternatives, investigate the feasibility of reducing the paper-based documents exchanged with the stakeholders and evaluate the possible outcome achieved by the paperless trade.

1.4 Company objective

To become more sustainable, reduce the total amount of paper generated during the shipping processes, avoid errors related to the paper-based processes and increase the efficiency the Freight department. Boston Scientific Kerkrade wants to develop a strategy that enables one current paper-based process to be paperless by the end of 2022.

1.5 Research objective

This thesis objective is to develop and evaluate a paperless strategy for the information exchange between the Traffic and Expediting departments. The researcher aims to identify the reason for the current task to be paper-based and from the point of view of the possible barriers and benefits that can achieve the company head BSC to consider the possibility of reducing the number of white paper processes done by the company at the end of 2022.

1.5.1 Research questions

Literature review

- What is paperless trade?
- Which are the benefits of the paperless trade?
- Which are the barriers for implementing PT?
- What is Pick to light?

Current Situation

- Which exact processes are currently using paper between the Traffic and Expediting departments?
- Which are the shipping documents required per country for shipping's coming from the Netherlands?
- How are currently overseen the projects management at Boston Scientific?
- In which processes could BSC implement a paperless trade?

Desired situation

- Is it still necessary to deliver in paper the shipping documents to the carrier?
- Does the consignee (Tier 2's) need the original or paper-based documentation?
- Can Traffic and Expediting departments digitalize the SAP list exchange of information?
- Is the implementation of paperless strategies a wise decision for the company in financial terms?
- Would `Pick to light´ lead BSC to a paperless solution?

1.6 Justification of methods

This thesis research looks forward to aligning the Company objective with the research objective and questions. Since the investigation required the consideration of tools or methods which could lead the organization to avoid the white paper processes, this qualitative study is being supported by interviews and literature collected in order to compile the necessary information for the development of a paperless trade strategy.

The literature used in this research is quoted and considered relevant for the purposes established, the order of the bibliographic sources responds to the necessity of understanding or clarifying concepts, cases, or strategies that could be used or considered to guide the research to accomplish the desired situation. All the theoretical information collected to solve the research questions is quoted in the following chart and the references page, equally, other quantitative

data used, and interviews are referenced in the chart but also in appendices at the end of the paper.

Table 1 Research methods

RQ No.	**Research Question**	**Method**	**Type of research**	**Source(s)**
Literature research				
1	What is a paperless trade?	Desk research	Qualitative	(UNCECE, 2017) (Duval & Mengjing, 2017)
2	Which are the benefits of the paperless trade?	Desk research	Qualitative	(Arora, 2019) (Laryea, Facilitating paperless international trade: a survey of Law and Policy in Asia., 2005) (Duval

				& Mengjing, 2017) (Mustafa et al, 2017)
3	Which are the barriers for implementing PT?	Desk research	Qualitative	(Laryea, Facilitating paperless international trade: a survey of Law and Policy in Asia., 2005) (Yen-yoo, 2021) (Mustafa et al,2017)
4	What is pick to light?	Desk research	Qualitative	(Bastian Solutions, 2022) (Michael, 2021) (Zhang, et al., 2010)
Current situation				

5	Which exact processes are currently using paper between the Traffic and Expediting departments?	Field research	Qualitative	
6	Which are the shipping documents required per country for shipping's coming from the Netherlands?	Field research	Qualitative	
7	How are currently overseen the projects management at Boston Scientific?	Field research	Qualitative	(Boston Scientifc, 2022)
8	In which processes could BSC implement a paperless trade?	Field research	Qualitative	
Desired situation				
9	Is it still necessary to deliver in paper the shipping documents to the carrier?	Field research	Qualitative	(Kouwenoord, 2022) (Verhaeg, 2022) (Jaspers, 2022)

				(Sennikova, 2022)
10	Does the consignee (Tier 2's) need the original or paper-based documentation?	Field research	Qualitative	(Garcia Leyton, 2022) (Lee, 2022) (Jimenez, 2022) (Coetzer, 2022) (Huaman, 2022) (Yang, 2022) (Ozkan, 2022) (Ramirez, 2022) (Mora A. , 2022) (Santos, 2022) (Mora N. , 2022)
11	Can Traffic and Expediting departments digitalize the	Field research	Qualitative	(Moon, Shim, & Kim, 2011)

	SAP list exchange of information?			
12	Would `Pick to light´ lead BSC to a paperless solution?	Field research	Qualitative	(Michael, 2021)

Source: Own creation

1.7 Research limitations

The theoretical research had limitations due to the lack of information available on company-focused paperless trade, most of the information available about paperless trade regards cross-border or regional agreements or it not research done in the last years.

Because of the quantity of stakeholders involved in this investigation it was a complex process establish communication with all of them, being difficult because of the limited networking had by the intern roll and the different time frames managed by all the interested parts around the world. The ratio answer received/ time required per to answer was almost a week required per every forwarder interviewed and almost three working days for the interviews done to every tier 2.

Given the sort of strategy tried to achieve the process it is only possible to translate the proposed solution scenarios to financial terms calculating the time saved per process using the average salary in the department as calculation base or calculating the total of white paper sheets saved but it is not relevant financial figures.

2. Literature review

2.1 Introduction

Currently, the shipping processes in BSC requires multiple exchanges of data for different tasks, most of them are still exchanging data on paper-based documents. This chapter will be researched what is paperless trade, which are the benefits of paperless trade for the company, and the barriers to the implementation of PT. Once reviewed this subject, it is summarized the most important theoretic information gathered.

2.2 Paperless trade

2.2.1 What is paperless trade?

Paperless trade (PT) refers to the digitalization of the data traded between different parties, it reduces or avoids the flow of white paper information. The organization UNECE (2017) defines the white paper trade as the digitalization of information flows making available and enabling the exchange of documents or trade-related data. The transformation of the paper-based documentation to digital formats can bring more alternatives to accelerate the information flow and ensure that it is exact.

Paperless trade is also defined as the conduct of international trade transactions using electronic media instead of paper-based data documents, formally defined as a trade "taking place on the basis of electronic communications, including exchange of trade-related data and documents in electronic form" in the Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific (FA-PT) adopted by Member States of United Nations ESCAP in May 2016 (Duval & Mengjing, 2017)

UNECE (2017) states that PT can be done in several ways, when there is the existence of paper documentation already it can be simply transformed to digital by a snapshot or scan, additionally, can be used internet web portals or data-trader interfaces where individuals could get access to the information electronically. The use of PT is usually present in the international trade of information, in the data flow from the business-to-business, business-to-government, and business-to-customer.

2.2.2 Which are the benefits of the paperless trade?

Usage of PT avoids the white paper documentation in multiple sorts of scenarios as the storage of regulatory transaction documents can turn into a logistic complication for different companies regarding the space utilization, manual data exchange, or the possibility of losing track of information in the process. "Thus, PT leads to considerable economy-wide savings (direct savings to traders in the form of lower compliance costs and a number of indirect, and less definable savings, such as faster movement of goods, and lower inventory costs)" (Laryea, 2005) According to Nayyar & Arora (2019) The advantages of using PT are costs effectiveness,

less time in the processes consumed, safety and security of the information, receiving and sending money faster, streamlining various responsibilities, and easy accessibility among others.

Paperless trade measures are essential to maintain trade competitiveness, and address trade control and logistic challenges (Duval & Mengjing, 2017). Among the benefits remarked by Duval & Mengjing (2017), it is possible to obtain significant economy-wide savings, which can include direct savings to traders due to lower compliance costs, indirect savings from a faster process of moving goods, affords time availability of shipping documents, reduces errors associated with re-keying data and lower inventory costs.

According to (Mustafa et al,2017) the implementation of electronic documents improves process time and allows the stakeholders to use real-time tracking, also the reporting systems can increase the efficiency of decision-making processes. Because of the electronic data interchange companies could identify an improvement in their supply chain operations due to the speed, accuracy, simplicity, and security that it provides (Moon, Shim, & Kim, 2011)

Tubbesing (2006) suggests from an International Air Transport Association perspective that some of the potential benefits of going paperless are: the speed of electronical information eliminates the wait for paperwork, also enable shippers to pre-clear shipments before their arrival, decrease of duplications and errors, eliminate unnecessary processes and security of get the accurate data (Tubbesing, 2006).

The speed of electronic documents eliminates the arrival of shipping documents, a persistent problem in international trade. Moreover, electronic documents are amenable to automation. Automation reduces the preparation time and eliminates the rekeying of data entry and potential associated errors.

(Laryea, Paperless Shipping Documents: An Australian Perspective, 2000)

Carriers such as UPS offer services as paperless invoice since several years ago, this service is meant to prevent shipments from submitting incomplete documents which are one of the principal reasons for shipments to be held on clearance, also UPS affirms that it saves time and resources by reducing office supplies and staff time associated with customs paperwork to their customers (Traffic world, 2007).

2.2.3 Barriers for PT

Through the years operational barriers are less common among the companies, recent technology developments and the implementation of advanced operational systems had helped to close the gap. Nevertheless, the cross-border PT requires a certain trust level between the parties involved which could be private or public, usually, the parties tend to base on their national legislation and use different technologies (Sung-Heun & Yen-yoo, 2021). “Further complicating the problem is the need for multiple parties to capture information at different points in the supply chain, inevitably a source for error and delay” (Tubbesing, 2006)

The most preeminent practical barrier to the development of electronic trade is the standardization of electronic documents (Financeasia, 2010 as cited by Mustafa et al, 2017). On the other hand, Laryea (2005) defined five types of operational barriers that may occur in the company, those are:

> (1) difficulties with establishing generally accepted PT systems; (2) lack of a PT community connecting all relevant entities in trade processes; (3) the existence of different documentary and information requirements, as well as different procedures, in

different countries; (4) the existence of different, and often incompatible, paperless systems; and (5) concerns over security and the potential for fraud.

(Laryea, 2005).

It is necessary to mention that in multiple cases the implementation of paperless strategies requires extra investments, due to the need for new technologies, training, and the time costs that represent the adequacy for the operators to the new systems. These costs can represent more than the benefits perceived by the company or the value-added for the customer, in these cases where the ROI is negative or takes an extended period to meet up the companies stop considering the implementation of the PT.

2.3 Pick to light system

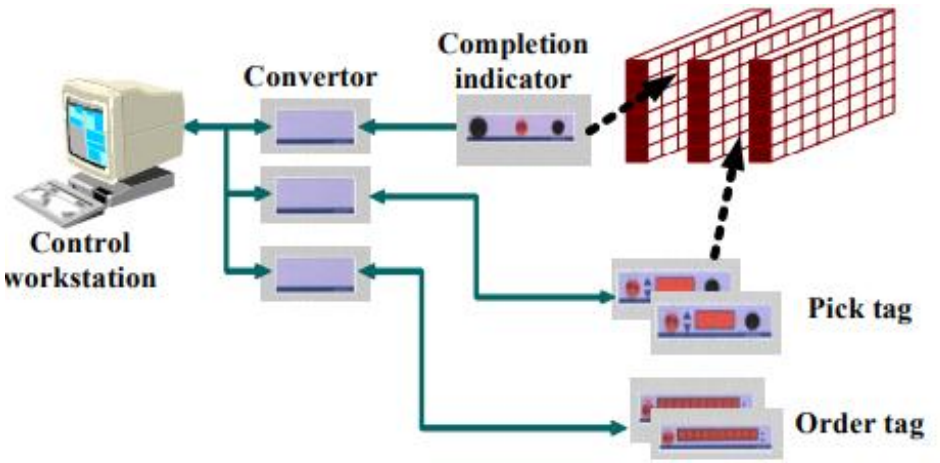
Pick to light is an order-fulfillment technology used in warehouse picking operations. Consist of the lights and numbers display bellow each picking point, it creates a more easy and efficient way of picking for the operator. Once the operator fulfilled the order all the lights are down and it allows to continue with the next order, if there is any light on (process picking incomplete) it does not accept a new order coming until fulfill the actual. Pick to light known as PTL as well, is a warehouse picking system which provides an efficient and accurate method of picking without the use of paper. (Bastian Solutions, 2022).

On the other hand, As cited by Michael (2021) the software sales manager of Bastian Solutions states Pick to light is very useful when all the locations are in the same picking area, its efficiency depends on the travel involved and the task time per acquisition of the product. When

the locations are far from others and there are multiple locations the pick to light system loses efficiency because it finally turns on a memory task for the operator to find the picking location. "In a zone picking system, management assigns an order to zones so that pickers can travel in smaller areas, become familiar with the product locations in their zones, and experience less congestion" (Kim & Hong, 2020).

According to Zhang et al (2010), The hardware of a Pick to Light system usually is composed of the control station, followed by convertors, completion indicator, pick tags, and order tags. The picked tag usually displays units depending on the number of products that need to be picked, has a confirm button, functions buttons, and LED lights. The operator is expected to push the confirmation button once the picking is successful, after all, lights in the rack are finished the completion indicator lights up, allowing new picking orders. (Zhang, et al., 2010)

Figure 1 Pick to light system structure.



Source: Retrieved from (Zhang, et al., 2010).

The authors de Vries., de Koster. & Stam (2016) state that Between PTL and the conventional picking zone set-up it is remarkable the productivity increase in PTL without decreasing the quality of picking, on the other hand, his studies also suggest that the effectivity also depends on the expertise of the pickers suggesting that it is also possible achieve decent levels of productivity if the pickers count with certain level of training and experience. (de_Vries, de_Koster, & Stam, 2016)

2.4 Literature research conclusions

The following conclusions can be extracted from the literature research:

- Paperless-trade is the digitalization of information flows making available and enabling the exchange of documents or trade-related data. (UNCECE, 2017)

- Paperless trade can be done in several ways and is usually present in international trade of information
- Paperless-trade leads to considerable economy-wide savings (direct savings to traders in the form of lower compliance costs and a number of indirect, and less definable savings, such as faster movement of goods, and lower inventory costs. (Laryea, Facilitating paperless international trade: a survey of Law and Policy in Asia., 2005)
- Paperless trade measures are essential to maintain trade competitiveness, and address trade control and logistic challenges (Duval & Mengjing, 2017).
- The implementation of electronic documents improves process time and allows the stakeholders to use real-time tracking, also the reporting systems can increase the efficiency of decision-making processes. (Mustafa et al,2017).
- Companies can identify an improvement in their supply chain operations using electronic exchange data due to the speed, accuracy, simplicity, and security that it provides (Moon, Shim, & Kim, 2011).
- Carriers as UPS that it saves time and resources by reducing office supplies and staff time associated with customs paperwork to their customers (Traffic world, 2007).
- The cross-border PT requires a certain trust level between the parties involved which could be private or public, usually, the parties tend to base on their national legislation and use different technologies (Sung-Heun & Yen-yoo, 2021).
- The most preeminent practical barrier to the development of electronic trade is the standardization of electronic documents (Financeasia, 2010 as cited by Mustafa et al, 2017).

- Pick to light is very useful when all the locations are in the same picking area, its efficiency depends on the travel involved and the task time per acquisition of the product. When the locations are far between others and are many of them the pick to light system lose efficiency because it finally turns on a memory task for the operator to find the picking location (Michael, 2021).
- Between PTL and the conventional picking zone set-up it is remarkable the productivity increase in PTL without decreasing the quality of picking, on the other hand, his studies also suggest that the effectivity also depends on the expertise of the pickers suggesting that it is also possible achieve decent levels of productivity if the pickers count with certain level of training and experience. (de_Vries, de_Koster, & Stam, 2016)

Chapter 3. Analysis of current situation

3.1 Introduction

The following chapter presents the current situation in the Traffic and Expediting departments. It is given with the objective of explaining paper-based processes or paper related processes to lead a further investigation on all the possible strategies that could help to meet up the company and research objectives. It is also mentioned data and context information about multiple tasks which are necessary to understand most of the processes developed and then lead a further investigation on all the possible strategies that could help their daily tasks the Traffic dep implements different tools and related abbreviations (See Appendix 1) which will be explained in the chapter.

3.2 Which exact processes are currently using paper between the Traffic and Expediting departments?

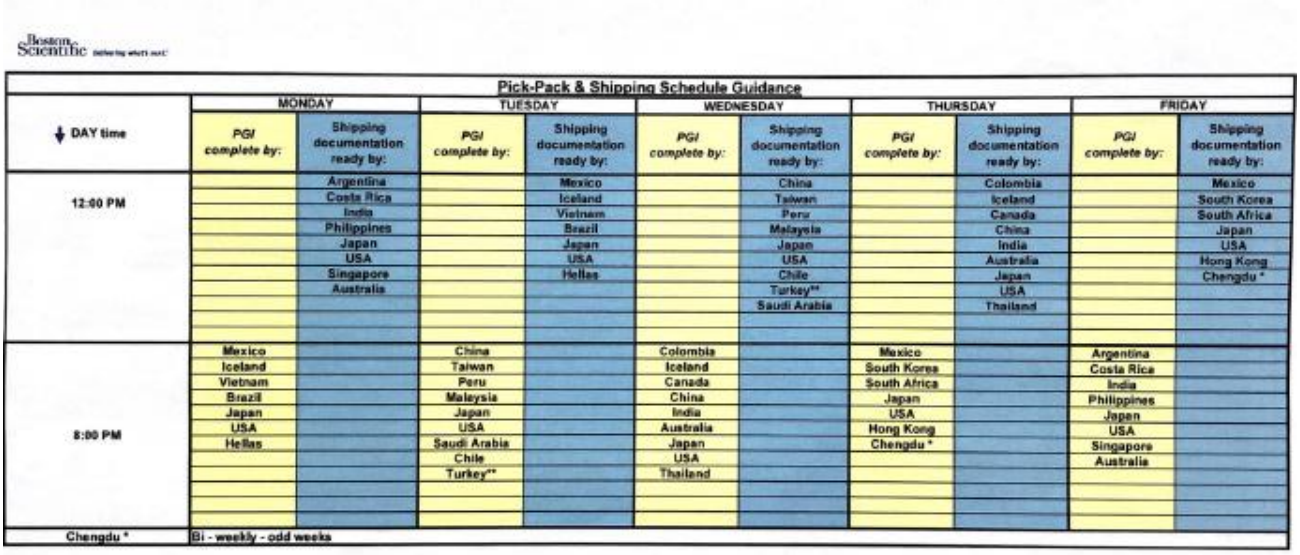
The following processes mentioned are directly related to the usage of paper in the Traffic and Expediting departments. In order to implement a paperless trade, it is necessary to be aware of why is currently required the usage of paper on each process to work on alternatives which can lead to reducing the paper-based tasks and increase the company´s efficiency on multiple levels. Traffic and Expediting departments oversee more side processes which are not

deeply explained because are not considered relevant for this research investigation due to the quantity of paper spent on them or are simply considered not necessary to investigate to accomplish the company objective.

Pick-pack & Shipping Schedule Guidance

Before mentioning the processes, it is necessary to explain the importance of this document for the development of tasks in the Traffic department. As its name suggests “Pick-Pack & Shipping Schedule Guidance” is a printed document that indicates the schedule (day and time) on which the Post Goods Issued (PGI) and the shipping documentation must be completed. This tool allows people in the Traffic department to prioritize their responsibilities and split tasks around the people working at the moment. This document may be subject to change depending on different variables such as changes in the demand flow for some countries, external government regulations or interactions with the carriers, among others.

Figure 2 Pick-pack & Shipping Schedule guidance



Pick-Pack & Shipping Schedule Guidance

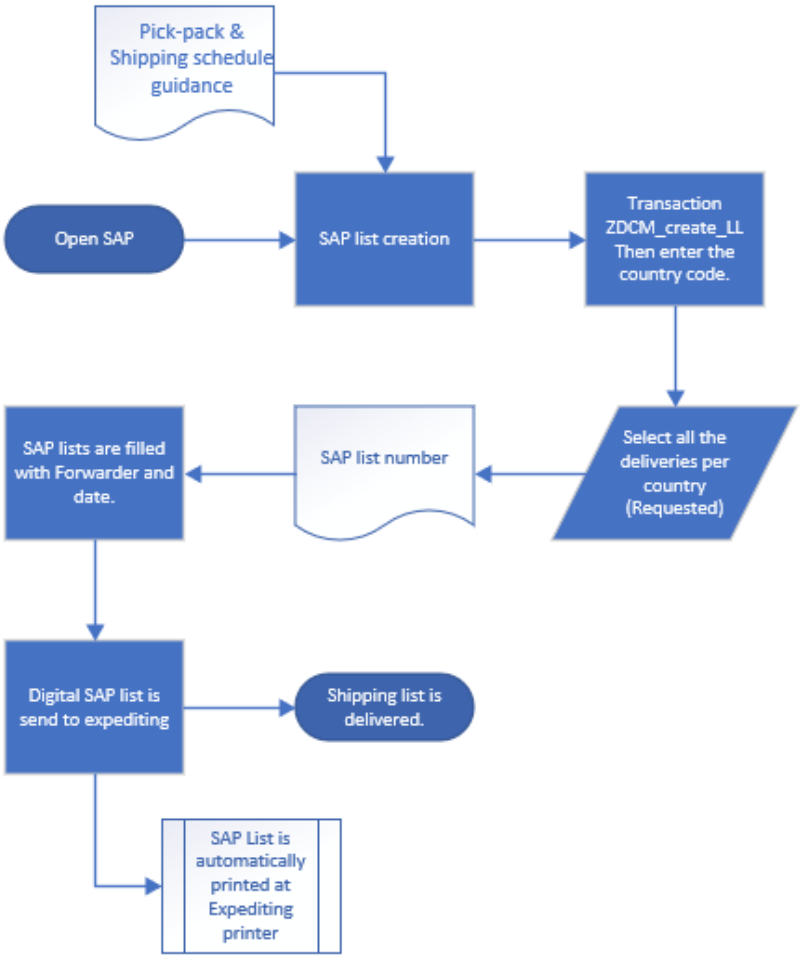
DAY time	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY	
	PGI complete by:	Shipping documentation ready by:	PGI complete by:	Shipping documentation ready by:	PGI complete by:	Shipping documentation ready by:	PGI complete by:	Shipping documentation ready by:	PGI complete by:	Shipping documentation ready by:
12:00 PM		Argentina Costa Rica India Philippines Japan USA Singapore Australia		Mexico Iceland Vietnam Brazil Japan USA Hellas		China Taiwan Peru Malaysia Japan USA Chile Turkey** Saudi Arabia		Colombia Iceland Canada China India Australia Japan USA Thailand		Mexico South Korea South Africa Japan USA Hong Kong Chengdu *
8:00 PM	Mexico Iceland Vietnam Brazil Japan USA Hellas		China Taiwan Peru Malaysia Japan USA Saudi Arabia Chile Turkey**		Colombia Iceland Canada China India Australia Japan USA Thailand		Mexico South Korea South Africa Japan USA Hong Kong Chengdu *		Argentina Costa Rica India Philippines Japan USA Singapore Australia	
Chengdu *	Bi - weekly - odd weeks									

Source: (Boston Scientific, 2022)

3.2.1 Creation of SAP lists

The creation of SAP lists is a process that must be done every morning as the first daily task for the Traffic department. SAP lists show which are the products requested for each country and generate a bar code per delivery needed to pick to then be scanned by the operator at Expediting to ensure the correct product was picked. The Traffic department team generates SAP lists depending on the Pick-pack & Shipping Guidance, previously explained. The steps taken for the creation of the SAP lists are illustrated in the following flowchart.

Figure 3 Flowchart Creation of SAP List



Source: Own creation

Figure 4 Example SAP List

ship to:
BOSTON SCIENTIFIC COLOMBIA
Cra 106 #15-25 Block 10
Warehouse 64
110111 BOGOTA
Colombia
Comments:

Created By: KERKHOFG
Expected Shipping Date:_____
Forwarder:_____

Boston Scientific International B.V.
European Distribution Center
Vestastraat 6, 6468 EX Kerkrade
The Netherlands

Delivery	Number of Boxes	Bin Location
4313943605	1	TS-03-15B
4313943603	1	TS-03-15B
4313854912	2	TS-03-15B
4313921193	1	TS-03-15B
4313865656	1	TS-03-15B
4313865657	1	TS-03-15B
4313921192	2	TS-03-15B
4313865659	1	TS-03-15B
4313883539	1	TS-03-15B
4313920590	1	TS-03-15B
4313905107	1	TS-03-15B
4313905106	2	TS-03-15B

Package Instructions:
Use gaylord and strap gaylord

17.02.2022 Please mention in any correspondence our loading list number as reference. Page 2 of 5

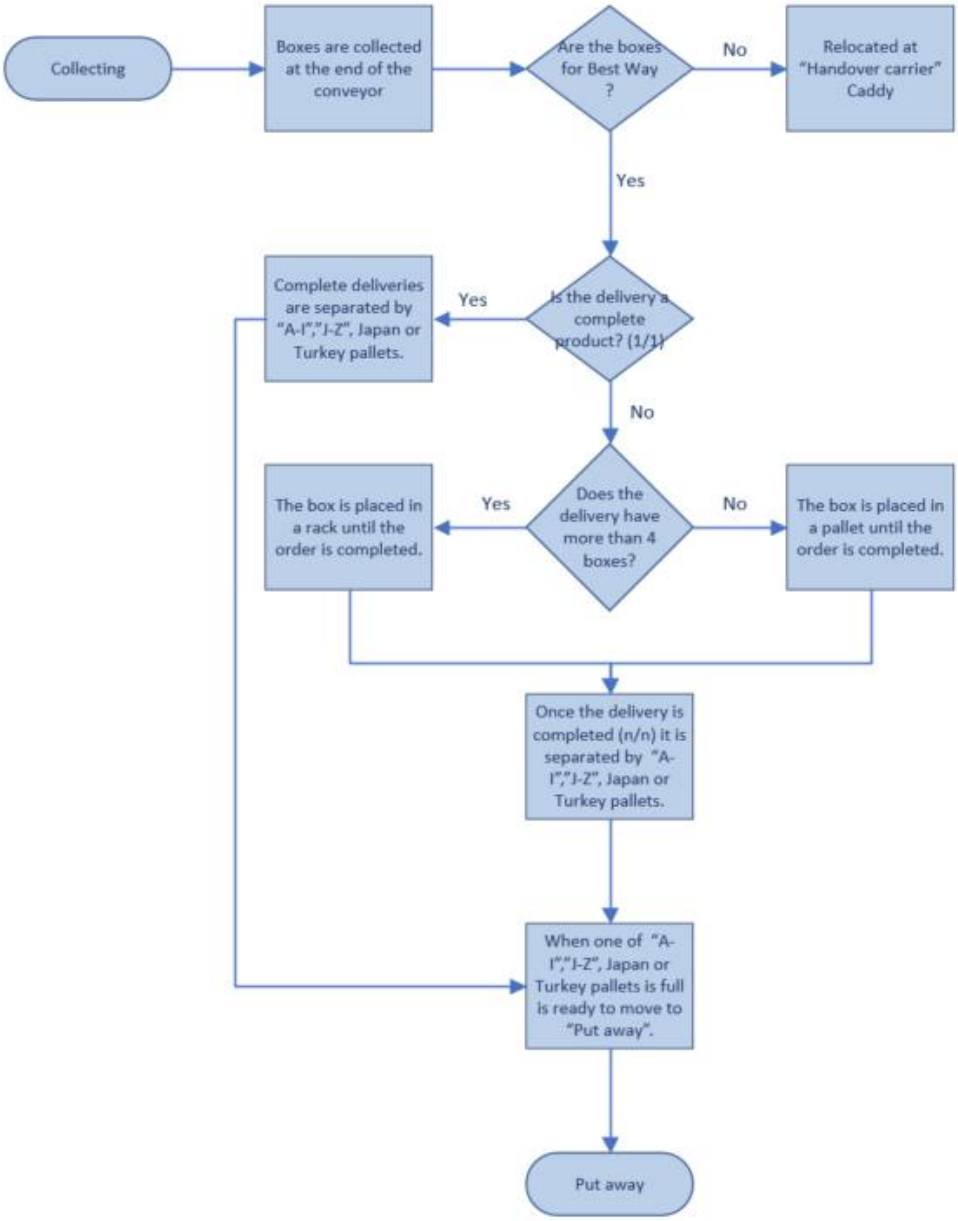
Source: Own creation

As it is possible to see the page of SAP list exposed as an example is page two of five pages which correspond to that shipment, like this, multiple SAP lists are created every day by the Traffic Department which results in several pages printed at the expediting department. Traffic department also print a copy of the loading list for them which is used as reference for the shipment and then is scanned along other copies of export documents to be archived, that action double the number of pages printed daily for the department only for SAP lists.

3.2.2 Collecting process

It is important to mention the collecting process to clarify which are the orders directly shipped by BSC due to some of them are outsourced to some carriers that also pick up products at the conveyor. Kerkrade Outbound report presents a total of 1.331.881 deliveries for 2020 and 1.482.622 for 2021. This is an increase of 11,31% in the total amount of deliveries shipped by BSC. Nevertheless, a great part of the shipments done is directly processed at the end of the conveyor from the implants as TNT, STOCK or DHL, they receive the paper documentation directly from the Traffic department or Global Distributors Services (GDS) and oversee the rest of the shipment. Considering that this research paper only focusses on the Best Way shipments which are handled directly by BSC and shipped with the Forwarders.

Figure 5 Collecting process Expediting



Source: Own creation

In the case a box must be relocated at the “Handover carrier” caddy it means that the box is not in the correct line of the conveyor and must be collected by one of the implants, so eventually, these implants must check the caddy to handle all the boxes that are their responsibility.

For this research investigation, it is necessary to consider the collecting process due to it is the previous process before picking the orders and creating the shipment, so it directly influences on the process efficiency of its following processes.

3.2.3 Put away

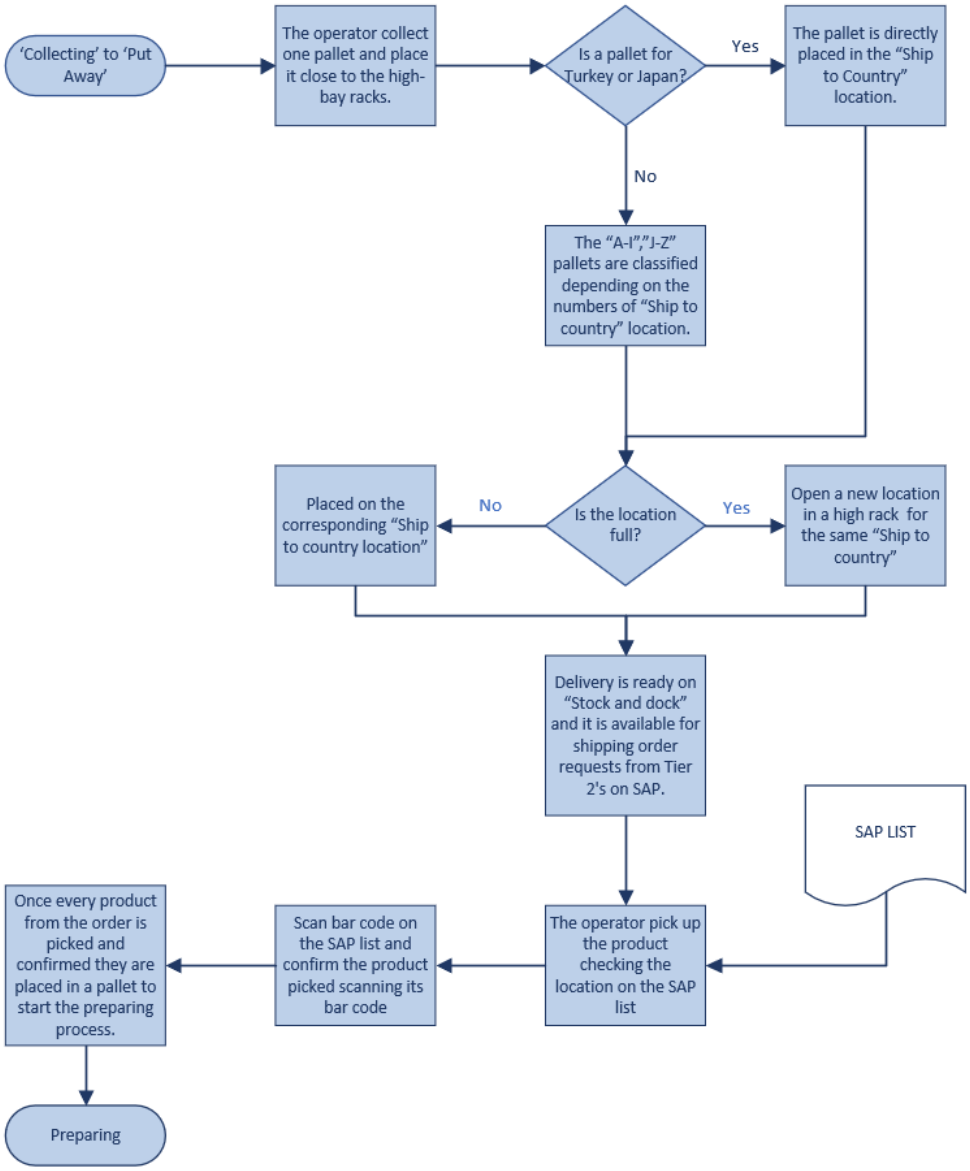
From the transaction of Loading list display on SAP Traffic department can visualize per ‘Ship to’ country all the delivery numbers scanned in the bin for the country selected, and next to them are three spaces which are filled automatically by SAP when the users trigger actions as scan bar codes. The spaces are:

- Completed: Once all the boxes from the same are collected and scanned by the operator in the Collecting process.
- PGI: Stands for Post Good Issued, means the delivery is ready to be ordered by the Tier 2 plants.
- Billing status: Meaning that the delivery is already been handled by the carriers.

Traffic department generate the SAP lists with the orders requested by the Tier 2 plants which does not have Billing status. Consequently, the operator at Expediting picks up from their printer the SAP lists and proceed to pick the products on the list using the forklifts available in

order to move through the high racks. Each box is picked and scanned manually. The Put away process is illustrated in the following figure:

Figure 6 Put away process Expediting



Source: Own creation

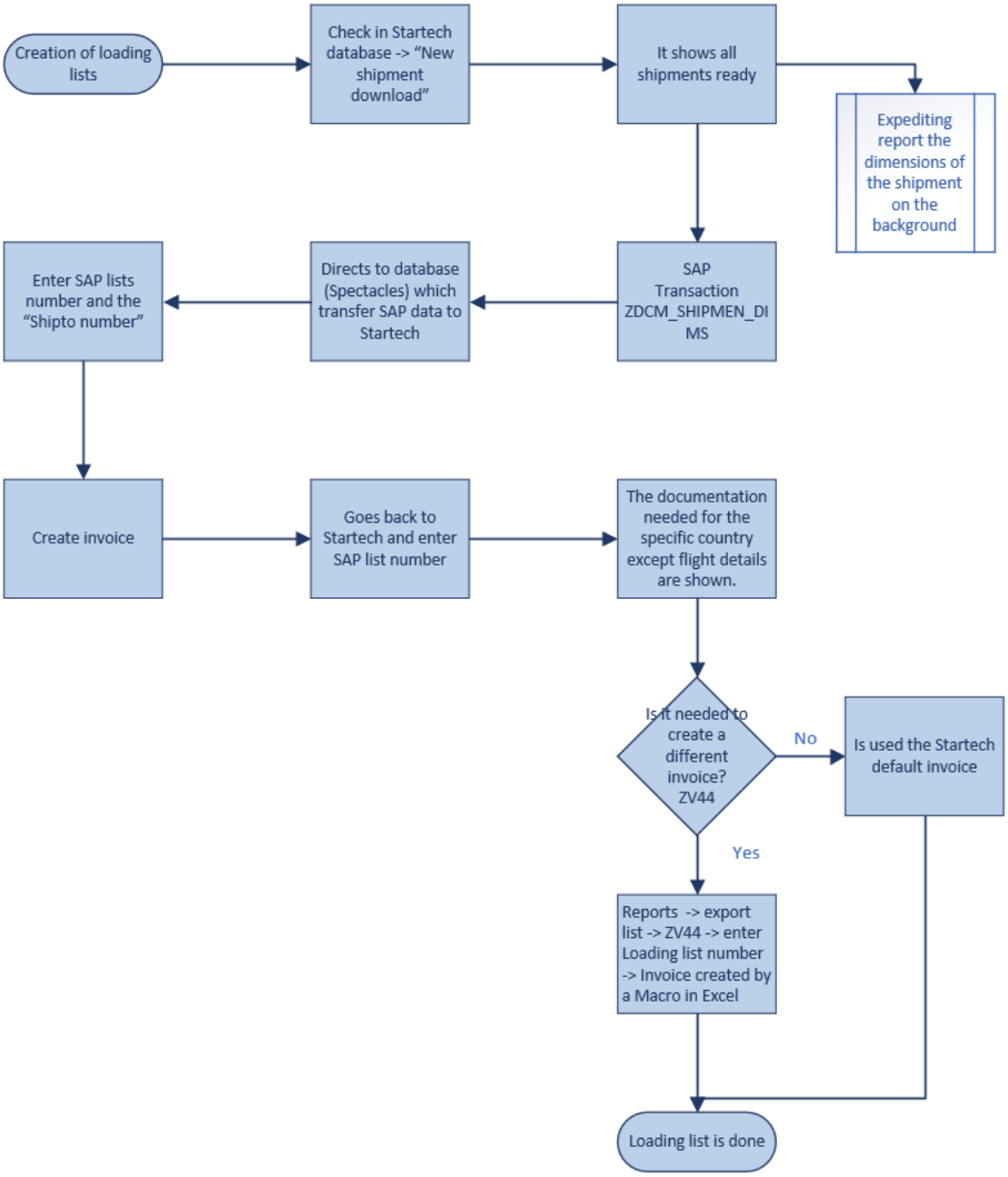
3.2.4 Creation of the loading list

The creation of the loading list is a process that specifies the cargo contained in the shipment with their respective dimensions. The rest of the documentation required for each country is given by the tool Stratech. It is important to consider that most countries vary the documentation that needs to be provided for the expeditor´s side, meaning that the final amount of paper-based documentation increase depending on the amount of extra documentation required and the volume of the cargo.

Traffic and GDS realize this process and deliver these documents to the Forwarders or directly to the implants. In the first case, when the documents are delivered to the forwarders, this process is done digitally via email and the documents are also printed, and then given to the carrier which must sign the CMR, this only happens for Best Way orders. For the documents which are delivered to the implants they handle the documents to customs and every step needed for their side.

When the Traffic department generate the export documents, they print them twice except for the CMR. One copy of the export documents its deliver to the carrier and the other copy stays at the Traffic department to be subsequently archived. It is shown in the following figure the general process for the creation of the loading list.

Figure 7 Flowchart creation of loading lists



Source: Own creation

3.2.4.1 Loading lists

From Kerkrade European distribution center, it was reported from march to December 2021 a total of 8610 loading lists created from march to December 2021 according to the international shipping performance file. The following chart shows all the 2021 total loading list created by month, but it will be worked from the months of march to December because of there is no information available regarding forwarders for the months of January and February.

Table 2 Loading lists created per month (mar-dec 2021)

Month	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Loading lists created	872	849	768	839	851	772	771	896	870	1153
Average per week	218	212.25	192	209.75	212.75	193	192.75	224	217.5	288.25

Source: Own creation

3.2.5 Convention on the Contract for the international carriage of goods by Road (CMR)

Commonly known as its abbreviation CMR, is a consignment note which regulates different situations related to the transportation of goods by road. It notes carriers'

responsibilities, the information that must be contained by the particulars, and if it is necessary any other indication that could be considered useful for the transportation process.

“From the practice found that a total of 3 copies of the CMR consignment note is insufficient, requiring at least one copy for companies’ expeditions” (CMR Management, 2022). Currently BSC issue 4 CMR copies which are distributed as:

- 1 copy for Expeditor.
- 1 copy for Recipient or Customer.
- 2 copies for the carrier.

3.2.6 Forwarder envelope

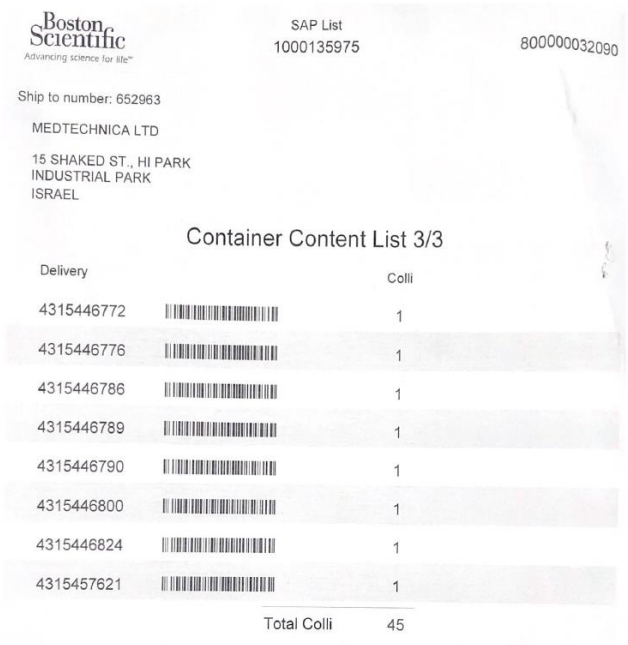
From the Traffic department it is filled an envelope directed to the forwarders which include the export documents needed by country. Stratech create the documents required for each country by default along the CMR and Skid label. Stratech shows the user the number of times that a document must be printed, in the case of the Skid label it varies depending on the total number of pallets reported by the Expediting department.

The envelope contains the loading list, the invoices required, and every other export document needed for the shipping process. The CMR is not inside the envelope but is delivered to the carrier driver along it because of it needs to be signed by the person before leaving the warehouse.

3.2.7 Container list

After the products from the SAP list are picked and their dimensions are noted on SAP, the operator must scan each product in the pallet to create the Container list. This list specifies which deliveries are in the container and how many boxes are part of it. The container list is printed twice, the first copy is kept on Expediting and the other copy is directed to the department that led the SAP list which can be Traffic or GDS. Each delivery count with a bar code is shown in the following example.

Figure 8 Example container list BSC



Boston Scientific
Advancing science for life™

SAP List
1000135975

800000032090

Ship to number: 652963
MEDTECHNICA LTD
15 SHAKED ST., HI PARK
INDUSTRIAL PARK
ISRAEL

Container Content List 3/3

Delivery	Colli
4315446772	1
4315446776	1
4315446786	1
4315446789	1
4315446790	1
4315446800	1
4315446824	1
4315457621	1
Total Colli	45

Source: (Boston Scientific, 2022)

A container can have multiple deliveries, which depends on the number of products requested by the customers or the DC's, because of the fact previously mentioned a Container list length in pages depend on the size of boxes that are stowed on it; therefore, small boxes result in long container lists with multiple pages.

3.2.8 Archiving process

After the creation and the delivery of the export documents the Traffic department must keep the information of every order shipped for the last five years due to government regulations. The archiving process is done by the following steps:

1. Scan the package of documents with the information related to the loading list (CMR, emails printed with specifications, container list, invoice and other documentation needed depending on the country).
2. Select the Traffic department scanner folder on the drive and change the name of each file with the loading list number and the country name, (e.g., 590789 Colombia).
3. Cut and paste all the files with the name changed to the folder with all the shipping information.

3.3 Which are the shipping documents required per country for shipping's coming from the Netherlands?

The shipping documents required for product exportation may vary for every destination, most of them are influenced by the location and current political relations which each country. Since countries that are not part of the European Union (EU) require different documentation, it directly affects the variation on paper usage.

For non-EU countries the extra documentation required is:

Argentina:

- Certificate of analysis

Brazil:

- COFA
- Invoice signed and stamped (Stamp and signed last page of the invoice)

Chile:

- Invoice declaration

China:

- Certificate of analysis
- Non wood certificate

Colombia:

- Certificate of analysis
- Invoice declaration

India:

- Certificate of analysis
- Certificate of manufacturer

South Korea:

- Certificate of analysis
- Invoice declaration
- Invoice signed and stamped (Stamp and signed last page of the invoice)

Mexico:

- Invoice declaration

Peru:

- Certificate of analysis

South Africa:

- Invoice declaration

Turkey:

- Invoice declaration

Vietnam:

- Certificate of analysis
- Invoice declaration
- Invoice signed and stamped
- Certificate of manufacturer
- Packing list

Costa Rica:

- No extra document needed.

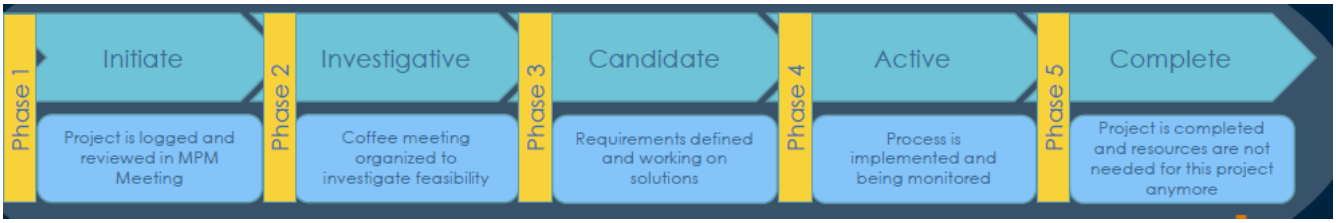
3.4 How are currently overseen the projects management at Boston Scientific?

Projects at BSC are currently guided by the Multi project management. It is a guide which ensure the projects to be done in the right way, and also increase the value creation in the company. The Multi project portfolio management has been implemented for managing Kerkrade projects portfolio with the intention of:

> Prioritizing projects, planning, and staffing them realistically with qualified and available resources, monitoring them, and keeping all involved parties informed about their status MPM should also facilitate collaboration, manage resources conflict, track project status and keep projects visibility via dashboard for example.
>
> This ensures that important projects are implemented first and that they also have the necessary resources Remaining capacities are then used for additional initiatives MPM places great value on resource planning and resource conflict resolution.
>
> (Boston Scientifc, 2022)

The tasks for the multi project management are strategic alignment, resource management, rough milestone planning, project portfolio controlling, project control and program support. In the same way, it is overseen by the structure of:

Figure 9 Multi project management structure.



Source: (Boston Scientifc, 2022)

3.5 In which processes could BSC implement a paperless trade?

Based on the complexity and need of being oversee by a person for some processes it is possible to identify the existence of tasks that cannot be part of a paperless trade currently. Nevertheless, with the information extracted from the current situation there is a direct room for improvement in the following processes:

- Creation of the loading list/SAP list: Nowadays, it is implemented a one-use paper for the information flow between Traffic and expediting. Currently the SAP list information is printed twice, one time in Traffic as a reference paper and one et the expediting printer. To improve the process time, efficiency and avoid the white paper usage, the process of information exchange can be digitalized considering all the variables at the Expediting department.

- Forwarder envelope: As previously mentioned, currently BSC creates an envelope that contains all the shipping and export documents, and it is delivered to the forwarder next to the

CMR. The process of sending the export documents is also done electronically due to from the Traffic department it is send an email with the documents.

If PT is implemented for the forwarder envelope, it would open possibilities of also reduce the paper used for the archiving. Being remarked that the archiving process in brief collect all the export documents required for each shipped separated by loading number. It is possible to also identify a strategy for the flow of information to redirect the folder where these documents are stored due to are currently electronically available and send to the forwarder.

3.4 Observations current situation

- The shipping process requires a high amount of data exchange and interaction between the Traffic and Expediting departments, and The Global Distributor services (GDS) and Expediting departments. For investigation purposes and relevancy, the interactions between GDS and Expediting are not investigated in this research paper.
- There is an opportunity of digitalizing the creation of the picking list process by the exchange of digital information. From the Traffic department in this case the picking list can be
- During creation of loading list, invoices, invoice declarations and certificates, the documents are usually printed more than the times required for to accomplish the process. The documents are printed with the intention of being delivered to the forwarder and create the existence of paper copies for the departments. Some of the

copies of the export documents are printed with the only purpose of being scanned later for the process of archiving. Therefore, is an unnecessary step considering that all the documents are already on a digital format. The intention of scan the documents is create a file in one scanning movement which gather all the documents instead of putting them together using a different method.

- Archiving the documents is a remarkable time-consuming task which must be done due to government regulations but is not required or add value for the realization of the shipping process.
- All the shipping documents are sent via email to the Forwarders except for the CMR, this due to the carrier's driver sign it and deliver their copies to the forwarders next to the envelope.
- Every non-EU country requires different documentation which is shown by Stratech so in case of digital automatization would not be possible to standardize the process.
- It was suggested by the coordinator of the Traffic department the implementation of a Pick to Light system for the picking process at Expediting.

4. Desired situation

4.1 Introduction

In this chapter will be presented information regarding the observations of the current situation and the room for improvement in those cases. It is analyzed the current situation of the information flow related to the paper-based export documents and, how is the information flow of the SAP list from Traffic to expediting, and how suitable is the current Expediting zone to implement Pick to light system suggested by the Traffic coordinator. After analyzing those cases it is proposed three scenarios for a paperless trade implementation.

4.2 Is it still necessary deliver the shipping paper-based documents to the carriers?

Among the literature research conclusions, it was found that recently some carriers had developed capabilities to exchange shipping documents digitally, nevertheless, it also depends on the stakeholders' capabilities, resources, feasibility, or willingness to change the processes. Currently for the Best Way shipments BSC work together with four forwarders (Expeditors, Kintetsu World Express, Kuehne + Nagel and DHL Global Forwarding). It was done a survey to the forwarders to understand if it is still necessary to deliver the shipping paper-based documents to them to continue with the export process and explore possibilities or boost the digital flow of information instead of the paper-based flow. The survey aimed to open discussion and research about the four main topics for the digitalization process.

- Current situation and requirements.
- CMR as a barrier.
- Existence of any other successful digitalization case with the forwarder.
- Willingness to digitalize the information flow of export documents.

The survey counted with the following questions:

1. Is still necessary to provide documents in a paper-based way? Why if the export documents are already sent by email?
2. Is there any possibility to digitalize the CMR in order to start using digital signs? Is it feasible for you work with a CMR signed digitally instead of the current paper based CMR?
3. Does any of you other B2B relationships implement the use of only digital documentation?
4. Would you be open to digitalize the process of export documents? If the answer is yes, what would be necessary to implement this digital process?

It was received responses via email by DHL global forwarding, Kuehne + Nagel, and Kintetsu world express. On the other hand, Expeditors answered in an interview.

In the following charts it is shown the information extracted from the forwarders.

Table 3 Is still necessary to provide documents in a paper-based way? Why if the export documents are already sent by email?

Is still necessary to provide documents in a paper-based way? Why if the export documents are already sent by email?	
Forwarder	**Answer**
DHL Global forwarding	"No this is not necessary. As long as we receive the required documentation via PDF via e-mail. Keep in mind that for example CoO or ATR need to be original documentation, signed, and stamped by customs and/or Chamber of Commerce. It is important to implement this new process in our mutual SOP. Also, it is important that we know if BSCI will send the documentation to the consignee or DHL." (Verhaeg, 2022)
Kuehne + Nagel	"Not necessary to provide documents in a paper-based way via mail is sufficient. Exceptions: 1. Brazil shipments for which origin documentation is required 2. IATA DGR regulated shipments (including lithium shipments)" (Sennikova, 2022)
Expeditors	"For the road transportation it is only CMR, not any commercial documents are a requirement usually for the transportation part itself, we are need to be able to identify shipments but for that we do not need paper copies." (Jaspers, 2022)
Kintetsu World Express	"For KWE it is not necessary to receive paper, if we receive all by mail that is enough." (Kouwenoord, 2022)

Source: Own creation

Table 4 Is there any possibility to digitalize the CMR in order to start using digital signs? Is it feasible for you work with a CMR signed digitally instead of the current paper based CMR?

Is there any possibility to digitalize the CMR in order to start using digital signs? Is it feasible for you work with a CMR signed digitally instead of the current paper based CMR?	
Forwarder	**Answer**
DHL Global forwarding	"It is mandatory that the driver need to have a (copy) CMR in case he will be stopped by Royal Police" (Verhaeg, 2022)
Kuehne + Nagel	"It is the responsibility of the shipper to create the CMR and as such the shipper needs to create this digital process in which it would be possible for the driver to sign off the handover of the goods. During transport the driver must be in possession of a signed handover document (CMR) either digital or hard copy. This means that the driver must have a handheld device on which this digital copy is stored to comply with the regulations in the Netherlands. In order to further investigate this a feasibility, a study must be done to get a clear overview what the pros and cons are." (Sennikova, 2022)
Expeditors	"In terms of system capabilities, when we already look at the small parcels deliveries, it is a paperless environment already where you do not get a CMR but there is a digital sign that you place and it is the way it is recorded, but to be honest I am not a 100% sure on what are the latest in regards of developments or if a digital CMR is a possibility in the days

	environment. It also really has to do with law and legal aspects." (Jaspers, 2022)
Kintetsu World Express	"The truck drivers still need a CMR upon pickup" (Kouwenoord, 2022)

Source: Own creation

Table 5 Does any of you other B2B relationships implement the use of only digital documentation?

Does any of you other B2B relationships implement the use of only digital documentation?	
Forwarder	**Answer**
DHL Global forwarding	"We are aiming for a paperless freight forwarding." (Verhaeg, 2022)
Kuehne + Nagel	"We are using eAWB for selected airlines, which means no documents are handed over to the airline when delivering the freight." (Sennikova, 2022)
Expeditors	"In general, we as a transportation/logistics provider do not send documents, we receive a lot of documents from our customers, we do have customers that do that completely automated and there are no paper copies anymore, I would say for 99% of the shipments we do not get original documentation, besides the CMR. If we deliver a shipment to Boston Scientific, the CMR is signed by BSC meaning that the goods are received in good order, but let's say

	commercial documents for ocean freight there is digital bills of lading, or electronic bills of lading and for air freight there is almost no standard for paper." (Jaspers, 2022)
Kintetsu World Express	"Yes, we have a few customers who only send their documents digital." (Kouwenoord, 2022)

Source: Own creation

Table 6 Would you be open to digitalize the process of export documents? If the answer is yes, what would be necessary to implement this digital process?

Would you be open to digitalize the process of export documents? If the answer is yes, what would be necessary to implement this digital process?	
Forwarder	**Answer**
DHL Global forwarding	"This is already completely digital. BSCI is sending these via e-mail including the transport order and supporting documents. We are providing the EX-A (customs document) to BSCI via mail" (Verhaeg, 2022)
Kuehne + Nagel	"Yes, we are open to digitalize the process of documents where possible. The following is needed to implement the digital process: 1. All involved stakeholders must be aware of the new digital process 2. SOP must be updated" (Sennikova, 2022)
Expeditors	"For expeditors is not necessary the paper documents, we have an electronic data archive or document archive which we call edoc.

	And this is basically where we keep all documents electronically stored for each shipment. For each entry. If we're talking about customs. So, we do not have paper copies saved somewhere in a in a dusty warehouse Of course, there are some exceptions. So, for example, there are customs documents which require originals. and potentially these original documents are sent throughout the world and or they need to accompany the freight physically. But for us in expeditors, we do not really have a paper process. This is really the exception; the rest is all digitally stored" (Jaspers, 2022)
Kintetsu World Express	"Yes, we are open for this, and it can be done very easily because if we receive the invoices etc. by mail it is enough for us to export the shipments." (Kouwenoord, 2022)

Source: Own creation

It was asked extra question to some of the forwarders with the intention of clarify and get extra information for the research, the questions and answers are shown below.

DHL Global Forwarding:

- From traffic department it is said that CoO, ATR and EX-A are documents issued by the forwarder (DGF in this case), so as BSC we do not need to send those documents in order to digitalize our processes, right?

"Coo is issued by BSCI, ATR and EX-A issued by DGF. At this point after creating ATR, there is a process to get it legalized by customs and then returned to BSCI Kerkrade" (Verhaeg, 2022)

- Once said that it is not necessary to provide the documents in a paper based:
  - Knowing that the invoices are sent in an envelope with the rest of the documents and via email, would you confirm that all the documentation necessary can be send via email?

"For the export process in NL yes, please keep in mind in some countries original stamped & signed invoices are needed for customs clearance" (Verhaeg, 2022)

  - Due to is not necessary send documents on a paper-based way, should BSCI notify once we stop doing it or how should be guided the process?

"Yes, please inform us once the process of paper invoices being send, will be stopped" (Verhaeg, 2022)

Expeditors:

- What would be necessary for BSC to stop the process of sending the export documents in an envelope as is done currently?

"For us it holds not value as long as we receive the documents digitally, off course what is important is that for some of your destinations the consignee or the customs authorities in the destination country require original. I know that for Boston Scientific is a document pouch on the pallet where the documents are put in, but we

as Expeditors do not do anything with original or printed copies of invoices and documents which we already receive via email or electronically." (Jaspers, 2022)

- Is it not necessary to sending the original and export documents for customs in countries which are part of the EU?

  "So, for the export customs, that is indeed not required in from Europe. However, it can be of course the shipment goes to, let's say, the Philippines. And it might be and there it the shipment needs to be imported again by the Philippine in customs authorities. So it might be that in the European Union we do not require a set of original documents or signed documents. Of course, but as an example, there are countries in the Middle East which required a signed and stemmed commercial invoice.

  For the import process which need to accompany the freight itself, that you have countries where 100% of the goods that come in a customs check is performed. And they will literally go to the freight check if the amount is correct, check if the packaging is alright. If it agrees with what is manifested and has been sent as a pre alert and they might actually need to check original documentation. So, it's not only the origin site, what we have to deal with in the case that Boston Scientific wishes to change their process." (Jaspers, 2022).

4.2.1 Key points of forwarders surveys and interview

From the interviews and surveys done to the forwarders is possible to perceive the following main points regarding the possibility of implement a paperless trade for the export documents.

- All the forwarders agree on being opened to fully digitalize the process of sending export documents and it is not necessary for them count with the paper or original documentation because they are receiving all the information also digitally already. Currently the creation of the forwarder's envelope adds no value to the BSC or forwarders processes.
- Non-EU countries require original documents (as mentioned on 3.3 documents required per country) and all the forwarders agree on the importance of also meet the consignee requirements, being this a BSC responsibility it is relevant to take this into account. However, there is a clear possibility of avoiding the use of paper for the EU countries. For non-EU the possibility of digitalizing all the export documents also depends on the current capabilities and needs from the final consignee.
- CMR is a mandatory document which must be present on the road transportation. From BSC traffic department is also remarked the importance of this document. Nevertheless, it is possible to have a digital copy of the CMR if it meets all regulations required for the Netherlands. Also, it is important to evaluate the capabilities of the stakeholders in order to work with a digital CMR.
- In case of implement the initiative of avoiding the creation of the forwarder's envelope it is necessary to contact the forwarders and inform them that only digital documentation will be shared with them. It is seeming mostly as a formality due to in most of the cases they expressed that is not necessary for them obtain the original or paper documentation.

- In order to digitalize the complete process, it is important to be aware of the consignee's capabilities and if it is feasible for them work without any paper-based or original document.

4.3 Does the consignee (Tier 2's) need the original or paper-based documentation?

From Traffic department it is issued a forwarder envelope in order to deliver the original documentation to the stakeholder interested on it, which can be used to customs clearance or archiving at the final destination. Nevertheless, Traffic only sends the envelope without being aware where is the destination of it, meaning that currently it is a mechanical process done by the department.

It was asked to the Tier 2's if they are receiving any paper-based documentation or if they currently need it due to the paper flow information can be lost on the way or it is not necessary because it is already digital. The questions asked where the followings:

- Are you currently receiving an envelope with the original export documents in a paper based along with the shipment?
- Is it necessary to send you the export documents on paper since it is already done digitally?

The questions where directly forwarder to foreign trade analysts, Operations and planning managers, import & export analysts, supply chain analysts, and logistics & distribution managers in order to acquire the most accurate answer for each country.

Table 7 Does the consignee (Tier 2's) need the original or paper-based documentation?

TIER	**Response**
South Korea	"We don't receive paper document in both import & export." (Lee, 2022)
Argentina	"In Argentina it is not necessary to send us any original documents. We only need the air waybill provided by the freight forwarder." (Garcia Leyton, 2022)
Mexico	"In Mexico it´s not necessary to send the documents physically. Digitally it is important to send the invoice, guide number and certificate of origin." (Jimenez, 2022)
Peru	"I double checked with my team, and I confirm you that from Kerkrade we are receiving original documents. It is important to keep receiving the original printed documents due to customs can ask for inspections, likewise, when the imports are entering the warehouse, the operator scan the packing list with the delivery numbers" (Huaman, 2022)
China	"For China import customs clearance purpose, only certificate of origin is necessary to have paper docs, since it's required by China Customs. Other docs like invoice only need e-docs.

	And for our warehouse, packing list stick on the package is still needed, since it's necessary for warehouse receiving work." (Yang, 2022)
Chile	"We don't receive all documents in paper together with the boxes, I think that is only the Packing list that is attached to the package. For us is only necessary keep that PL on the package and the other documents like Invoice, AWB, we need it in digitally format" (Ramirez, 2022)
Vietnam	No response received.
Colombia	"I confirm that for customs processes the documentation can be virtual for the invoice, packing list, analysis certificate, etc… In relation with the physical documentation that arrives next to the merchandise it is only important to continue sending the following certificates: - Packing list - Analysis certificate." (Mora N. , 2022)
Costa Rica	"Yes, it is necessary for customs requirements" (Mora A. , 2022)
India	No response received.
Brazil	"Yes, documents are attached on the gaylord. Yes, we need receive with the shipment, because it's requirement of Brazilian customs." (Santos, 2022)

South Africa	"Yes, we receive physical copies of the applicable paperwork with each T1 shipment. Yes, our warehouse team requires these documents during incoming inspection and SAP receipt." (Coetzer, 2022)
Turkey	"We need original printed export document in envelope with the shipment. That is presented by truck/truck company to customs." (Ozkan, 2022)

Source: Own creation

4.3.1 Key points – export documentation delivered and required

Once the forwarder research done it was concluded that they have capabilities to work with electronic documents. On the other hand, for non-domestic deliveries (non-EU deliveries) it depends on the recipient country requirements, mostly orientated to the documents needed for customs clearance. After investigated with the Tier 2 recipients from BSCI in other countries it was found that some countries claim to do not need any paper-based documentation in order to accomplish their processes, however, there are countries which affirm to require all the original paper based documentation due to customs needs on a country level, or there are countries which response was the need of some of the export documents that are currently send by Kerkrade.

In the following table it is shown the difference between the documents that are currently shipped by Kerkrade European distribution center to the tier 2's and their responses.

Table 8 Current documents sent and required by tier 2's

Country	**Documents currently shipped**	**Documents needed (according to Tier 2 answers)**
South Korea	Certificate of analysis Invoice declaration Invoice signed and stamped (Stamp and signed last page of the invoice)	No documents received.
Argentina	Certificate of analysis	No documents needed.
Mexico	Invoice declaration	No paper-based documents needed.
Peru	Certificate of analysis	Certificate of analysis.
China	Certificate of analysis Non wood certificate	Certificate of origin.
Chile	Invoice declaration	No documents received. Only electronical documents needed.
Vietnam	Certificate of analysis Invoice declaration Invoice signed and stamped Certificate of manufacturer	No information available to compare.

	Packing list	
Colombia	Certificate of analysis Invoice declaration	Certificate of analysis
Costa Rica	No extra document needed	Inconsistency (Claim to need documents for customs).
India	Certificate of analysis Certificate of manufacturer	No information available to compare.
Brazil	COFA Invoice signed and stamped (Stamp and signed last page of the invoice)	COFA Invoice signed and stamped (Stamp and signed last page of the invoice)
South Africa	Invoice declaration	Invoice declaration
Turkey	Invoice declaration	Invoice declaration

Source: Own creation

From the information extracted it is possible to identify inconsistencies regarding the number of documents that are sent in comparison with the number of documents that arrive to the country. There is an open possibility that it is lost the track of the documents or are collected by customs in the import process, it is necessary to investigate.

Contrarily, some Tier 2 countries affirm that can work with only electronic documentation and no paper-based or original documentation is needed. Also, for some tier 2's more documentation is sent that is needed.

4.3.2 Export documents created based on of loading lists

The international shipping performance file began to be recorded in March of 2021. Given that fact it is only known the number of orders (loading list created) since that period. To estimate the increase was used the straight-line method to forecast the increase of orders for the following years using 2021 as reference. It is considered an 1,38% comparing the total order increase from 2021 to 2022.

The data collected from 2021 and 2022 for the months of March, April and May is shown below.

Table 9 Number of export documents created based on loading lists 2021

	2021			
Row Labels	**Mar**	**Apr**	**May**	**Grand Total**
Turkey	24	33	33	90
Costa Rica	29	26	33	88
India	27	28	24	79
China	16	22	19	57

Vietnam	9	18	14	41
South Africa	11	7	11	29
South Korea	11	9	6	26
Mexico	9	9	8	26
Argentina	6	7	8	21
Colombia	5	9	5	19
Brazil	5	4	4	13
Peru	5	4	3	12
Chile	3	3	2	8
Grand Total	**160**	**179**	**170**	**509**

Source: Own creation

Table 10 Number of export documents created based on loading lists 2021

	2022			
Row Labels	**Mar**	**Apr**	**May**	**Grand Total**
Turkey	40	27	24	91
India	27	29	29	85
Costa Rica	29	26	23	78
China	16	17	20	53
Mexico	12	12	11	35
South Korea	12	14	8	34
South Africa	9	8	11	28

Vietnam	8	8	11	27
Argentina	6	8	4	18
Colombia	7	6	5	18
Chile	6	8	4	18
Peru	6	4	7	17
Brazil	6	4	4	14
Grand Total	**184**	**171**	**161**	**516**

Source: Own creation

The forecast done using the straight-line method for the following 5 years of loading lists created is shown below.

Table 11. Forecast expected export documents for the following 5 years

Country	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
Turkey	360	364	369	374	379	384	390
Costa Rica	352	340	345	349	354	359	364
India	316	312	316	321	325	330	334
China	228	212	215	218	221	224	227
Vietnam	164	140	142	144	146	148	150
South Africa	116	136	138	140	142	144	146
South Korea	104	112	114	115	117	118	120
Mexico	104	108	109	111	113	114	116

Argentina	84	72	73	74	75	76	77
Colombia	76	72	73	74	75	76	77
Brazil	52	72	73	74	75	76	77
Peru	48	68	69	70	71	72	73
Chile	32	56	57	58	58	59	60
Grand Total	**2036**	**2064**	**2092**	**2121**	**2150**	**2180**	**2210**

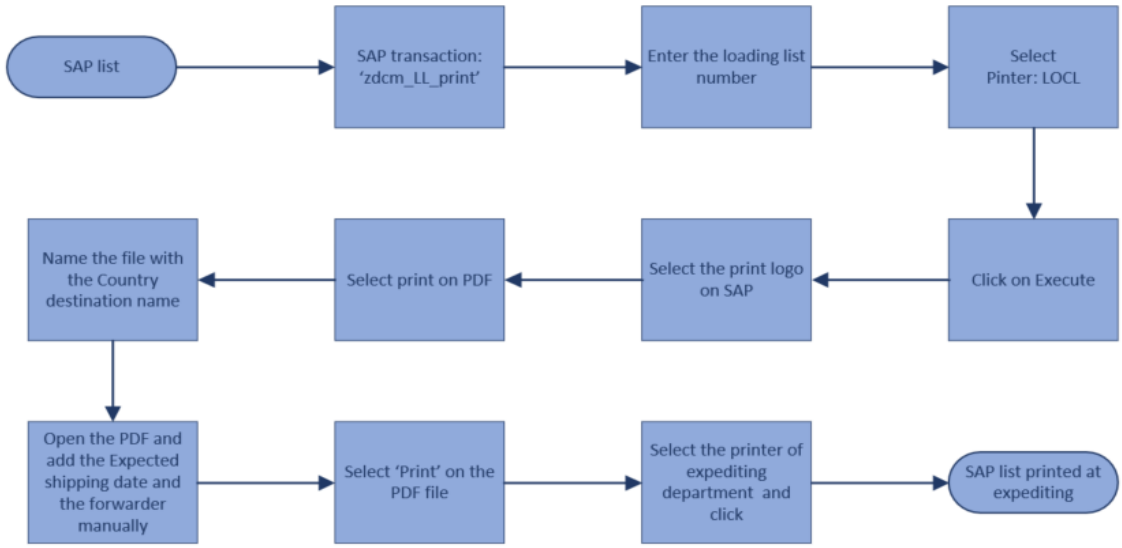
Source: Own creation

4.4 Can Traffic and Expediting departments digitalize the SAP list exchange of information?

Nowadays, the SAP list is printed twice at the Traffic and Expediting department separately. Traffic department use their copy as reference for the export document process followed by it. On the other hand, the SAP list takes more value at the Expediting department due to is needed for the complete picking process.

The process to provide the SAP list once is done from Traffic to Expediting in detail is the following:

Figure 10 Sending SAP list to Expediting. Source: Juan Sebastian Ballen Prada, author´s creation



Source: Own creation

4.4.1 Which variables and restrictions should be considered to digitalize completely the SAP list process?

- All the storage locations at the high racks store different deliveries depending on the 'Ship to country' number.
- Commonly the specific 'Ship to country' locations are in the same zone of the high racks, meaning that a country does not have multiple locations in different high racks.
- Due to the 'Ship to country' locations are in the same high rack; two operators cannot pick deliveries for the same SAP list or cannot pick deliveries for the same country.
- Different persons at expediting can work simultaneously in different SAP list so, it is needed the capacity of receive files from more than one sender at the same time.

4.4.2 How to digitalize the SAP list flow of information?

As mentioned by Moon, Shim, & Kim (2011) companies can identify room for improvement in their supply chain operations using electronic exchange of data, this directly boost the speed, accuracy, simplicity, and security. Remarking the simplicity and the accuracy required for this process a feasible solution for avoid the paper-based exchange of information between traffic and expediting departments is the (software implementation). The implementation of a software which lead the information flow and increase efficiency is an open possibility. Given that it must facilitate the data exchange between departments, is necessary to recall the process of "sending an SAP list to expediting" (see figure 11) to comprehend where digitalization process would take place, this is the penultimate step of the process, just before sending the SAP list.

Due to the creation of the SAP list must be oversaw by people at Traffic and they must manually add the date and forwarder's name, it is not currently considered the possibility of automating that process, also because of shipping information can vary for multiple business conditions and it must be checked and confirmed before sending the list to Expediting.

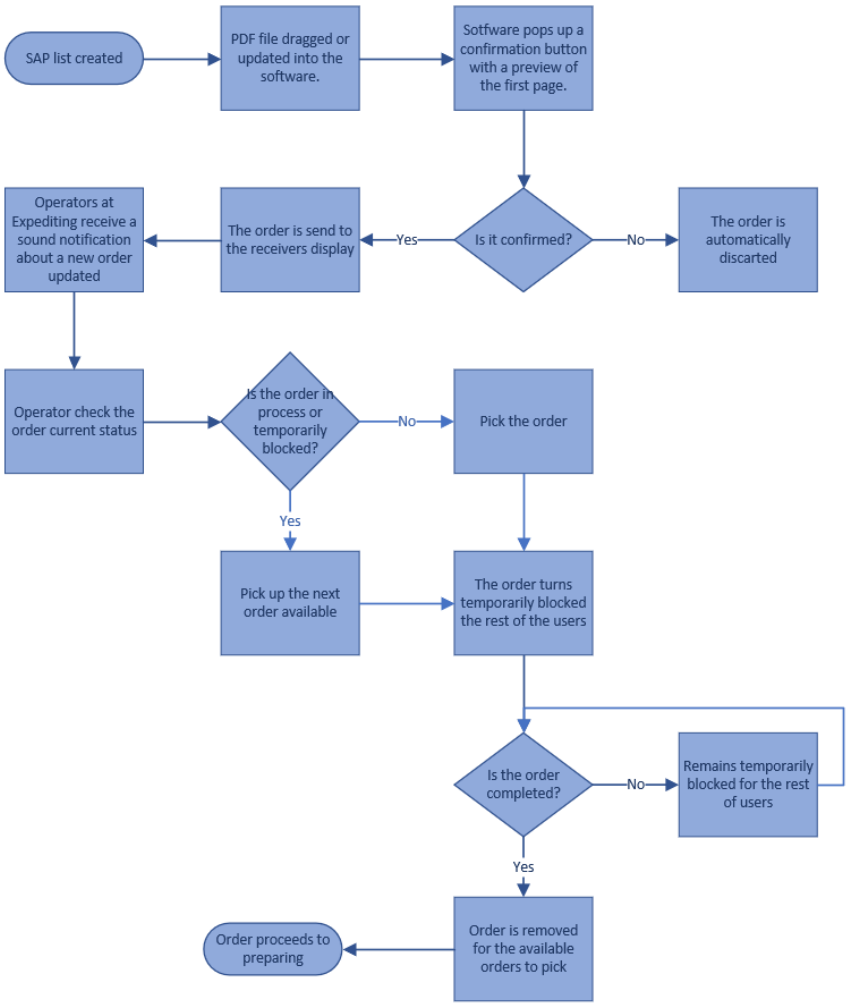
To facilitate the exchange of information, once the PDF file with the SAP list is done the easiest action for the person who created it on Traffic would be dragging it to the open software or uploading it. From the Expediting department it would be necessary the acquisition of at least three tablets (two for daily usage and one for backup) to display the PDF files from the receiver view.

Considering the restrictions previously mentioned to digitalize the process (heading 4.4.1) in order to avoid the paper-based information and improve the efficiency of the process the digital solution it should include the following requirements:

- Live time update of active orders
- Temporarily orders blocked and show when an order is currently being picked by another operator. (Orders in process are shown in orange).
- Temporarily block orders that generate conflict between them.
- Due to the deliveries are placed on the same “Ship to code” location it would be useful include a pop up that mark when a location required is at the moment in the high racks where an operator is currently picking another order, this would save the time realization time and avoid bottlenecks in this process.
- Record of orders completed.

The following flowchart illustrate how the process would be done by this solution:

Figure 11 Digitalization sending SAP list. Source: Juan Sebastian Ballen Prada, author´s creation



Source: Own creation

4.4.3 SAP data

According to the international shipping performance file SAP lists are only created for the following shipping types: best way shipments, best way express shipments, marketing services and Taxis services. Filtering by them it is possible to identify 4581 SAP lists reported for the year 2021.

It was compiled for two days the archiving files from expediting department. In this process it was counted the number of pages per SAP list created for those two days, used as a sample for the normal process. For 45 SAP lists analyzed in the period of one week it was seen an average of 2.04 pages per SAP list, with a maximum of 7 pages and a minimum of 1. It was also calculated a standard deviation of 1.38 which allow us to know how the number of pages fluctuates around the average.

Due to it is not possible to keep track digitally of the number of pages created per SAP lists in total, it is estimated with the data found above the total number of pages used for SAP lists for the 2021.

Table 12 SAP lists created

Average number of pages per SAP list	2.04
Total SAP lists reported for 2021	4581
Estimated total of SAP pages printed (2.04 x 4581 x 2) *	9345
Estimated total of SAP pages printed at expediting	4673
Estimated number of SAP pages printed per day at Expediting *	18

Source: Own creation

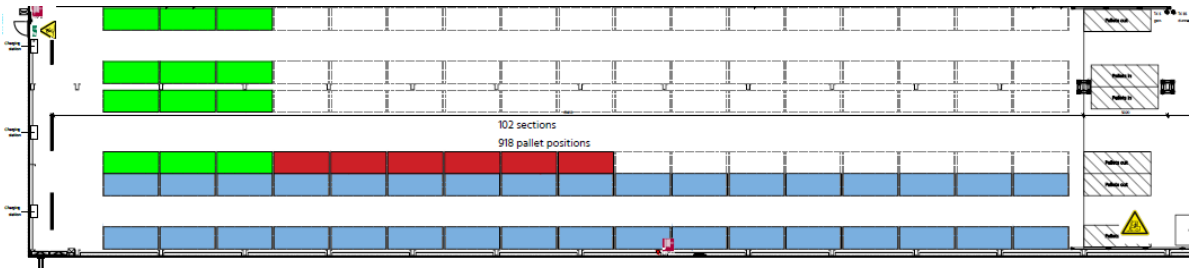
*** Note:** In the total of SAP pages printed it is multiplied by 2 due to Traffic print it twice, one copy used as reference in their department and another copy directed at the Expediting printer.

Due to BSC does not ship deliveries on weekends it is used 260 working days as calculation base.

4.5 Is expediting department an appropriate zone for Pick to Light implementation?

Currently the Expediting picking zone is composed by four high racks which have a drivable forklift between two pair of high-racks, the first forklift is designed to support the operator to pick deliveries from the first two high-racks on the left and right zone of the forklift, the second forklift works equally for the high racks three and four. It is shown in the following illustration, being the blue colored high racks used by the marketing and returns departments.

Figure 12 High racks distribution at Expediting (Layout provided by Facilities department BSC Kerkrade)

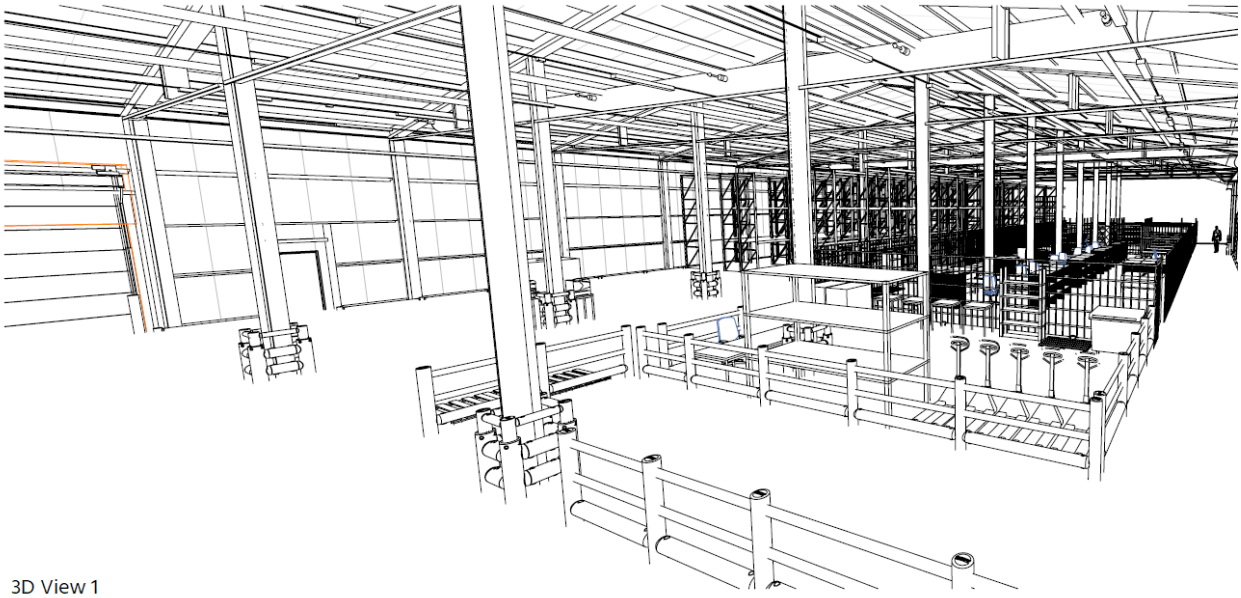


Source: Own creation

Expediting counts with 68 sections with a storage possibility for 612 pallet positions. Each section size is divided in three height levels of 3,3m length x 1,7m height x 1,3m depth, giving this a storage capacity for 9 pallet positions per section. The minimum distance that an operator would have to drive the forklift from one section to another is 3,3 meters, and the maximum distance would be 56,1 meters, considering that each section counts with three height levels the operator can also move a minimum of 1,7 meters and a maximum of 3,4 meters vertically.

Currently the picking process done by the operators consist of scan the bar code for one delivery on the picking list, each delivery says which is the number of boxes that is part of it and the operator must scan them to confirm that the delivery was successfully picked. The boxes can vary in size and weight, the heavier boxes require more effort and time to be picked, depending on the position of the box in the pallet as well (can be behind, on top, in front or below the rest of the boxes). Once picked and scanned the box is placed in a pallet in front of the forklift and the operator proceed to pick the next delivery until finish the number of deliveries required, then the forklift is parked in its original place in front of the high racks and the pallet is moved in front of the high racks ready to start the preparing process, this place is shown in the following 3D model of Expediting.

Figure 13 Expediting layout BSC Kerkrade *(Source: Facilities PDF from BSC Kerkrade)*



Source: (Boston Scientific, 2022)

5. Strategic scenarios and choice

5.1 Introduction

At the beginning of this chapter, it is analyzed if the research suggestion done by the Traffic coordinator would lead BSC to a paperless solution or would help to meet the company goals. On the other hand, it is presented two solution scenarios of strategic plans to turn a process paperless, the scenarios are presented considering the research previously done for the current situation and the improvements that can be added to it in with the objective of reach the desired situation. Once presented the scenario alternatives the more suitable scenario for the company emerges and finally it is concluded why the scores of the decision matrix were given along a conclusion and recommendation for BSC.

5.2 Would `Pick to light´ lead BSC to a paperless solution?

The Traffic department supervisor suggested the implementation of a Pick to light system to eliminate paper involved in the creation of the picking list and improve the picking efficiency (See Appendix 1). As reviewed PTL can increase the picking efficiency and minimize the quantity of human errors. On the other hand, PTL requires certain conditions to be implemented. Currently the Expediting department receive a picking list the operators available pick it from the

printer and proceed to drive the forklift trough the zones divided by “Ship to locations” picking the products on the list.

It is also important to remark that the “Ship to locations” do not storage the same the same product units per location, each delivery are boxes of different sizes and do not contain the same number or type of units. Usually, the implementation of PTL is used for manual or conveyor picking zones, which is not the case at the Expediting department. According to Michael (2021) Pick to light would increase the efficiency if the products were in the same picking area, otherwise, the task would turn into a memory process for the operator. The layout of the picking area at Expediting is formed by 102 sections with storage possibility for 918 pallet positions. Since the operator must operate and scroll a forklift trough the multiple “Ship to Country” the picking zone is not ideal to apply PTL.

The implementation of PTL would be turn into a loss of installation time, training time, resources, and efficiency because the length and wide of the picking zone does not allow the operator to see the lights from distance driving a forklift. Consequently, it will not lead the department to an efficiency increase or the reduction of a paper process. Because of that, PTL as an alternative solution for the implementation of paperless trade in one process will not be considered.

5.3 Paperless-trade scenarios

Given the field research previously shown in chapter four it is possible to conclude that currently BSC has room for improvement in the avoidance of paper usage. According to the field

research done it can be improved by digitalizing the process of sending the SAP list from Traffic to Expediting and modifying the paper creation of export documents directed to tier 2's.

As stated in chapter 1 the company objective aims to develop a strategy to enable on process to become paperless by the end of 2022 and be more sustainable, avoid errors related to the paper flow information as losing track of information, printing mistakes, among others. Based on Tubbesing (2006) some of the potential benefits of implementing paperless processes are the speed of the electronical information, shippers can pre-clear documents before their arrival to accelerate the customs check process, the decrease of data duplications and errors, or elimination of unnecessary processes permitting the obtaining of accurate data.

To accomplish this objective, it was studied the current situation of the company, based on the observations done about possibilities for paperless implementation were given two possibilities of digitalization the flow of information.

5.3.1 Scenario 1: Digitalization of export documents

In the field research done to the forwarders and to the Tier 2 related to the export documents requirements for product exportation and importation, it was found that for domestic shipments the only document required is the CMR. Nevertheless, it was mentioned by most of them that currently they are not working with paper-based documents and, as long as they count with the electronic documents, it is not an inconvenience. There are some exceptions as stated for Kuehne Nagel for the case of Brazil where the documents on paper are required and confirmed as well by Loraine Santos (2022), Foreign trade analyst of Boston Scientific in Brazil.

However, it was found a series of inconsistencies regarding the current process of issuing export documents and the current requirements of the Tier 2's. The production of paper-based documents is turned into a mechanical process where due to the miscommunication, the operators accomplish their daily tasks without being aware of the new market needs or the latest updates regarding export and import documents requirements by the countries. To avoid the use of paper, increase the process productivity and stop doing process twice but in different media (paper and electronically), and according to the field research previously shown, BSC traffic department must embrace a digitalization plan for the sort of consignees which do not require the paper-paper based documentation and update or stop creating extra documentation for the stakeholders which do not need more than the necessary. The gap between what is wanted to be achieved in this scenario and the current situation is shown in the table 8 current documents sent and required by tier 2's.

5.3.2 Scenario 2: Digitalization of the SAP list

The scenario number 2 aims to the implementation of a strategy where the paper-based information daily given from Traffic to Expediting gets turned digitally. Done by a software implementation which meets the Expediting requirements and current process restrictions previously explained of chapter 4. It was evaluated what it is necessary to request to the engineering team of Kerkrade or to an outsourcing relation for the software design. The final information flow desired is shown in the Figure 11. With the objective of reducing errors possibilities related to the paper-based information as losing track of one page or more pages of the SAP list, printing mistakes, and increase the process efficiency allowing the operators to

know which the ideal zone is to pick without interrupting other operators' tasks, count with live time updates of active orders and an easy access tool where they can check the orders completed record.

With this software implementation it would be saved around 18 white paper sheets a day meaning total savings of 4673 white paper sheets printed yearly for the SAP list production. Considering a % increase of SAP list production it is estimated saving of 29023 paper sheets for the following 5 years (forecasting a 1,38% of orders increase per year).

Table 13 Forecast SAP lists

Forecast following 5 years	
2022	4673
2023	4737.4874
2024	4802.864726
2025	4869.144259
2026	4936.33845
2027	5004.459921
Total	29023.29476

Source: Own creation

5.4 Scenarios decision matrix

To rate which would be the most beneficial scenario to implement paperless trade it was used a decision matrix to compare the scenarios in multiple aspects. It is given a score between 0 and 5 depending on for suitable is the scenario in every aspect evaluated. Finally, the highest score between the two scenarios will represent the most convenient for the company and the scenario which would lead us to accomplish the company objective.

Scores:

0- Poor

1- Not suitable category analyzed

2- A little suitable category analyzed

3- Moderately suitable category analyzed

4- Suitable for category analyzed

5- Perfectly suitable category analyzed

Table 14 Decision Matrix

			Digitalization of export documents	**Digitalization of the SAP list**
Relevance	Directly influences the company processes	30%	4	3
	Adds value to the company processes		4	3
	Directly related with the department's tasks		4	4
Complexity	Avoids the consuming of budget resources	25%	4	2
	Ability to be implemented in the short term		4	4

	Does not need support from multiple stakeholders		2	4
Performance	Ability to save task time used	25%	2	2
	Ability to save company capital resources		3	3
	Ability to meet an efficiency improvement		3	4
Sustainability	Reduce the paper usage	20%	4	3
	Sustainable solution in the long term		4	4
	Final score		**3.5**	**3.28333333**

Source: Own creation

5.4.1 Decision matrix scores

Suitable for the category relevance were given to the first scenario Digitalization of export documents due to is a solution which directly influences the company flow of information in the daily basis process, reducing drastically the over production of unnecessary paperwork. For complexity it was considered the fact that will not spend monetary resources but will require time to double check with the customs authorities of every country the updated requirements before stop the documents issuing. Nevertheless, it is a process which will not influence the time

required for the task or increase decidedly the efficiency. It is a solution sustainable in the long term and which can be completely applied by the end of 2022.

On the other hand, the second scenario digitalization of SAP counts with an overall score above suitable for relevance due to given it is a daily basis process will not be considered as important as the first scenario. Would add social responsibility value to the company processes but would not be directly reflexed on the interested parts. An advantage of this scenario is the implementation of it will not require approvements outside Kerkrade facilities. Additionally, it would have an impact in the department budget but will be minor due to the capital equipment requirements for the scenario. A project that can be developed by the end of 2022.

5.5 Conclusion and recommendations

Bearing in mind the opportunities of paperless implementation shown in the current situation of the company and the field research substantiated in chapter four about how can be reached the desired situation it is discarded the pick to light system suggested by the Traffic coordinator at the beginning of the research due to it simply would not led BSC to a paperless solution and the system is not suitable for the current picking zone of Expediting, adjacent, two scenarios possibilities where proposed and evaluated in an decision matrix considering four categories (relevance, complexity, performance and sustainability) embracing their own criteria inside the matrix.

Given the evaluation of the decision matrix, it was considered the weighted average of 3.5 for the first scenario and it is concluded that BSC should implement the digitalization of export documents to reduce the total amount of paper generated in the shipping process and turn paperless the export information flow. Being this scenario the most aligned to BSC objectives, the implementation of this strategy will reduce the aggregate paper production issued by Traffic to the tier 2's turning more sustainable the process and avoiding the possibility of incur into paper-based issues as losing track of information for this situation. It is recommended to start the strategy implementation in the second semester of 2022 to conclude the project by the end of the year.

Action plan

6.1 Introduction

In this chapter is presented the action plan with regards the choice of strategic option. The requirements, people involved, resources needed and timeframes for the implementation of the scenario chosen. The plan of action is considered given the multi project management guidance currently used by the company. To conclude, the chapter ends with a financial underpinning of the scenario and the final research conclusion.

6.2 Action plan

Table 15 Action plan

Action	**1**	**2**	**3**	**4**
	Project opening	**Data compilation**	**Stratech updating**	**Communication and project closing**

Who	Supply chain analyst 1 or Freight trainee at BSC Kerkrade because it is a project not suitable for other members of the team in regards of operational time available.	Supply chain analyst from Boston Scientific Kerkrade since it is the distribution center that ship to the Tier 2's.	Traffic coordinator because he is the BSC connection with Stratech.	The European Freight manager and the supply chain analyst who had direct contact with the tiers should communicate the new information flow in order to present an efficient update to every Tier 2.
What	Open the "Export documents digitalization" project in the Freight department team in order to clear responsibilities and the time	It is necessary to communicate with the import department of each Tier 2, let them know the project purpose and ask them to double check with the customs	Once the list of documents requirements is updated it in necessary to transfer the information of the export documents requirements per country to Stratech. Due to it is the	Inform the variation in the new information flow to every Tier 2. Enabling the open communication other export documents are not necessary for

	frame required for each task. Also, times to follow up the project are stablished.	authorities of each country in order to marked as ready to update.	platform that automatically produce the list of documents needed for every order at Traffic.	further occasions. On the other hand, it is also necessary inform Expediting about the paper-based information reduction.
Where	Kerkrade Boston Scientific facilities (Freight department)	The data will be collected by an analyst at Kerkrade Boston Scientific facilities (Freight department) but the process of data compilation should be done online.	Kerkrade Boston Scientific facilities (Traffic department)	The project conclusion must be communicated virtually to all the stakeholders, information must be shared in a virtual meeting and by email.

When	The project opening should start at July 1st, 2022, the project has to be logged and reviewed in the MPM meeting.	The data compilation is a process that can take two weeks after the project opening due to the velocity of customs response in some countries.	Due to it is necessary to count with a "Superuser" to customize the client requirements from Stratech, the BSC contact person needs to specify the data and export documents which need to be provided by the platform. It would take a week after the end of data compilation process.	The communication and project closing are a process that would involve multiple meetings because of the different time zones. It is planned to be covered in a week.

Why	In order to meet up the company objective BSC should start the export documents digitalization project as soon as possible. It is planned for July first to avoid the unnecessary document production and bring the effectiveness of electronically documentation to around the enterprise.	The data compilation action is the clue part for the of the project. Counting already with a list of the current documents required for each country and their needs on paper the next step is to get information from Vietnam and India (two countries on where the communication was not successful) and double check with the customs authorities for	Stratech is the current tool used by Traffic department to issue all the export documents required for each country. Once the SAP data is extracted the program creates standard files meeting up every country customs requirement. The program must be updated to avoid automatic printing of documents that are not necessary on paper anymore. Instead, it must be programmed to produce a PDF file and directed to a desired location at the	It is necessary to inform all the stakeholders which are going to be the new implementations on the information flow and explain the final purpose of the project. Import departments must be aware of where they can find the documents of each order and embrace a communication lane when different situations occur

		each country to create a final file for Stratech updating.	Drive of the Traffic department to then be electronically send to the Tier 2.	as the avoidance of more paper-based documents in the following months or years.

Source: Own creation

Table 16 Gantt chart short-term implementation

	Short-term implementations	**Project opening**	**Check updated requirements list**	**Follow up meetings with tier 2´s and data compilation**	**Stratech updating request**	**Update Tiers about the information flow**	**Project closing**
Person involved	**Supply chain Analyst**	x	x			x	x
	Traffic coordinator		x	x	x		

	Freight Manager					x	
July	**Week 1**						
	Week 2						
	Week 3						
	Week 4						
August	**Week 5**						
	Week 6						

Source: Own creation

6.3 Potentially saved export documents

Based on the forecast done in Chapter 4 it is possible to estimate the potential saving of documents by the implementation of this strategy. It is important to remark that these documents are rarely composed of less than 2 pages, and they usually can reach 6 pages or more depending on the number of deliveries on each order.

Table 17 Potentially saved documents in the following 5 years

Country	**Non required documents**	**Potential number of documents saved**					
		2023	**2024**	**2025**	**2026**	**2027**	**Total**
Turkey	0	369	374	379	384	390	1896
Costa Rica	0	345	349	354	359	364	1771
India	No info available.	316	321	325	330	334	1626
China	Non wood certificate.	215	218	221	224	227	1105
Vietnam	No info available.	142	144	146	148	150	729
South Africa	0	138	140	142	144	146	709

South Korea	Certificate of analysis. Invoice declaration. Invoice signed and stamped.	114	115	117	118	120	584
Mexico	Invoice declaration.	109	111	113	114	116	563
Argentina	Certificate of analysis.	73	74	75	76	77	375
Colombia	Invoice declaration.	73	74	75	76	77	375
Brazil	0	73	74	75	76	77	375
Peru	0	69	70	71	72	73	354
Chile	Invoice declaration.	57	58	58	59	60	292
Grand Total		**2092**	**2121**	**2150**	**2180**	**2210**	

Source: Own creation

Table 18 Summary of potential paper saved

Summary	**2023**	**2024**	**2025**	**2026**	**2027**	**Total**
Invoice declaration	353	358	363	368	373	**1813**
Non wood certificate	215	218	221	224	227	**1105**
Certificate of analysis	187	189	192	194	197	**959**
Invoice signed and stamped	114	115	117	118	120	**584**

Source: Own creation

6.4 Financial underpinning

The costs of this project are time related due to there is not direct effect in the budget. For the calculation it was used the time spend in the investigation project in addition on the time necessary for each task multiplied per the person involved salary. On the other hand, the project will not reflect any cost saving for the enterprise because is focused on error avoidance, information flow efficacy and sustainability.

Table 19 Wage per hour

	Wage per hour
Supply chain analyst	€ 16.88
European Freight Manager	€ 25.00
Traffic coordinator	€ 20.00
Freight intern	€ 2.81

Source: Own creation

c

		Cost
		€
Hours required for the research	216	607.50

Source: Own creation

Table 20 Cost per person and per task

		Wage per person involved			
Short term implementations	**Estimated time required (hours)**	**Supply chain Analyst**	**Traffic coordinator**	**Freight European Manager**	**Total cost per task**
Project opening	1	€ 16.88			**€ 16.88**
Checking updated requirements list	2	€ 33.75	€ 40.00		**€ 73.75**
Follow up meetings with tier 2's and data compilation	10	€ 168.75			**€ 168.75**
Stratech updating request	3		€ 60.00		**€ 60.00**
Update Tiers about the information flow	4	€ 67.50		€ 100.00	**€ 167.50**
Project closing	1	€ 16.88			**€ 16.88**
Total cost per person involved		€ 303.75	€ 100.00	€ 100.00	

Source: Own creation

Table 21 Financial underpinning

Short term cost estimation	€ 503.75
Research cost	€ 607.50
Cost estimation + research cost	**€ 1,111.25**

Source: Own creation

Table 22 Inflation rate in the Netherlands

Average inflation rate Netherlands*	3,30%					
Xeros business paper ream price	$ 5,92					
Year	**2023**	**2024**	**2025**	**2026**	**2027**	**Total**
Estimated savings on paper	$ 74,40	$ 75,34	$ 76,45	$ 77,40	$ 78,51	$ 369,73

Source: Own creation

*__Note:__ inflation rate calculated by worlddata.info

6.5 Conclusion

The Export documents digitalization is a strategy that would not have a relevant impact on the Freight department budget with the estimated spending of € 1.111,25 and having estimating savings of €369,7, meaning it that the total cost is higher than the potential savings

but given the fact that is a non-profit focus project with a low investment the benefits presented by it make the project worthy to implement. Being this a short-term project with several potential savings on white paper printing for the following years it can completely accomplish the company objective to become more sustainable, reduce errors related to paper-based documentation as losing track of the information in the shipping process and customs clearance, increase the speed of the information arrival and the overall process efficiency. By the end of the project, it is an estimated savings of 31.227 paper sheets for the following 5 years being this strategy a highly recommended project to implement.

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