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OPTIMIZATION OF ADMINISTRATIVE PROCESSES IN BEER EXPORT: A CASE STUDY

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OPTIMIZATION OF ADMINISTRATIVE PROCESSES IN BEER EXPORT: A CASE STUDY

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Abstract

Amidst the expanding global trade landscape, the effective management of global supply chains (GSCs) has become a crucial concern for multinational corporations, significantly impacting their performance. In the context of the beer industry, maritime transportation, particularly through container shipments, plays a pivotal role, influencing and being influenced by various interconnected chains. In 2022, Heineken's French subsidiary faced a €10,000 loss due to inconsistencies in customs clearance documentation, a crucial aspect of export operations. In response, this study presents an approach aimed at optimizing customs document transmission, grounded in a thorough process analysis. This approach involves two optimization strategies: the automation of repetitive tasks through VBA programming and SAP macros, and the reduction of errors through systematic checklists.

Keywords: export, customs, documents, mapping, automation, VBA, checklists.

1. Introduction

In recent years, supply chains have gone global, bringing forth new challenges and operational issues across various sectors. A global supply chain comprises diverse organizations spread across multiple tiers and geographic locations (KOBERG et al., 2019). To bridge distances and facilitate the exchange of materials and information, efficient supply chain management is essential, as well as the smooth functioning of the transportation system (FRANSOO et al., 2013).

As highlighted by Nguyen et al. (2022), maritime transport, particularly container shipping, accounts for over 80% of global trade volume. Following a decline in 2020, primarily due to the COVID-19 crisis, global maritime trade rebounded in 2021. Containerized shipments grew by 3.2%, reaching a total of 11 billion tons (UNCTAD, 2022), solidifying their role as the backbone of global commerce (CHRISTIANSEN et al., 2007).

The ocean container supply chain involves various stakeholders, including suppliers, buyers, ocean carriers, logistic service providers, hinterland carriers, and terminal operators. As Fransoo et al. (2013) identified, a characteristic of this chain is that not all parties have direct contracts; typically, there is a contractual relationship between two parties linked to others through operational connections. Consequently, there isn't a

single entity controlling end-to-end container transport, underscoring the need for coordination among players to ensure the efficiency of the supplier-customer chain. Additionally, various barriers, such as legislative requirements, impact the transportation of goods within the chain.

In 2021, the global beer market generated revenues of 651 billion euros, as reported by Statista's Consumer Market Outlook. Leading the market are the three giants: Inheuser-Busch InBev, with the largest market share, followed by Heineken and Carlsberg. Unsurprisingly, the global beer supply chain faces challenges ranging from production and storage management to coordinating multiple parties not always bound by contracts.

In France, Heineken dominates the beer market, boasting a portfolio of more than twenty brands, including Heineken®, Desperados®, Pelforth®, and Affligem®. Heineken France is responsible for 4,000 direct and 30,000 indirect jobs, with three breweries in Mons, Schiltigheim, and Marseille, collectively capable of producing over 6,300,000 Hl per year.

For Heineken France Opco, the export operation encountered a bottleneck in sharing information with government authorities. In 2022, the company incurred a loss of 10,000 Euros due to containers not being shipped from the port due to inadequate or incorrect customs documentation. This resulted in various losses, including container storage costs at the port, rescheduling expenses, and a decline in customer trust. Interestingly, this wasn't the first time Heineken faced government regulation challenges. In 2007, Heineken Netherlands (NL) faced the introduction of a new Export Control System, which eventually required Heineken to submit unnecessary declarations and documents for EU customs control. Although this system is now commonplace, it was a novel experience for Heineken NL at the time, prompting them to launch the Beer Living Lab (BeerLL) research project. The primary objective of this initiative was to establish partnerships between customs authorities and businesses, with a focus on creating a secure and centralized document transmission system between Heineken NL and CustomsNL (BAIDA et al., 2007).

With these challenges in mind, this study aims to investigate the beer export process from Heineken France to its customers outside the European Union (EU), identifying information flow and the responsibilities of each actor involved. Furthermore, the project seeks to develop action plans to reduce losses in the process of sending documents for customs clearance.

The paper's structure is as follows: Section 2 will provide a literature review on the difficulties encountered in containerized exports and the European regulatory requirements governing beer exporting businesses. Section 3 will detail the chosen methodology to address the problem and achieve the objectives, followed by Section 4, which will discuss the results obtained. Finally, Section 5 will present the conclusion, summarizing the main achievements and values of this work.

2. Literature review

2.1 Global Supply Chains

Since the 2000s, global supply chains (GSC) have garnered significant attention from both researchers and industry stakeholders (GEREFFI et al, 2012). A GSC encompasses actors situated across diverse regions worldwide, interconnected through shared processes (KOBERG et al., 2019). These processes typically form part of the supply chain logistics for multinational corporations, playing a crucial role in value creation and ensuring the success of a business model. The configuration of the chain, whether linear or circular, must align with and support the company's business model objectives and strategies (VEGTER et al., 2020).

The linear supply chain follows a sequence of processes that commences with raw material acquisition and concludes with the delivery of goods to the end customer, with no subsequent return of the product. Linear Supply Chain management concentrates on optimizing processes for efficiency, reducing costs, increasing revenue for shareholders, and gaining a competitive advantage (MASI et al., 2017). In contrast, the circular supply chain envisions the reintroduction of the marketed product into either the same production chain or another value chain, achieved through practices like remanufacturing, recycling, and reuse (FAROOQUE et al., 2011). In recent years, the circular supply chain has gained prominence, primarily driven by companies' commitment to reducing their environmental footprint (TAGHIKHAH et al., 2019).

Supply chain management (SCM) can be explored through cross-functional, cross-firm, and process-based frameworks, with two well-known models being Cooper & Lambert's (1997) SCM framework and the Supply Chain Operations Reference (SCOR) model, developed in 1996 by the non-profit organization Supply-Chain Council. The SCOR model categorizes SC management into 6 processes: Plan, Source, Make, Deliver, Return, and Enable, with the latter two processes added in 2001 and 2012, respectively, broadening the understanding of SC from linear to circular, incorporating return flows. While the SCOR model emphasizes transactional efficiency via operational strategy, Cooper and Lambert's framework takes a broader view, focusing on corporate strategy and emphasizing the significance of relationship management in achieving value (COOPER et al., 1997). It broadens the scope by considering the involvement of each functional area within the chain (LAMBERT et al., 2017).

Efficient SCM is indispensable for generating value for all stakeholders involved, with particular attention to the end customer (TIEN et al., 2019). According to Barber et al. (2017), a focus on SCM practices leads to improved SC performance. Nevertheless, managers encounter numerous challenges, both internally and externally. A study addressing complexity assessment in supply chains reveals a methodology for assessing SC complexity by examining certain drivers, including variability, uncertainty, information/synchronization gaps, and lack of cooperation (DE LEEUW et al., 2012).

The influence of these drivers, such as variability and uncertainty, has become especially evident in recent times. The COVID-19 pandemic necessitated rapid corporate reorganization in response to a continually evolving situation (CHOWDHURY et al., 2021). The crisis significantly disrupted global goods flows, underscoring the growing

importance of SC coordination, essential for ensuring responsiveness and dynamic adjustments in the face of disruptive events like COVID-19 (TRABUCCO et al., 2021). Xu et al. (2020) demonstrates that firms can mitigate the impacts of such unpredictable events through the development of robust and resilient supply chains.

This effect takes on particular significance when analyzed within GSCs, given that decentralized governance introduces challenges in terms of information flow and traceability (GEREFFI et al., 2012). As the chain expands and undergoes internationalization, it leads to a proliferation of participating stakeholders and spatial dispersion. Consequently, there is a noticeable surge in transaction volumes involving traded commodities (SERDARASAN, 2013; SARAGIH et al., 2020). While this dispersion aligns with companies' objectives of expanding their market share, global influence, and profits, it introduces an additional layer of complexity in tracing commercialized goods and information, as well as in coordinating the various stakeholders involved.

2.2. The importance of maritime transport on GSC

According to Nguyen et al. (2022), maritime transport, particularly container shipping, constitutes more than 80% of the global trade volume. In 2020, international maritime trade volume experienced a decline of 4.1%. Among the factors affecting container transport volume, the significant increase in shipping prices due to the COVID-19 pandemic stands out as a noteworthy impact (GRZELAKOWSKI, 2022). This price surge gradually subsided as the situation returned to normal but began to rise again in the latter half of 2022 following the announcement of the Ukraine war, illustrating the market's sensitivity to external contextual changes (UNCTAD, 2022).

Ocean container shipping has become a crucial component of global supply chains (GSCs) today, serving as the backbone of global commerce (UNCTAD, 2022). However, as highlighted by Fransoo et al. (2013), the influence of various supply chains on this mode of transport remains understudied. The global maritime transport market witnessed a 9.2% growth in the volume of merchandise trade in 2021, largely influenced by flows from Asia and Europe (UNCTAD, 2022). Despite being relatively underexplored, supply chains of major multinational corporations are both influenced by and exert influence on the containerized shipping sector. The complexity of this subject arises from several factors, including coordination among parties, whether or not bound by contracts, pricing policies, and competition among ports, carriers, and terminals (FRANSOO et al., 2013). The ability of supply chain management (SCM) plays a crucial role in facilitating efficient interaction between a firm's supply chains and global container transport flows.

From a corporate perspective, making informed decisions about trading partners to facilitate global goods transportation is paramount. Numerous parties are involved in this process. Figure 1, as presented by Fransoo et al. (2013), illustrates the typical actors involved in container export operations and their relationships. At least six different actors can be identified in this model. Here, the vendor is connected to the buyer through a contractual relationship, as well as to a Non-Vessel Operating Common Carrier (NVOCC) that serves as an intermediary entity linking the vendor, buyer, ocean carrier, terminal operator, and hinterland carrier.

In the usual scenario, the seller company's role concludes upon the goods being loaded by the container carrier. This responsibility can vary depending on the applicable incoterms. Incoterms® are a set of rules established by the International Chamber of Commerce (ICC) with the explicit purpose of precisely defining the rights and obligations of buyers and sellers in international trade using a standardized language (HIEN et al., 2014). Incoterms® enable the precise determination of duties and responsibilities regarding transportation costs, risks (such as loss or damage), and customs formalities. As demonstrated by Hien et al. (2014), companies that have a clear understanding of the environmental factors influencing their choice of incoterms tend to exhibit superior export performance.

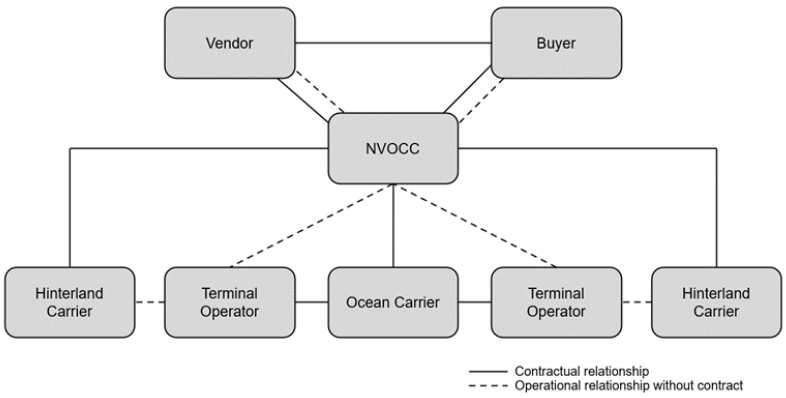


Figure 1: Diagram illustrating various connections among participants in a container export process, adapted from the model by Fransoo et al. (2013).

Incoterms® are reviewed and updated every decade. An illustrative figure summarizing the primary incoterms used in containerized goods transport can be found in the Appendices section. This figure showcases the most recent version of Incoterms®, issued on January 1st, 2020. Within this depiction, the 7 multimodal incoterms® are outlined, spanning from EXW (Ex Works), imposing minimal obligations on the seller, whose sole responsibility is to prepare and make the goods available to the buyer, to DDP (Delivered Duty Paid), which imposes the highest level of duties on the seller. For DDP, the seller assumes all risks and expenses, including customs clearance, up to the agreed delivery point.

The maritime-specific incoterms®, not covered in this figure, are designated for bulk goods and conventional maritime transport. Containerized transportation adheres to the guidelines outlined by the multimodal incoterms®, thus their detailed representation here. The chosen incoterm® significantly influences a critical aspect of export processes: customs procedures. Customs plays a pivotal role in implementing government trade policies, overseeing compliance and streamlining trade, preventing contraband, safeguarding cultural heritage, and enforcing intellectual property regulations (WIDDOWSON, 2007).

2.3. Customs Clearance: an important step

In the realm of excise goods trade, customs clearance is an important stage. Particularly in the alcoholic beverage sector, ensuring product authenticity across the product lifecycle is crucial (AZZI et al., 2019), alongside providing comprehensive

information for customs clearance. This process often entails numerous trade barriers due to its involvement of diverse stakeholders, including government agencies, transporters, and financial institutions (WORLD CUSTOMS ORGANIZATION, 2014). An illustrative example can be found in the case of Heineken Netherlands, where the business-to-government data transfer was identified as a hurdle due to evolving customs declaration requirements in 2007. This led to the initiation of the Beer Living Lab (BLL) project, aiming to foster collaboration between public and private entities within the customs process (BAIDA et al., 2007).

Presently, customs services in international trade significantly contribute to the competitiveness of global companies, and the quality of these services bears tangible effects on company performance, as emphasized by Keen (2003). Nevertheless, excessive taxation and bureaucratic hurdles can act as barriers for companies, leading to increased costs or longer delays in product imports and exports. Cooper et al. (2012) have identified excessive tax levels as the primary economic driver influencing illicit tobacco trade, and within the European Union, nearly 8% of total excise duty receipts pertain to excise fraud concerning alcoholic beverages (EU COMMISSION, 2006). The EU's budget relies heavily on three revenue sources, with two of them being customs duties on imports from outside the EU and Value Added Tax (VAT). Hence, the EU continually enhances its fraud control system to improve transparency, data traceability, and security (European Anti-Fraud Office).

The effectiveness of border and customs clearance processes is commonly assessed based on their speed, simplicity, and predictability (WORLD ECONOMIC FORUM, 2022). Different regions adhere to distinct customs procedures, further complicating international transport logistics. In Europe, the EU's intra-area trade policy stands as an advantage, given its reduced customs documentation requirements and stronger business-government integration, streamlining cross-border trade (MEUNIER et al., 2005). In contrast, Africa, for instance, operates with individual country-based customs management, resulting in non-standardized processes that significantly hinder intercontinental exchanges (WORLD ECONOMIC FORUM, 2022; KUTEYI et al., 2022).

A study conducted by the © 2022 World Economic Forum in collaboration with the consulting firm Deloitte has revealed that, in Africa's case, 44% of non-tariff-related complaints hindering international trade are linked to customs and entry procedures. This percentage climbs to 75% when transport, clearing, and forwarding-related issues are included. The study identifies certain inefficiencies in the process, such as manual paper-based procedures, congested port movements, and a lack of transparency in customs administration. According to the authors, streamlining these processes could potentially boost world trade by up to $1 trillion per year.

In the context of Europe, the EU's Customs Union continually strives to innovate and enhance the efficiency of customs processes to facilitate and stimulate international trade in goods. To achieve this, the European Commission has initiated several efforts to transition from paper-based to electronic customs processes. EU-wide electronic customs system developments are outlined in the EU's Multi-Annual Strategic Plan (MASP) for electronic Customs in 2007. The plan's objectives encompass improving customs

clearance efficiency, reducing administrative burdens, enhancing international trade security, mitigating fraud, and enabling seamless data flow (DG/TAXUD, 2006). The plan also envisioned the implementation of Authorized Economic Operators (AEO), a concept based on the Customs-to-Business partnership introduced by the World Customs Organization (WCO) with the primary aim of "enhancing international supply chain security and facilitating legitimate trade" (Taxation and Customs Union). Presently, Electronic Customs, or e-customs, is a reality in the EU (OFFICIAL JOURNAL OF THE EUROPEAN UNION, 2008), but a substantial volume of information is still exchanged inefficiently or on paper.

2.4. Unleashing efficiency through digitalization and process automation

Several authors (BAIDA et al., 2007; LEBID et al., 2021; VOORSPUIJ et al., 2020) emphasize the central role of digitalization in streamlining processes and alleviating customs bureaucracy within global supply chains. The persistence of paper-based protocols for controlling maritime goods transit hampers chain efficiency and generates losses (KEEN, 2003). This digitalization process is extensively examined with a focus on enhancing public-private collaboration, as exemplified by the BLL initiative. The BLL demonstrated that leveraging advanced container security technology alongside internet-based EPCIS (Electronic Product Code Information Services) databases, integrating the ERPs of stakeholders engaged in the export process, could enhance transparency in government interactions and obviate the need for multiple submissions among diverse process participants.

In practice, large enterprises often delegate customs clearance for exports to service providers. Here, the selling company must furnish the service provider with essential documents and information for accurate declaration in the Customs System. In a process involving at least six distinct stakeholders, reliance on paper documents renders control intricate, traceability challenging, reliability diminished, and response time prolonged (VORONA, 2022). While most companies currently transmit documents electronically, Deloitte's study indicates that email and telephone are the primary modes. Research attests that substantial benefits can be realized through innovative IT solutions (DELOITTE, 2020).

Regarding internal operations, Iserhard (2021) links automation to achieving cost-efficiency and agility in customer service. Automation of repetitive tasks falls within the realm of process management in customer service sectors, employing technologies like Robotic Process Automation (RPA). Strategic alignment combined with process-centric management is underscored for maximizing gains in organizations.

Repetitive tasks are a daily reality for companies, including the logistics sector. With data and transactions primarily stored in Enterprise Resource Planning (ERP) systems, technologies like VBA® programming and SAP Script emerge as alternatives to human-executed standardized tasks (ALVES, 2019). Given the widespread application of Excel-ERP correspondences in logistics, programming offers potential for time and cost savings by automating repetitive tasks across both interfaces (ALVES, 2019). According to Syed et al. (2020), characteristics of tasks amenable to automation include being rule-based, high-volume, mature, easy to perform, involving digitized and structured input data, manual, transactional, standardized, with minimal exceptions,

highly repetitive, part of relatively uncomplicated processes, well-documented, and capable of interacting with various systems.

In customs declaration processes, a web interface connecting customs service providers and customers could standardize data input and facilitate automation for data verification (DELOITTE, 2020). A real-time interface offering status updates during customs declaration could significantly enhance speed and accuracy of information flow. Directly linking this interface to company ERPs would be an added advantage (DELOITTE, 2020). However, developing a custom data interface can be time and cost-intensive. A clear process vision and understanding of information flow are imperative to pinpoint areas where automation is most beneficial.

The ensuing section will elucidate the methodology employed in applying automation and digitalization tools to the customs document submission process.

3. Methodological procedures

This study falls under the category of applied research, focusing on solving a specific problem related to optimizing customs document submission for international goods shipments within a real organization (Gerhardt et al., 2009). The approach combines qualitative and quantitative elements – it qualitatively studies the process through stakeholder inputs and quantifies errors and time to gauge outcomes (Mangan et al., 2004). Its objectives are exploratory, involving literature review, stakeholder interviews, and current process analysis (Gil, 2002). The chosen procedure is a case study, allowing for data collection from an actual scenario to propose viable solutions for the organization.

The research methodology is based on the five stages outlined in the Project Management Body of Knowledge (PMBOK® Guide): initiation, planning, execution, monitoring and controlling, and closing. These stages will be elaborated further in section 3.2 of this article. First, in section 3.1, the company and the sector where the case study was conducted will be presented.

3.1. Scenario description

The project was undertaken within the French division of the multinational brewing company Heineken, specifically within the Customer Service department. Subsequent sections will provide detailed descriptions of both the company and this sector.

3.1.1. The company

Founded in the Netherlands by Gerard Adriaan in 1873, the multinational Heineken possesses approximately 140 breweries spanning over 70 nations. Its most famous beer, Heineken®, is currently sold in more than 190 countries. In France, Heineken holds the top spot in the beer market, featuring a portfolio of about 20 brands, including iconic names like Heineken®, Desperados®, Pelforth®, and Affligem®. With four breweries, two warehouses, and the central office, Heineken France generates 4,000

direct and 30,000 indirect jobs, with an annual beer production capacity exceeding 6,300,000 HL.

The French branch's supply chain management is centralized at the company's administrative headquarters, situated in the Île de France region. This comprehensive end-to-end supply chain management enables the company's active involvement across the spectrum – from raw material production and supply, through production planning, distribution, sales forecasts and customer service.

Section 3.1.2 provides a succinct overview of the Customer Service and Logistics sector, responsible for managing export clientele and serving as the focal point of the improvement project's development.

3.1.2. Customer service and logistics (CS&L)

The CS&L sector acts as a bridge between the company's internal structure (including its breweries and administrative sectors) and external stakeholders such as customers and carriers. It takes charge of the final phase of Heineken's Supply Chain, with a primary goal of ensuring product availability and transportation to meet customer requirements. Within Heineken France, this department is segmented into four customer categories: i. "Consommation Hors Domicile" (CHD) encompassing bars, restaurants, and hotels; ii. "Publicité sur Lieu de Vente" (PLV) which covers non-beer products related to advertising and marketing; iii. “Export”, for international customers; and iv. "Alimentaire" catering to the retail sector, especially supermarkets.

The Export sector manages a portfolio of over 70 international clients beyond the borders of France. Notably, direct customers here are frequently not end consumers, but other Heineken subsidiaries (referred to as Opcos). These Opcos, in turn, have their own roster of end clients. In 2022, the French export sector achieved net sales surpassing EUR 14 million, equating to approximately 1% of Heineken France's total sales. This relatively modest contribution stems from the trade between Opcos, which isn't primarily profit-driven. Instead, its purpose lies in the exchange of goods to fulfill global demand and bolster brand image.

The customer portfolio to which Heineken France frequently exports is based on 73 % of customers outside the European Union, whose goods are shipped by container. Approximately 20 containers are shipped every week, heading to regions across the America and Africa. The container shipping process encompasses multiple stages and participants, with a crucial step being the submission of documents for customs clearance.

Daily transmission of these documents is managed by the Export sector. Acting as an intermediary, this sector facilitates communication between the brewery, responsible for document generation, and a third-party service provider handling customs declarations and container transport. Over the August to October 2022 period, at least three exports incurred surcharges due to document inaccuracies, and one instance even led to a container being left unshipped.

Frequent document errors result in various setbacks, including the need for rework and several associated losses such as wasted time and money, diminished trust, partner dissatisfaction, and delayed problem resolution. This situation prompted the initiation of

a scientific investigation and the subsequent development of an improvement project, both of which will be expounded upon in the forthcoming sections.

3.2. Work steps

The execution of the improvement initiative within this case study is rooted in the principles outlined by the Project Management Body of Knowledge (PMBOK® Guide). The PMBOK® Guide serves as a benchmark for effectively steering projects across diverse industries and sectors. By delineating project management procedures, tools, and methodologies, these standards facilitate managers in the successful orchestration of projects (Guide, A., 2001).

The impetus for undertaking this project emanates from recurrent challenges encountered in the documentation submitted to Customs. These issues were discerned by key stakeholders within the company's export operations. By traversing the five phases of the PMBOK process, the aim is to conduct a comprehensive assessment of the present landscape, culminating in the formulation of a strategic action plan geared towards mitigating the principal areas of identified losses. The subsequent sections will expound upon these five stages, elucidating the activities and methodologies employed in each.

The "Initiation" phase involved the grasp of the existing scenario and the delineation of the project's objective. First, a breakdown of Heineken's export process by container was executed, in terms of the flow of activities performed. In his exploration of global value chains, Frederick (2019) emphasizes the fundamental nature of identifying structural constituents via four elements: (1) value-added activities or business functions, (2) the supply chain, (3) end markets, and (4) the supporting environment. Furthermore, Kaplinsky and Morris (2008) highlight the significance of chain mapping as the main step towards comprehending the production process and identifying key links within the chain. Based on the key elements of Frederick, S. (2019), a process mapping was constructed through 3 major perspectives: service functions (or stakeholders), information flow and process steps. The process mapping exercise entailed the use of standardized Business Process Model and Notation (BPMN) language for schematic representations. Additionally, the employed SIPOC methodology emerged as a pertinent framework. The SIPOC diagram facilitated the discernment of not only key stakeholders but also real challenges within the processIt also revealed needs from both outside and inside customers and examine the inputs and outputs of the process (Mishra et al., 2014).

Following the completion of the process mapping, data was gathered from engaged stakeholders and managers, enabling the identification of critical process stages. To obtain this data, the process map was individually presented to four key interlocutors. The first among them was the CS&L sector manager, possessing comprehensive perspective of the sector's goals in alignment with the company's strategic planning. The remaining three respondents comprised the CS&L Export sector employee with four years of experience, the primary brewery stakeholder overseeing shipments and document generation, and the NVOCC service provider's correspondent handling customs clearance for Heineken. This interaction outlined two principal avenues of action: the automation of document generation and the establishment of an error transmission contingency to the customs registration provider.

Concurrently, observational analysis is underway to track document-related errors. The document transmission procedure takes place each morning, with discrepancies being identified by both the Customer Service Export team and the outsourced service provider during customs registration. Consequently, the preliminary measure in the scenario assessment involved logging occurrences and types of errors, thereby generating an array of data. This procedure persisted throughout the entire initiation period spanning from September to December 2022.

During the planning stage, an action plan for each critical step was devised. This action plan was rooted in an itinerary of tasks and the requisition of human and technical resources. In the ensuing phase, the third stage, the execution of technologies and new processes as defined in the action plan unfolded. This phase stood as the most pivotal and challenging stage of the project. It encompassed not only the execution of automation tasks but also necessitated the engagement of disparate divisions within the company, extending beyond the export customer service sector. Notably, this engagement included collaboration with the brewery and IT teams. Given the project's engagement with external entities, certain constraints in information exchange surfaced, necessitating meticulous management during the solution's testing period.

Upon achieving stabilization in the testing phase of the new processes, the project transitioned into the control and monitoring phase. During this stage, a re-evaluation of quantitative and qualitative data took place, encompassing the duration of the document transmission process, the incidence of transmitted errors, the response time when addressing errors, and the contentment level of the involved stakeholders. To evaluate the latter aspect, an online survey was dispatched via email to the process stakeholders.

The fifth and final phase encapsulated the project's conclusion. This entailed the documentation of findings within this article, a thorough review of the assessed indicators, and the formulation of a lessons learned document, intended for prospective projects or enhancements pertaining to the addressed process. These measures ensured the continuity of the implemented actions.

4. Results and Discussion

Based on the 5 stages of the PMBOK, the project was conducted, leading to the results that will be presented and discussed in the following sections.

4.1. Initiation phase

The initiation phase involved an assessment of the current scenario, where the container-based export process was charted. This mapping occurred at two levels: initially, the comprehensive procedure of container-based export was delineated; subsequently, a more focused analysis centered on the sub-process of document transmission, a pivotal step within the overarching procedure. To clearly illustrate the flow of these processes, the utilization of Business Process Model and Notation (BPMN) was chosen. This notation offers a standardized graphical approach for process design, making them easily comprehensible to diverse audiences (CHINOSI et al., 2012). The main forms of BPMN (Business Process Model and Notation) include flow objects (tasks, events, and gateways), connecting objects (sequence flows, message flows, and associations), swimlanes (pools and lanes), and artifacts (data objects, annotations, and

groups). These forms collectively serve to model and document business processes comprehensively (WESKE, 2012).

Figure 2 portrays the visual representation of the container-based export process. It begins with the reception of the purchase order (PO) from the customer, necessitating integration into the company's ERP system or handling, especially in cases involving Electronic Data Interchange (EDI). Subsequently, the allocation of orders within the shipment schedule takes place, facilitated through an Excel® spreadsheet. This allocation process must adhere to customer-requested deadlines, while considering product availability and resource readiness within the brewery. The brewery's resource availability is verified through weekly meetings involving brewery personnel and sub-contracted loading teams.

Upon formulating shipment plans, requisitions for container rental and vessel reservations are initiated. These arrangements are facilitated by a service provider acting as an intermediary between Heineken and the shipping company. If the requested resources are available, containers are loaded at the brewery on the scheduled date. Following loading, specific documents are sent to the customs agent. This agent is responsible for executing export customs clearance, confirming the documentary compliance of the export, thus ensuring its smooth passage through customs.

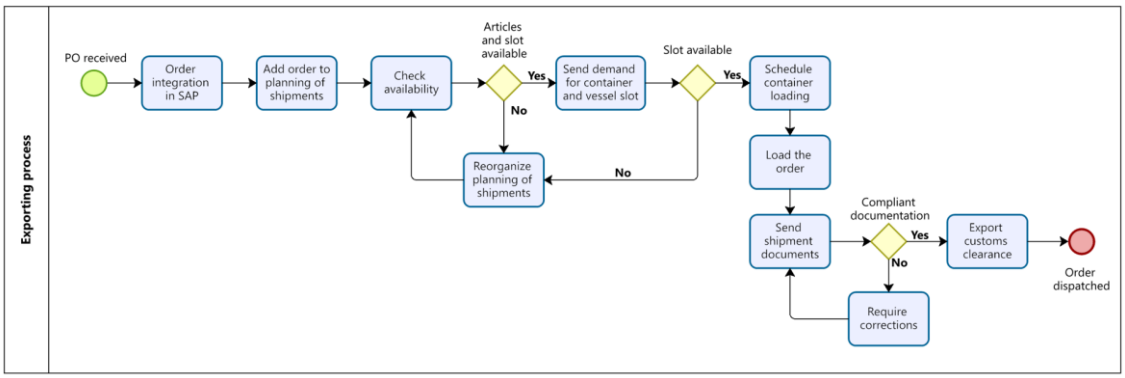


Figure 2 – Map of Containerized Export Process.

Considering the recurrence of errors in documents submitted to the service provider responsible for customs clearance, it was determined that an intensified exploration of a specific facet within the export macro process was warranted: the document transmission phase. To this end, the SIPOC methodology (Suppliers, Inputs, Processes, Outputs, and Customers) was employed. Figure 3 offers a visual representation of the SIPOC model pertinent to the scrutinized process. The involved parties, input sources, and output information will be elucidated below.

The SIPOC delves into the process of sending shipment documents, analysing its intricacies in terms of inputs and outputs. The process consists of two primary steps: document generation, which employs the first three documents as inputs (purchase order, shipment scheduling, and bill of lading); and the document sending process, which essentially involves transmitting the delivery note, invoice, and Verified Gross Mass (VGM) to the NVOCC, enabling them to proceed with export customs clearance.

In relation to stakeholders, the SIPOC framework provided insights into information providers and recipients among the involved parties. Four principal stakeholders emerged: the Opco client, a Heineken subsidiary who imports from Heineken France; the CS&L Export team, responsible for Heineken France's export customer service; the NVOCC, designated with the terminology "Non-Vessel Operating Common Carrier" as per Fransoo et al. (2013), a subcontracted entity fulfilling roles as a freight forwarder, customs agent, and shipping agent, thus handling container transport, vessel loading (in collaboration with the shipping company), and customs clearance; and the brewery team, responsible for preparing and loading orders at the production and beer storage site.

Six key documents were identified as inputs:

(i) Purchase Order in SAP: Representing customer requisites in terms of products, quantities, delivery dates, etc. Usually transmitted via Electronic Data Interchange (EDI), either through the intermediate document interface (IDoc) or an Excel spreadsheet, and later integrated into the company's SAP system;

(ii) Planning of Shipments: An Excel file detailing the planned loads per day and hour across the 6 available slots within the brewery;

(iii) Bill of Lading: A document solidifying the execution of the carriage agreement between the shipper and the carrier. It signifies the goods and outlines their disposition, along with the responsibilities of all parties involved;

(iv) Delivery Note: This document serves as a "packing list" for a shipment, enumerating loaded products along with information like item code, description, quantity, price, Electronic Accompanying Document (EAD) and excise number. Issued by the brewery post-loading, it's retrievable in SAP;

(v) Invoice: A document embodying the total payment due from the customer. This document is auto-generated, factoring in the transfer price (TP) of the items, and is also accessible within SAP;

(vi) Verified Gross Mass (VGM): The VGM document presents the total gross mass of a container. It encompasses all packaging, cargo units, strapping, bracing equipment, and tare weight. This manual document is produced solely by the operator during loading at the brewery, subsequently scanned and emailed to the CS&L Export team.

The process culminates in four primary final outcomes, which include: (i) Export Declaration, a government-issued document stipulating the designated goods slated for shipment out of the country. It's completed by the exporter and submitted to the government; (ii) Export Customs Clearance, a governmental prerequisite permitting goods to exit trade zones. It's the primary process that relies on documents sent by Heineken; (iii) EAD customs document, an Export Accompanying Document serving as evidence from a customs office that the export is permissible; and (iv) Advice of Shipment, a notification conveyed to local or foreign buyers indicating shipment progress and furnishing packing and routing specifics. An invoice copy is often included, and if needed, a bill of lading copy. These documents substantiate export compliance and success, and are transmitted to Heineken by the NVOCC.

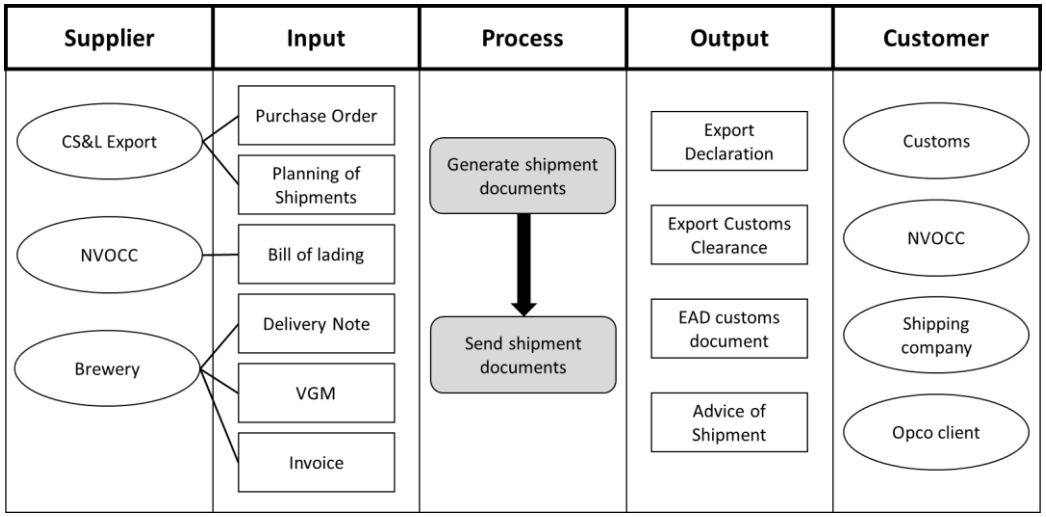


Figure 3 - SIPOC of containerized export document transmission process.

The SIPOC diagram enables the identification of information interdependencies at each process step. To optimize this stage, interviews were conducted during the initiation phase. These interviews aimed to pinpoint challenges perceived by key stakeholders and subsequently, critical steps. A total of four individuals were interviewed through a semi-structured approach. The initial interviewee was the area manager, who emphasized the need to curtail execution times of repetitive tasks lacking added value. This objective aligned with concurrent efforts within the company's supply chain management to automate such tasks.

The other three interviewees included the employee overseeing the CS&L Export sector's operations for four years, the main point of contact at the brewery for shipments and document generation, and the correspondent from the NVOCC service provider responsible for Heineken's customs clearance process. For these stakeholders, the primary grievance stemmed from documentation errors during transmission. This issue mandated last-minute information corrections, mere hours before container loading onto ships, thereby endangering shipment integrity. Such occurrences led to potential disruptions and necessitated rework for both the service provider and Heineken teams.

Finally, project objectives were established, grounded in the present scenario and insights gleaned from the interviewed stakeholders:

1- Reducing the overall processing time for dispatching documentation linked to shipments to the NVOCC service provider.
2- Mitigating the occurrence of errors in documents dispatched to the NVOCC service provider, thereby preempting the need for subsequent rework.

To comprehensively assess the prevailing state of the processes earmarked for optimization and restructuring, a set of indicators was defined to form a performance evaluation metric. For the automation of the document retrieval process, the designated indicator was the task execution time—ranging from retrieving the documents associated

with the six prior-day requests to their subsequent transmission via email. The current process schema can be seen in Figure 4.

Through process analysis, the interconnections among distinct stakeholders—functionally associated process units—alongside their respective actions, were identified. While document generation occurs within the brewery, document handling and transmission fall under the purview of the CS&L team. By charting the present state of the process, one can gain an in-depth comprehension of the human actions necessary for the process's execution. Automation covered the workflow of retrieving documents and generating emails for sending them out. The step-by-step human actions, subsequently embedded into the computer code for replication, will be expounded upon in later sections.

The process map further facilitated an understanding of the juncture at which documentation errors were detected. It became evident that information validation was exclusively conducted at the process's culmination by the NVOCC. In cases of non-compliant documentation, the NVOCC would transmit a correction request to the CS&L team, who would subsequently relay it to the brewery. This cycle of rework, resulting from late verification, is the focal point of the project's second objective.

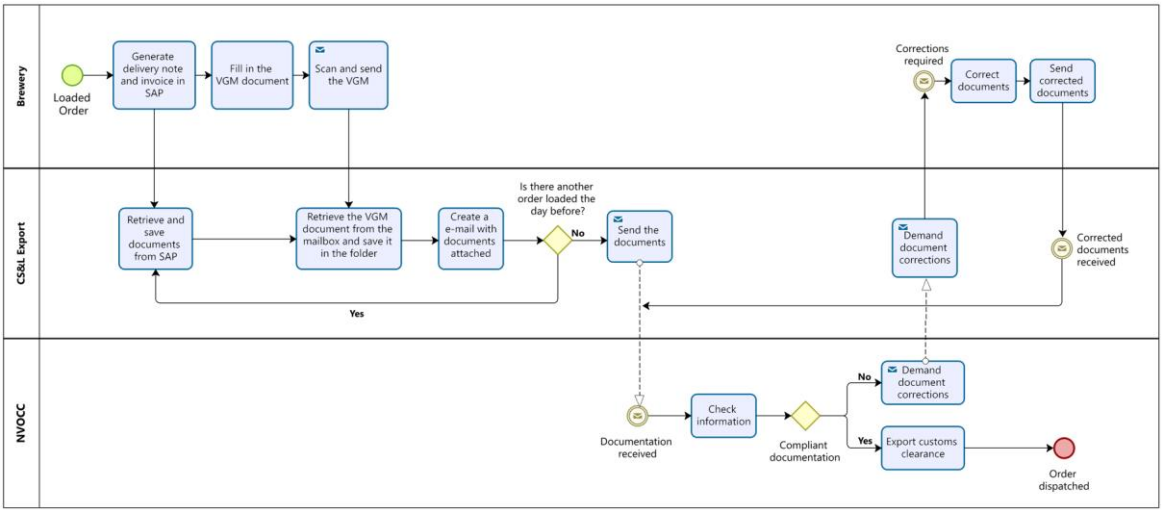


Figure 4 – Pre-Action Plan Process Flow for Document Transmission.

Regarding the first objective, and in alignment with the second goal, indicators were formulated to gauge the efficacy of the action plan:

- Average number of errors per month (where "before sending errors" are identified by the CS&L Export team and the "after sending" ones are identified by the NVOCC);
- Average number of emails exchanged regarding the documentation of a shipment.

4.2. Planning and execution phases

The ensuing phase of the project involved devising action plans to fulfill the objectives. In the case of the project directed at curtailing the duration of customs documentation dispatch, the strategy involved the creation of programs in VBA language. These programs, incorporating SAP macros, aimed to replicate the actions performed by human operators. Table 1 details the activities pertinent to the document retrieval process, with an emphasis on the actions conducted by the CS&L team operator. This table also outlines the updated array of process activities following the automation.

The action plan encompassed the automation of all commands amenable to such treatment, with the overarching goal of diminishing process time. This initiative's implementation facilitated the automated retrieval and storage of delivery notes and invoices. Through programmed commands, the system scans all orders loaded the previous day, accesses their respective documents within SAP, and subsequently stores them in their designated order/customer/year folders—these folders are themselves automatically generated. Additionally, a third code creates the email to be dispatched. This code assembles recipient lists and tailors the email subject based on the order number and customer, details available in the Planning of Shipments.

The revamped process centralizes the operator's activities within the Planning of Shipments interface. By activating buttons equipped with macros, two of the three document-saving tasks are automated. Only the attachment of VGMs necessitates manual intervention. Apart from expediting execution time, the new process simplifies user interaction. An intuitive user interface simplifies code execution.

Significantly, the revised process reduces the operator's actions from 12 to 5, thereby easing their workload. The earlier process demanded interface shifts for each action, transitioning between SAP, Excel, local repositories, and email inboxes. The new process confines actions to an Excel document, the Planning of Shipments, and the email inbox. Furthermore, automation minimizes the potential for writing or path-saving errors. By replicating standardized actions, the likelihood of human errors is appreciably diminished.

	Retrieve and save documents in client folder - activities	
	Before action plan	**After action plan**
1	Extracts the order number from the Planning of Shipments module.	Initiate the delivery note retrieval macro by clicking the designated button.
2	Accesses the corresponding order in the SAP system using its unique identification number.	Activate the invoice retrieval macro by clicking the designated button.
3	Navigates to the document flow associated with the specific order.	Trigger the email creation macro by clicking the specified button.
4	Copies the delivery note number for further processing.	Append the Verified Gross Mass (VGM) documents to their respective emails.
5	Returns to the main menu interface.	Transmit the prepared emails.
6	Retrieves the delivery note by referencing its specific number.	
7	Establishes a dedicated folder within the customer repository for organizing the order.	
8	Safeguards the delivery note document within the designated folder.	
9	Repeats the aforementioned procedure, adapting it to the case of the invoice.	
10	Searches the email inbox for the Verified Gross Mass (VGM) linked to the specific order.	
11	Archives the VGM document within the appropriate folder associated with the order.	
12	Generates and dispatches an email containing the pertinent documents as attachments.	

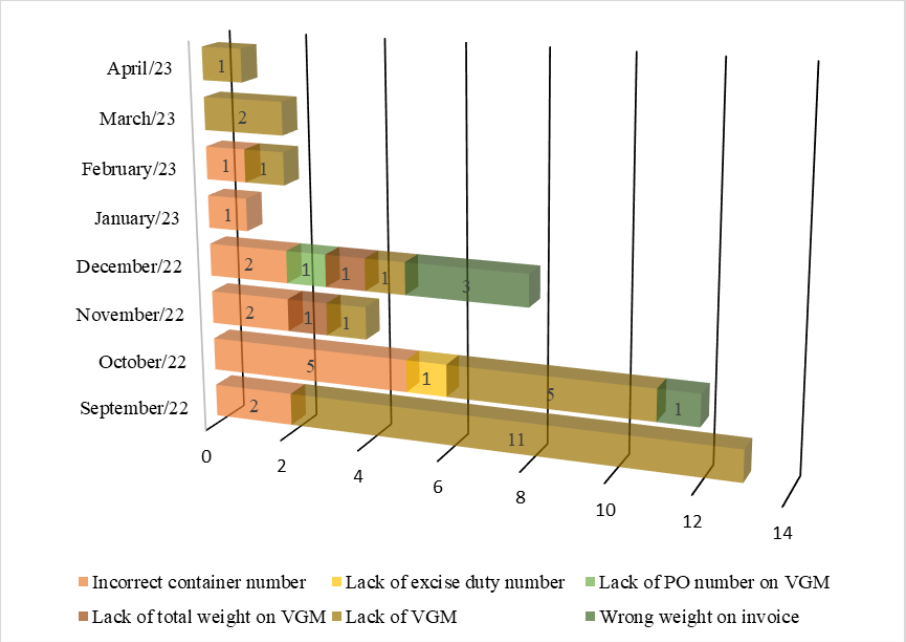
Table 1 - actions performed by the operator in the sub-process of retrieving and saving the documents - before and after the implementation of the action plan.

To calculate the average time required for the document sending process, the time spent on the activity was recorded before and after automation. The task was carried out by the responsible operator, who initiated the timer at the beginning and stopped it once the document had been sent to the NVOCC. The analysis of the times allowed for the measurement of the time taken to complete the task, as presented in Table 2. A reduction of 83.3% in the process execution time was achieved, diminishing from 30 minutes to a mere 5 minutes. This substantial time-saving achievement was deemed highly satisfactory, enabling a restructuring of sector responsibilities. As a result, employees could redirect their efforts towards the principal objective of Customer Service: enhancing customer satisfaction.

While the time reduction objective was definitively accomplished and aligned with the company's current technological landscape, the implementation of automation via SAP macros introduced some degree of instability. The SAP macro, reproducing the precise steps of Operator X, for instance, might not seamlessly function in the system of Operator Y, who may possess a distinct SAP configuration from the initial macro recorder. This disparity necessitated adaptation of the program to accommodate various operators, thereby mitigating challenges in process dissemination. During the implementation phase, efforts were made to universalize the code.

The second action plan was devised to implement contingency measures aimed at curtailing the occurrence of errors in document transmission. To this end, errors identified from September to December 2022 were documented, thereby generating a database of error types and their corresponding occurrence dates. Graph 1 summarizes this set of data,

extending its scope to cover the post-action plan phase (spanning January to April/2023). By systematically monitoring these errors, their origins were discerned, with a majority traceable back to the brewery.



Graph 1 – Monthly Breakdown of Shipment Document Errors by Type.

The most common error pertained to the absence of VGMs. This issue was consistently identified by the CS&L Export team during the VGM retrieval process from the mailbox. This error indicated that the brewery had not dispatched the document, necessitating a subsequent request. Another type of error involved discrepancies or omissions within the documentation, often detected by the NVOCC during customs registration. These errors carried significant consequences, often requiring urgent rectification on the same day as vessel shipment, posing the risk of non-boarding. In response to this challenge, two measures were implemented:

1- A checklist was introduced for the responsible brewery employee to ensure VGM dispatch. This checklist contains all the necessary steps to be carried out by the operator at the brewery in order to generate the documents relating to container shipments. This approach aimed to prevent oversights by operators.
2- An information checklist was introduced for the CS&L Export team during document dispatch. The checklist aimed to ensure the accuracy and completeness of all information entered at the brewery, including container weight, number, excise duty, and more.

Figure 5 illustrates the new process. A new task, the information check, was incorporated. Time savings resulting from automation allowed the internal integration of the checking task before document dispatch, mitigating errors and fostering a company-wide culture of error prevention. This outcome was further validated by the interpretation of performance evaluation indicators.

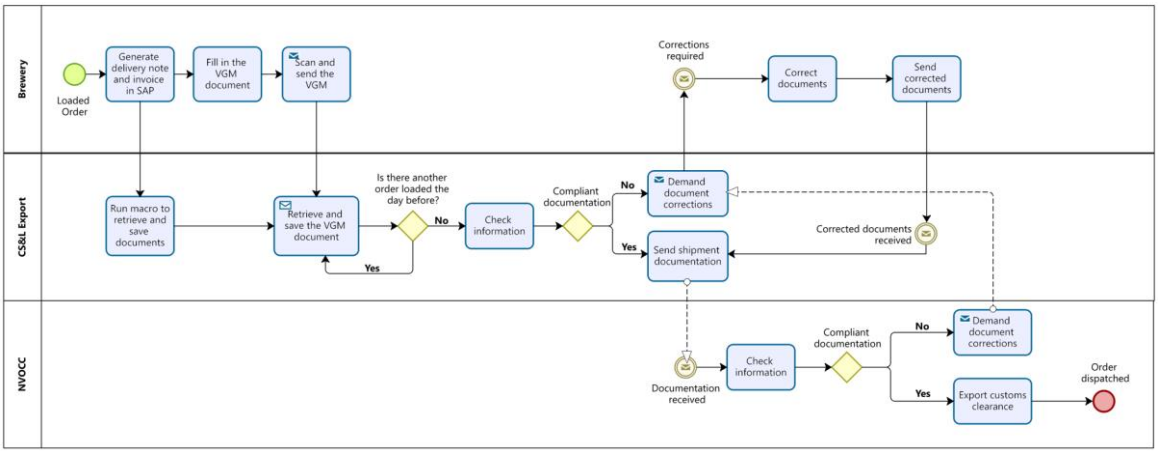


Figure 5 - Post-Action Plan Process Flow for Document Transmission.

4.3. Monitoring and control phase

Upon consolidating the new processes during the execution phase, the organization transitioned into the monitoring and control phase. In this phase, the predefined indicators were assessed, considering the situation both before and after the implementation of the action plans. Table 2 shows these indicators.

PROCESS OF SENDING SHIPMENT DOCUMENTS	**Before action plan**	**After action plan**
1- Execution time (minutes)	30	5
2- Average number of errors (errors/month)	8,5	2,5
Identified before sending	47%	60%
Identified after sending	53%	40%
3- Average number of emails exchanged (emails/order)	5,5	5,1

Table 2 - Performance Indicators for Optimized Processes Before and After Action Plan Implementation.

As previously discussed, automating repetitive tasks led to an 83.3% reduction in the execution time of the document transmission process. Subsequently, the focus shifted towards addressing errors and retrieving essential documents for process adherence. Indicators 2 and 3 highlight the outcomes from introducing safeguards aimed at curbing error propagation. This initiative yielded a substantial 71% reduction in the average monthly count of recorded errors. Notably, a shift occurred in error identification, transitioning from post-shipment detection (attributed to the NVOCC, often necessitating urgent action) to pre-shipment recognition (orchestrated by the CS&L Export team). This transformation was primarily driven by implementing control mechanisms that introduced proactive corrective actions, markedly reducing error propagation to the service provider.

Regarding email volume per Purchase Order (PO), the reduction, though numerically modest, carries significance – a 7,3% decrease, from an average of 5.5 emails

per PO to 5.1. However, considering the standard number of emails dispatched per order (5 in total, including slot demand, slot confirmation, documentation exchange, shipment confirmation, and departure declaration; escalating to 10 in cases of non-conforming documentation), the magnitude of this reduction becomes more pronounced.

The monitoring and control phase perpetuates a cycle of continuous improvements alongside comprehensive project documentation. Notably, certain challenges emerged during the implementation phase, particularly pertaining to the learning curve experienced by users transitioning to the automated process. This highlighted the vital significance of knowledge transfer and user training in VBA programming. The organization conducted a qualification initiative targeting the principal interlocutor within the CS&L Export team.

Moreover, the geographical dispersion of the brewery's stakeholders posed constraints on problem-solving approaches aimed at addressing document-related errors. The checklist solution, while straightforward, was regarded as interim. The ultimate aspiration encompasses all-inclusive information vetting at the point of origin, during document generation. An envisaged digital conduit for information exchange and traceability emerges as a potentially robust solution.

5. Conclusion

This study focused on optimizing the customs document transmission process at Heineken's French subsidiary, leading to a reduction in losses identified through the process study, using a combination of process mapping tools, interviews and performance indicators. The primary focus of the optimization initiative included two key actions: first, a reduction in the processing time for dispatching documentation to the NVOCC service provider, and second, proactive error mitigation in documents sent to the NVOCC service provider to prevent subsequent rework. An outstanding outcome of this study is the substantial time savings achieved through automated document retrieval, cutting daily effort from 30 minutes to just 5, while centralizing operator actions on a unified interface. Additionally, the introduction of validation processes, facilitated through the implementation of checklists, has notably culminated in the mitigation of document errors and their subsequent transmission. The checklist strategy at the brewery level served to curtail error propagation, further complemented by an auxiliary verification process at the CS&L level adeptly identifying residual errors before dispatch. This action plan resulted in a 71% reduction in errors, with 60% of instances successfully detecting errors before transmission.

Certain limitations, including the necessity for employee training on the new automated tool and the challenge of addressing errors at the source through innovative technologies like cloud-based repositories due to geographical constraints and technological maturity, were identified. Future endeavors could optimally leverage the established process mappings to facilitate deeper document flow integration, potentially

harnessing cloud-based repositories to enhance overall process efficiency and efficacy, aligning seamlessly with the company's envisioned technological advancement.

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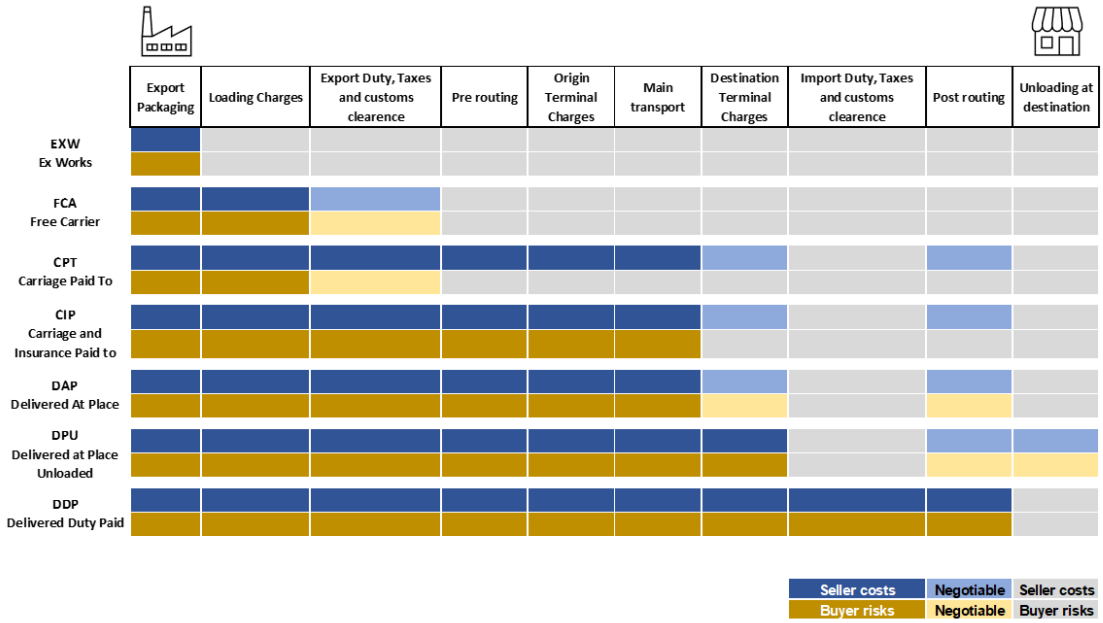
Appendices

Appendice 1. The 7 multimodal Incoterms® 2020. Based on “Règles Incoterms® 2020 – Multimodales”.



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