

Analysis and Assessment of Sellers’ Operational Performance in an E-Marketplace

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Abstract

E-commerce is at an all-time high as the pandemic situation accelerated the digital transition worldwide. Customers were forced to shop online, due to lockdowns and "brick-and-mortar" retail closures, increasing the demand and competition, thus increasing customers' standards and expectations.

The focus of the present dissertation is on the analysis and assessment of the operational performance of one of the main stakeholders in any pure e-marketplace - its sellers. Having operationally efficient sellers is fundamental for the long-term success of any intermediary based e-commerce platform, as they are responsible for some of the core business processes that are directly linked to the customers' shopping experience. Therefore, it is important to understand the impact of operational performance on customer experience, how it can be evaluated and classified and how that information can be used as a vehicle to customer trust and customer loyalty.

Dott, a recently created pure e-marketplace emerging in the Portuguese e-commerce scene, does not have complete and direct control over the order fulfillment and return flows, for example, as they rely on external partners' performance and capacity - sellers and carrier -, thus being key to monitor and assess performance within, so as to master the different processes and operations. The current project was developed in Dott's Seller Operations Team, hence the focus on the e-marketplace sellers' activities.

Having this in mind, the sellers' operational processes were mapped and the main sellers' operational misconducts were identified so as to assess its impact on customer experience. The most relevant KPIs were selected and complementary metrics were created in order to monitor seller performance. Storytelling dashboards were built for two specific sellers' processes - operational onboarding and "own shipping" sellers' order fulfillment - through Fry (2007)'s data visualization process.

Furthermore, two approaches were developed so as to evaluate and classify the company's sellers: a clustering analysis, segmenting sellers according to their operational performance; and a seller performance score, a weighted score based on the most relevant operational KPIs.

Having all sellers' processes mapped and the most relevant metrics selected allowed a deeper control over sellers' operations. It was possible to conclude, as presumed, that low seller operational performance levels have a direct negative impact on customer experience. The new metrics were implemented in the existing company's dashboards and the process-specific dashboards were also added to Dott's Operations Report, allowing the monitoring of previously non-observed flows. Also, several solutions are suggested so as to evaluate sellers' according to their operational performance. Using badges and scores for providing more information to the buyer and influence the best offer selection in the purchase moment.

Keywords: e-commerce, e-marketplaces, seller performance, customer experience, KPIs

Resumo

O *e-commerce* atingiu um pico devido à situação pandémica que acelerou a transformação digital em todo o mundo. Os consumidores viram-se forçados a comprar *online* devido às medidas de confinamento e do fecho do comércio local, aumentando a procura e a competição e, consequentemente, os padrões e expectativas do comprador.

O objetivo da presente dissertação é analisar e avaliar o desempenho operacional de um dos principais parceiros de qualquer *e-marketplace* puro - os seus vendedores. A eficiência operacional dos vendedores é fundamental para o sucesso a longo prazo de qualquer plataforma de *e-commerce* que sirva como intermediário, dado o papel que estes desempenham em processos chave que estão inerentemente ligados à experiência de compra do cliente final. Assim, é importante perceber o impacto do seu desempenho na experiência do cliente, de que forma pode ser avaliado e classificado e como essa informação pode ser utilizada como um veículo para ganhar a confiança e lealdade do comprador.

O Dott não tem responsabilidade direta sobre os fluxos de encomendas e devoluções, dependendo do desempenho e capacidade de parceiros externos - vendedores e transportadora -, tornando-se imperativo monitorizar e avaliar a sua *performance*, de forma a dominar os diferentes processos e operações. Este projeto foi desenvolvido na Equipa de *Seller Operations*, focando-se, portanto, nas atividades dos vendedores da plataforma.

Os processos operacionais dos vendedores foram mapeados e as principais falhas operacionais foram identificadas de modo a permitir avaliar o seu impacto na experiência do cliente. Os indicadores mais adequados foram criados e selecionados. Adicionalmente, painéis de controlo foram construídos para dois processos específicos - *onboarding* operacional e encomenda para vendedores responsáveis pelo envio - através do processo de visualização de dados proposto por Fry (2007). Para além disso, duas abordagens foram desenvolvidas de forma a avaliar e classificar os vendedores: uma análise de *clustering*, segmentando os vendedores de acordo com o seu desempenho operacional; e a criação de um índice de desempenho, ponderando os indicadores operacionais mais relevantes.

Foi possível concluir que, como pressuposto, um fraco desempenho operacional por parte dos vendedores traduz-se numa experiência de compra negativa providenciada ao cliente. De forma a prevenir esta situação, ter os processos mapeados e as principais métricas selecionadas permitem um nível de controlo superior. As novas métricas criadas foram implementadas nos painéis de controlo respetivos e consideradas na rotina de avaliação mensal dos vendedores. Os painéis de controlo específicos criados foram adicionados ao relatório da equipa de Operações, permitindo visualizar e controlar esses mesmos processos, anteriormente não monitorizados.

Algumas sugestões foram dadas para avaliar os vendedores de acordo com o seu desempenho operacional. Por exemplo, a utilização de distintivos, a apresentação de mais informação ao cliente e a utilização de um índice de desempenho do vendedor para influenciar a seleção da melhor oferta no momento de compra. A implementação das soluções apresentadas envolve o trabalho das diferentes equipas da empresa que serão envolvidas num futuro próximo.

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To my friends, for all the memories we have been creating together and for the many more still to come.

*"Para ser grande, sê inteiro: nada
Teu exagera ou exclui.
Sê todo em cada coisa. Põe quanto és
No mínimo que fazes.
Assim em cada lago a lua toda
Brilha, porque alta vive"*

Ricardo Reis

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Acronyms and Symbols

AM	Account Manager
API	Application Programming Interface
BPM	Business Process Modeling
B2C	Business to Consumer
B2B	Business to Business
CSAT	Customer Satisfaction
EAN	European Article Number
GMV	Gross Merchandise Value
GTIN	Global Trade Item Number
IT	Information and Technology
KPI	Key Performance Indicator
MO	Merchant Order
NPS	Net Promoter Score
OFT	Offer Fulfillment Time
OOS	Out Of Stock
SKU	Stock Keeping Unit
SLA	Service Level Agreement
SME	Small and Medium-sized Enterprise
SO	Sales Order
TCE	Total Customer Experience

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Chapter 1

Introduction

The current dissertation was developed at Dott, a recently created pure e-marketplace emerging in the Portuguese e-commerce scene, taking advantage of the rising trend of e-commerce and empowering the digitizing of Portuguese companies.

Since 1994 and 1995, with the founding of Amazon and eBay, respectively, e-commerce, and e-marketplaces in particular, have been growing by staggering proportions and changing the way businesses, markets and consumers behave (Laudon and Traver, 2016).

According to Statista (2020), in 2019, e-retail sales worldwide surpassed 3.53 trillion US dollars. In 2020, amid the COVID-19 pandemic, e-commerce grew even further and reinforced its role as a fundamental tool for companies to stay competitive in an increasingly digital economy.

In less than 2 years, Dott's growth has been notable, exceeding all expectations and business targets for 2020. However, the maturity level of the company and the rapid growth lead to an increased complexity in operational management and a need of maintaining and improving service levels across the different business processes. Assessing and monitoring seller performance becomes key for providing a good customer experience.

This chapter provides some context over the environment in which the project was developed and is divided in five sections: the introduction of the company; the motivation of the project; the main settled objectives; the methodology chosen to approach the problem; and an overview of the document's structure.

1.1 Context

In June 2018 two of the most recognizable Portuguese companies - CTT and Sonae - announced a partnership that would enable the creation of a new 100% Portuguese e-commerce platform. According to Sonae, this joint venture represented a high bet on e-commerce with a special focus on the digitizing of the Portuguese' small and medium-sized enterprises (SME) (Store Magazine, 2020). The announced investment represented a total of 10 to 15 million euros over the following 4 years.

With 500 years of history, the recently privatised CTT - Correios de Portugal, S.A operates as Portugal's national postal service and as a commercial group with subsidiaries in banking and logistics, for example. The company is currently going through a digital transformation thus to ensure a more sustainable growth and improve the profitability of its different business' branches (CTT). Furthermore, CTT serves as Dott's main logistics provider, allowing every seller to easily ship their orders, taking advantage of CTT's Iberian network and expertise, as well as the over 1.600 CTT collection points across the country.

On the other hand, Sonae provides the retail experience and marketing proficiency, as a multi-national company with a diversified portfolio of businesses in retail, financial services, technology, shopping centres and telecommunications (Sonae, 2020).

Less than one year from the announcement, on the 1st of May 2019, Dott officially launched its website, gathering more than 500 sellers and 500.000 products. Today, it joins over 1.500 sellers and 3 million products distributed across 17 different categories, such as fashion, health and beauty, electronics, home and gardening, among others. The company's main goal is to establish itself as one of the biggest online shopping players in Portugal and as an online reference for the Portuguese consumer.

1.2 Project's motivation

This dissertation was developed at Dott's Strategy and Operations Department which is responsible for optimizing the performance and relationships with the different e-marketplace partners. This department is divided in two focus areas: Delivery Operations, responsible for all decisions, processes and metrics involving the delivery and logistics services; and Customer and Seller Operations, responsible for all the processes and operations regarding the customer experience with Dott (purchase, return, contact), as well as, all decisions involving sellers' processes, operations and operational performance throughout the Dott life cycle. This work was developed within the Seller Operations' Team.

Dott is a pure e-marketplace - it holds no inventory and has no control on the order fulfillment process - serving as an intermediary, providing the infrastructure and the community of both sellers and buyers, relying on the partner's operations and capacity. Typically, within an e-marketplace, consumers buy from known or unknown sellers, regardless of the risk, having in mind the reputation and trust provided by the intermediary (Hong and Cho, 2011). Therefore, sellers' quality standards have to be aligned with the customers' expectations for the platform as a whole.

As mentioned before, there are over 1.500 unique sellers using Dott, each responsible for part of the order fulfillment and return processes. As a result, sellers' operational performance is directly linked to the quality of the online shopping experience provided to the buyer.

Bearing this in mind, the present dissertation focuses on the analysis and mapping of the different seller processes, the identification and design of key performance metrics and respective target values, as well as, the creation of dedicated dashboards for monitoring specific processes.

As a generalist e-marketplace, the same product can be sold by multiple sellers. At the moment, Dott does not provide any seller operational performance information to the buyer and bases the best offer selection solely on the price, recommending the offer from the seller that provides the lowest price. However, the cheapest offer does not necessarily translate into the offer which will provide the best customer experience. In fact, customers might consider order speed or quality to be more important than the price itself.

Furthermore, a seller classification analysis is performed, in order to understand sellers' operational performance behaviour, and a sellers' operational performance score model is proposed, so as to assess seller performance as a whole.

1.3 Project's objectives

The main objective of this dissertation is to analyse and assess sellers' operational performance. In order to achieve this goal, the following questions were formulated:

- **RQ1:** What is the sellers' operational performance impact on customer experience?
- **RQ2:** How can sellers' operational performance be assessed?

To select the most relevant KPIs and determine its importance, it is fundamental to start by acknowledging sellers' operational performance impact on customer experience, hence RQ1. After this, it is possible to develop different ways of ranking sellers according to their performance levels (RQ2).

To answer the first question, sellers' processes were mapped in order to identify the most problematic steps, process deviations and its impact on customer experience, through the available data. For answering RQ2 the main performance metrics were selected, complementary metrics were created and dedicated dashboards were built to monitor specific processes. In addition, two approaches are presented so as to classify and evaluate seller performance as a whole.

1.4 Methodology

In order to achieve the objectives defined in the previous section, the methodology presented in Figure 1.1 was followed. It is important to start by acknowledging Dott's business. Understand and define the different processes associated with sellers' activities, using process mapping techniques, and analyse the current key performance indicators and respective targets. The goal is not to redesign the main processes but to get a clearer view of the core seller activities and identify its variants and most problematic steps.

In the second phase, having flagged the most problematic steps and process variants, it is important to understand its impact on customer experience, select the most relevant KPIs and create complementary metrics in order to assess seller performance. The data visualization process proposed by Fry (2007) was also deployed to build dedicated and intuitive dashboards for monitoring the specific processes reviewed.

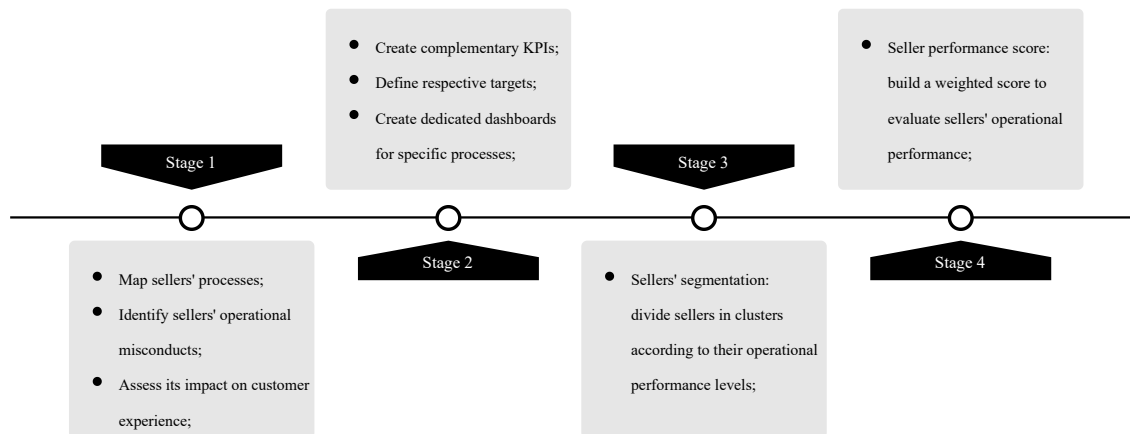


Figure 1.1: Methodology

In the third phase, a partitioning clustering technique is used to segment the different sellers and classify seller performance and, lastly, a global seller performance score is proposed in order to globally evaluate sellers' operational performance.

1.5 Thesis outline

This dissertation is divided into five chapters as follows:

Chapter 1 introduces this dissertation's context, motivation and objectives, as well as, the methodology applied throughout the project.

Chapter 2 encompasses a theoretical background, starting by providing a brief overview on e-commerce, the Portuguese business environment and the impact of COVID-19. The effect of seller performance on customer experience, and the connection between customer trust and seller reputation are also explored. This chapter also provides some insights on operational performance measurement, key performance indicators and business processes definition. Data visualization and data mining techniques are also covered.

Chapter 3 presents the company's value proposition, the main processes involving the e-marketplace sellers and the main performance metrics in use.

Chapter 4 follows the methodology presented on Chapter 1.4. The main processes are mapped, seller problematic areas are presented as well as its impact on customer experience. The most relevant KPIs are selected and complementary ones are created. Dashboards for monitoring specific processes are developed. Lastly, a classification technique and a seller performance score model are applied so as to assess sellers' operational performance.

Chapter 5 highlights the obtained conclusions and the main considerations and insights for future work.

Chapter 2

Background

This chapter approaches key topics and concepts considered to be relevant for the present dissertation. Initially, it provides an overview of the state of e-commerce, with special focus on the Portuguese market, and the main trends triggered by the unexpected pandemic situation. Secondly, it covers the increased importance of customer experience and the impact of sellers' operational performance, as well as, the concepts of customer trust and reputation mechanisms regarding the e-marketplace sellers. Finally, it presents a review over some essential tools and methods for seller performance measurement, analysis and classification.

2.1 E-commerce overview

Electronic commerce or e-commerce is often simply referred to as the act of buying or selling goods through the internet. However, its scope is much broader than that, also including pre-sale and post-sale activities across the supply chain (Chaffey, 2007). These transactions can happen within an organization, between businesses (B2B), between businesses and consumers (B2C) or between the public and private sector (Chaffey, 2007). Half of all global e-commerce sales happen through electronic marketplaces or e-marketplaces. Nearly 2 trillion US dollars are spent annually on the top 100 e-marketplaces worldwide, compelling brands to participate and forcing the world's biggest retailers to join the trend (Shopify, 2020).

According to Bakos (1998), e-marketplaces have 3 main functions: connecting buyers and sellers; facilitating the exchange of information, goods, services, and payments associated with market transactions; and providing an institutional infrastructure, such as a legal and regulatory framework, enabling the efficient functioning of the market. In the process, they create economic value for buyers, sellers, market intermediaries, and for society at large.

Traditionally, online retailers served merely as product resellers. In a reselling model, online retailers buy their products from suppliers for a wholesome price and then determine the retail prices for consumers. Alternatively, in a pure online marketplace model, suppliers determine the retail prices and share a percentage of the revenue with the online retailer, who does not carry any

inventory. It is also possible to find hybrid model solutions, acting as a reseller for some products while acting as a e-marketplace for others (Garbarino and Johnson, 1999).

Amazon, Worten or Fnac, for example, act both as resellers and online marketplaces. In May 2016, Amazon had a total of 353,710,754 different products available at its marketplace, while Amazon itself was responsible for 12,231,203 of those listings (Seeds, 2016).

2.1.1 E-commerce in Portugal

According to CTT's E-commerce Report (2020), in 2019 B2C e-commerce grew by 20% in Portugal, translating into 5.9 billion euros spent online by the Portuguese consumer. This follows the trends in previous years (12% and 17% in 2017 and 2018, respectively). The COVID-19 pandemic boosted the digital transition even further and introduced new shopping habits and behaviours into the Portuguese market. The same report predicts that in 2020 e-commerce will have grown between 40% to 60%.

Portugal surges as an emerging market in the European scene. However, the European E-commerce Association Foundation (2019) states that only 49% of the Portuguese consumers using the internet shopped online in 2018, in contrast to other European countries, such as Denmark, Sweden or The Netherlands which rank around 80%. Another interesting statistic is presented by the Global E-commerce Market Ranking (Eshopworld.com, 2019) which positions Portugal as the European country with the most cross-border e-commerce transactions - 86% of the overall Portuguese online spending happened through foreign platforms. Approximately 67% coming from China (ACEPI/IDC, 2019).

The digitizing of businesses and brands is more important than ever, giving both large and small retailers the opportunity to serve different customer segments, create synergies, and exploit economies of scale by providing new multi-channel experiences to the customer (Agatz, Fleischmann, and van Nunen, 2008). However, the Portuguese Digital Economy Association's Annual Report ACEPI/IDC (2019) states that only 19% of the Portuguese companies have a digital presence - Figure 2.1.

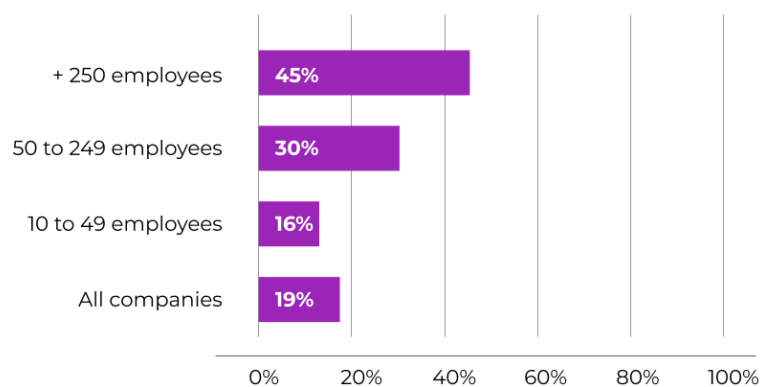


Figure 2.1: Portuguese companies with e-commerce (ACEPI/IDC, 2019)

2.1.2 The effects of the COVID-19 pandemic on e-commerce

COVID-19 truly revolutionised e-commerce, catalyzing the transition of companies to the online and motivating new consumers to shop online for the first time. With curfews and “brick-and-mortar” retail closed, buying online was the most viable alternative. The online buying frequency and the entry of new online consumers accelerated the volume and the value of e-commerce, not only in Portugal, but all around the world. According to Satya Nadella (2020), Microsoft’s CEO, “We’ve seen two years’ worth of digital transformation in two months.”.

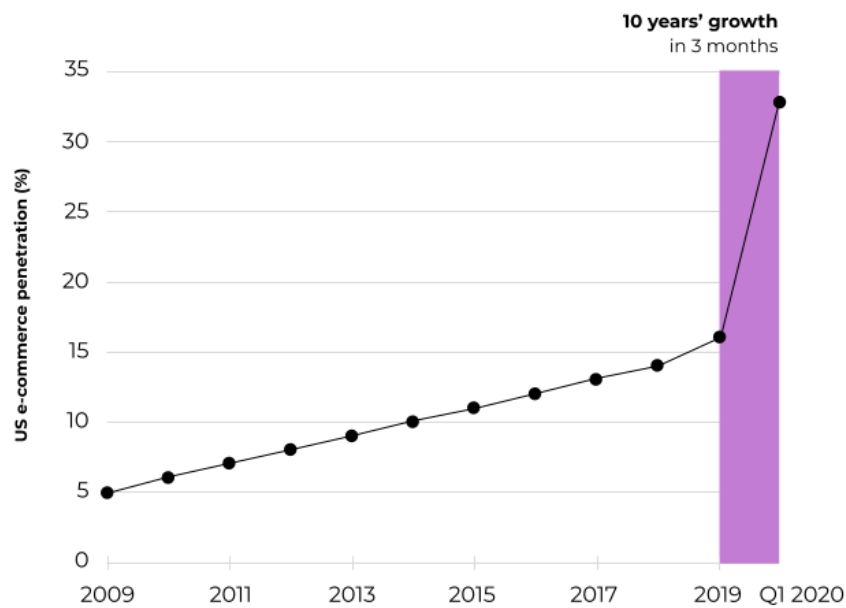


Figure 2.2: US E-commerce penetration Source: Kohli, Fabius, and Veranen (2020)

Mckinsey & Company (Kohli, Fabius, and Veranen, 2020) estimates US e-commerce to have grown in 3 months the equivalent of ten years at the previous rate (Figure 2.2). More interesting than the growth itself is its impact in the future. Mckinsey states that 60% of US consumers expect to integrate the new brands and stores in their post-COVID-19 lives.

Looking exclusively at the Portuguese case, Delloite (2020) reported a 44% growth in online retail commerce. Moreover, according to Google, in 2020, during the three months following March, e-commerce and online shopping related queries in Portugal surpassed 2019’s Black Friday by 45%.

Also, both Portuguese sellers and consumers are expected to accelerate the transition to e-retail solutions. CTT (2020) reported that the Portuguese e-buyers expect to increase their online shopping frequency and value by 45% and 41%, respectively. At the same time, 70% of the Portuguese e-sellers expect to raise their online sales in the following months, highlight their increasing focus on online sales through e-marketplaces (48.6%) and social media (64.3%).

To take advantage of this exponential growth, e-commerce platforms must be able to provide a good customer experience in order to retain first-time online shoppers.

2.2 Customer experience and seller performance

With an increasing number of people buying online, customer experience has gained a bigger role and importance in consumers' lives. Today, customers expect easy-to-use and intuitive digital experiences across different channels and devices. Because of that, in order to achieve greater returns, brands must be able to deliver on those expectations. (Shopify, 2020) According to Zendesk's Customer Experience Report (2021), 75% of customers are willing to spend more to buy from companies that give them a good customer experience, while 80% of the respondents say they would switch to a competitor after one bad incident.

It is the total customer experience (TCE) that determines customer satisfaction and ultimately, customer loyalty. Sun (2009) describes customer satisfaction as the difference between the post-purchase service evaluation and the customer's expectations beforehand (Figure 2.3). Customer loyalty, on the other hand, is described as the potentiality of establishing a long-term relationship between the seller and buyer, translating into future transactions. (Sun, 2009) As Lindgreen, Davis, Brodie, and Buchanan-Oliver (2000) suggest, there must be a focus on customer loyalty as it can be up to ten times more expensive to win a customer than to retain one.

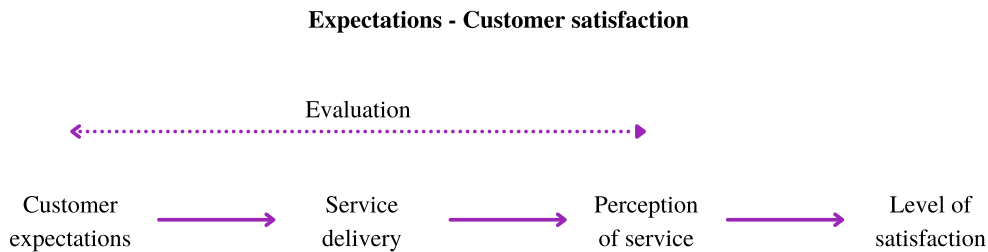


Figure 2.3: Customer satisfaction Source: Johnston (2005)

In an e-marketplace, the TCE goes way beyond the interactions and usability of the website. In fact, it comprises all the activities surrounding a purchase: finding the website, the buying and delivery processes, the pre and post-sales support, the consumption of products and services, and so on. Besides that, every experience depends on the customer's own individual, social and cultural background that is responsible for customer's expectations, judgements and loyalty. In order for a customer to do business within an e-commerce environment he needs to get value from this service encounter (Petre, Minocha, and Roberts, 2006; Dawson, Minocha, and Petre, 2003).

As mentioned before, in a pure e-marketplace, sellers are the ones responsible for the products or services provided to the buyer and not the website itself, which acts as an intermediary. Xiao (2016) proposes that, in an intermediary e-commerce platform context, seller quality can be represented by two dimensions: fulfillment and seller service. Fulfillment reflects the seller's ability to deliver the right product to buyers in time and in proper condition, while seller service encompasses the willingness of sellers to professionally answer and solve buyer's requests, providing quick and effective help.

Buyers may easily feel frustrated if the order is not received in time or if the wrong product is sent. The same can happen if seller's response is slow and unhelpful. Xiao (2016) findings suggest that sellers' performance can influence buyers' satisfaction and the overall shopping experience, and that fulfillment is the most important quality component in an e-marketplace.

Having this in mind, and because customer expectations are constantly evolving, companies must adopt continuous improvement strategies in order to stay competitive (Naumann, Jackson, and Rosenbaum, 2001).

2.3 Customer trust and seller reputation

Another fundamental factor in any e-marketplace is trust, which represents one of the main barriers to the growth of intermediary-based e-commerce. CTT E-commerce Report (2020), for example, shows that around 20% of Portuguese e-buyers leave the search for a product due to the lack of trust on the e-seller. According to some researchers trust is a mediating effect that increases the influence of satisfaction on repurchase intention. (Ha, Janda, and Muthaly, 2010) Unlike a traditional exchange in a regular physical store, when buying something online the buyer can not touch or feel the product and, therefore, relies exclusively on the information displayed on the website (Tadelis, 2016).

In a pure e-marketplace business model there are essentially two parties who act to serve customers for transactions: the intermediary and the sellers. Because of this, it may often become obscure who is responsible for problems that may occur in the course of order fulfillment (Hong and Cho, 2011). The presence of the e-marketplace as an intermediary though, guarantees the reliability of transactions: members trust the e-marketplace without having necessarily to trust other members (Ferreira and Pinto Ferreira, 2004).

A study conducted by Kim and Ahn (2007) found that the impact of trust in the intermediary and in the sellers changes with the duration of the relationship. For less experienced buyers in the e-marketplace, their transaction intention is heavily influenced by the degree of the trust in the intermediary. For more experienced buyers, their transaction intention is more affected by the level of trust in the sellers.

Therefore, enhancing trust is a critical factor for the success of any e-marketplace. In order to cement trust, e-marketplaces resort to reputation mechanisms, mostly backed on customer's reviews. Buyers can rate the sellers and the products or services they offer, creating valuable information for other buyers to choose whom to interact with. A research conducted by Li, Ch'ng, Chong, and Bao (2016), reinforced that a large number of reviews and overall positive review ratings lead to better sales performance than small volume or negative ratings. This creates an incentive for quality, as the behaviour of buyers and sellers becomes increasingly public. This information can be incorporated by platforms into reputation scores – for example, penalizing sellers who receive low rates of feedback (Luca, 2017).

A seller's reputation reflects the confidence the buyer has in the seller's ability of providing high-quality services. The level of confidence is related to the information which is provided by the seller before the transaction (Sfenrianto, Wijaya, and Wang, 2018).

It is important to highlight, though, that reviews systems are usually voluntary: not every buyer who completes a purchase leaves an online review. In particular, buyers may be more likely to leave a review after an especially positive or negative experience (Luca, 2017).

Besides reputation mechanisms based on customer reviews, e-marketplaces often resort to other strategies in order to prioritize customer experience, rewarding sellers based on their value proposition and compliance with the platform's service standards. Sellers' values include a set of specific attributes that are relevant to the marketplace (Wu and LIN, 2014).

Airbnb - a vacation rental online marketplace -, for example, dynamically ranks listings based on hosts' reviews, nights booked, response rate, and cancellations. This creates competition among hosts, as the hosts that offers lower value to travellers get less exposure (Wu and LIN, 2014).

On Taobao.com - a Chinese online shopping website -, a seller's value may be a combination of multiple factors, such as its product condition, promptness in responding to potential buyers' enquiries, delivery service, product guarantee, its experience as a Taobao seller, and any other additional offerings to buyers (Wu and LIN, 2014).

These attributes can also be used by e-marketplaces to select the winning bid in the so called "buy-box" - the call-to-action placed on every product detail page so that customers can add an item directly to their shopping cart. Gómez-Losada and Duch-Brown (2019) conducted a machine learning approach in order to understand which factors influenced the change in Amazon's "buy-box" selected offer. Their predictive models showed that the more relevant features were the ratio between consecutive prices in products and the number of customer reviews, but other factors such as fulfillment options or cancellation rates are also considered.

This types of mechanisms create competition among sellers and encourage the adoption of best operational practices as the increased visibility results in better sales. According to Feedvisor (2020)'s The Amazon Buy Box Playbook, a product in the "buy-box" will sell four times more than the same product without it, considering that 80% of Amazon website sales take place through this button.

2.4 Business processes and performance measurement

Organizations increasingly rely on the design and redesign of business processes as a way of generating value by measuring and managing its outcomes and progresses, and reducing the number of non value added tasks. Davenport (1992) defines a process as a measured set of activities with a structure describing their logical order and dependence designed to produce a specified output. Business process modeling (BPM) allows the comprehensive understanding and analysis of an organization's business processes, easing performance evaluation (Aguilar-Savén, 2004).

Today's economy is increasingly global and competitive, featuring global operations, outsourcing, more complex supply chains and e-commerce. Because of that, measuring performance is essential for an effective operations' management (Gunasekaran and Kobu, 2007).

Performance measurement can be defined as the process of quantifying the efficiency and effectiveness of action. An action is effective when customer requirements are met, and is efficient when the firm's resources are utilized economically, providing a given level of customer satisfaction. (Andy, Mike, and Ken, 1995) Therefore, measurement can be the foundation of organisation's strategies by providing an assessment of how the company is progressing towards its objectives, identifying strengths and improvement areas and providing key takeaways about future initiatives (Dilanthi and David, 2002).

In order to measure performance it is necessary to define the most suitable metrics and key performance indicators (KPI). Traditional financial accounting measures are proven to be insufficient in today's competitive environment. Kaplan and Norton (1992) devised a "balanced scorecard" which complemented financial measurements - that demonstrated the results of already taken actions - with operational measurements on customer satisfaction, internal processes, innovation and improvement, as the drivers of future financial performance.

According to Eckerson (2010), a KPI is a metric that measures how well an organization or an individual is performing in an operational, tactical or strategic activity that is critical for the current and future success of the organization.

Literature often uses the "SMART" criteria to describe and support KPI's selection, characterizing them as: Specific, Measurable, Attainable, Realistic and Time-based. However, this rule does not regard one of its most important attributes: a KPI should be Actionable. When a metric is following an unfavorable trend, users and organizations should be aware of what action is necessary to control and correct that outcome (Kerzner, 2017).

Usually, KPIs have an associated target value that establishes the service level of a given process. Benchmarking is one of the methods used for setting target values, so as to achieve processes' performance improvements. It can be defined as a tool for improvement through continuous comparison with other organisations considered to be the standard of excellence for that business process (Andersen and Pettersen, 1995).

In business process outsourcing scenarios, target values are specified by the service provider and the service consumer in service level agreements (SLA), in order to define the expected service behaviour and quality. In addition, the SLA can define penalties in case of violations (Del-Río-Ortega, Gutierrez, Durán Toro, Resinas, and Ruiz-Cortés, 2015).

2.5 Data visualization

Data visualization is increasingly taking its rightful place as an important part of business intelligence (Few and Edge, 2007). Dashboards are the preferred tool across organizations for monitoring business performance. It allows the rapid assessment of an organization's performance by visualizing aggregated data using different kinds of charts, tables and scorecards. By visually

monitoring different KPIs it is possible to compare current performance against a target required to fulfill business objectives and easily identify deviations and understand its root cause (Peral, Maté, and Marco, 2017; Maté, Trujillo, and Mylopoulos, 2017).

Sometimes it is difficult to extract meaningful information from a given set of data. To help with this process, Fry (2007) proposed the following seven stages for visualizing data:

1. Acquire: obtaining the data;
2. Parse: providing structure to the data;
3. Filter: removing all data without interest;
4. Mine: applying statistical or data mining methods;
5. Represent: choosing a basic visual model;
6. Refine: improving the basic representation;
7. Interact: adding methods for manipulating the data and controlling what features are visible.

When designing a dashboard it is important to encompass both functional and visual features that enable the proper understanding of the state of the process. Functional features are related to the different functionalities available while the visual features address how to effectively present the information. This is a powerful tool of visual analysis that allows the display of multiple charts and tables, which can feature different subsets of data taken from a larger data set.

2.6 Data mining

Data mining has become a powerful tool for extracting useful information from huge volumes of data, as it aims to find unusual and valuable patterns within. Its applications in the business area are varied, for example, customer segmentation and profiling, credit-card fraud detection, among others. (Wu, 2012) One of the core topics of data mining is cluster analysis.

Clustering is a method of unsupervised learning and a common technique for statistical data analysis used in many fields. It consists in grouping data instances into subsets in such a manner that similar instances are grouped together, while different instances belong to different groups. The instances are thereby organized into an efficient representation that characterizes the population being sampled (Velmurugan and Santhanam, 2011; Rokach and Maimon, 2005).

There are several clustering methods: partitioning clustering, hierarchical clustering and model-based clustering. Nevertheless, for the purpose of this dissertation, only one method of partitioning clustering will be covered.

K-means is the oldest and widest used partitioning based clustering algorithm, employing a squared error criterion, in an attempt to find K non-overlapping clusters. This algorithm partitions the data into K clusters, represented by their centroids. A cluster centroid is typically the mean of all the instances belonging to that cluster. The clustering process of K-means is as follows: K

initial centroids are selected, where K is specified by the user and indicates the desired number of clusters; every point in the data is assigned to the closest centroid; each collection of points assigned to a centroid forms a cluster; this process is repeated until no point changes clusters (Velmurugan and Santhanam, 2011; Rokach and Maimon, 2005; Wu, 2012).

Chapter 3

Problem Description

The present chapter focuses on providing a clear understanding of Dott's business model and Dott's sellers' operations. In order to do so, it is important to understand the company's value proposition, the role sellers play in the company's business processes and the main metrics in use to assess seller performance.

3.1 Value proposition

Dott has a pure e-marketplace business model, connecting buyers and sellers, providing the infrastructure and allocating the necessary logistics services on its partner - CTT. "From the Portuguese to the Portuguese", Dott's *glocal* approach highlights the company's commitment to create a personalized and close relationship with the Portuguese buyer and seller, aiming at becoming Portugal's biggest online shopping centre and providing a solid value-proposition to both.

Pure e-marketplaces exhibit one-way network externality where the value of the e-marketplace to buyers is dependent on the number of sellers. (Kwon, Yang, and Rowley, 2009) Having this in mind, Dott aims at creating a convenient way of buying online by offering a diversified catalog, gathering a wide variety of products and categories all in the same place. In less than two years, there are already over 3 million references distributed over 17 fast-growing categories. At the same time, the goal is to make the buying experience the best possible by providing an easy and intuitive user interface, competitive prices and an exceptional and comfortable delivery service.

On the other hand, Dott allows companies to easily set-up their first online shop or create an additional sales channel without any entry or maintenance fees. The whole process is personalized and accompanied by a dedicated Account Manager. From big multinational brands, such as Procter & Gamble and Copenhagen Flying Tiger, to local Portuguese producers, every seller, regardless of the size, is eligible to sell at Dott. Moreover, for most sellers, the whole logistics process is managed by Dott's logistics provider, removing additional operational constraints from the seller's side.

To sum up, buyers benefit as the participation of more sellers provides a more extensive catalog and drives down price. Sellers benefit from the size and diversity of the buyers' audience.

3.2 Seller operations

Sellers play a key role in any e-marketplace, adding value by ensuring the catalog's variety, product's quality and service levels. Thereby, this section focuses on understanding Dott's main sellers' tools, processes and performance metrics.

3.2.1 Tools

Dott's Tech Team is currently working on building Dott's own seller back office solution in order to gain the necessary flexibility for technical and operational management. The platform is expected to be live in the first quarter of 2021. For now, Dott's sellers and the Seller Operations Team rely on IZBERG as the platform through which it is possible to manage all orders. Internally, Dott's Teams rely on Google Cloud Platform's suite to store, manage and visualize all the available data.

IZBERG

IZBERG is a marketplace SaaS platform for B2C, B2B, services and e-procurement, that allows the management of complex elements and workflows thanks to its APIs: connecting to Dott's existing technical environment without constraints, integrating 3rd party sellers and their catalogue, and managing financial flows, for example.

Besides that, it provides both an operator and seller back office. The operator's back office allows Dott's teams to search for orders, returns and sellers' details. On the other hand, the seller's back office is the platform used by sellers to access and manage their orders and returns. Each step of the sellers' processes include actions that must be completed in the seller's back office. Some system limitations create constraints in the sellers' operational flow. It is important to identify and highlight the constraints so as to provide valuable insights for the development of the new back office solution.

Google Cloud Platform

The Seller Operations Team relies on Google's Big Query and Google's Data Studio to access, display, visualize and interact with all the valuable data. Google's Big Query is a fully-managed, serverless data warehouse that enables scalable analysis over data. It supports querying using SQL and has built-in machine learning capabilities. On the other hand, Google's Data Studio allows data visualisation, turning data into informative, easy to read, easy to share, and fully customizable dashboards and reports. These products share the same ecosystem easing the extraction of data.

3.2.2 Processes

As aforementioned, Dott is a pure e-marketplace and, as such, all the products available on Dott.pt belong to Dott's sellers. Dott does not hold any inventory and the seller is responsible for the order fulfillment process, every time a buyer makes a purchase, and part of the order return process, every time a buyer returns a product. There are always three intervening parts - Dott, seller and carrier -, each playing a clear task in the different steps of these processes.

Firstly, in order to fully understand the mentioned business processes, it is important to clarify some concepts, presented on Table 3.1.

Table 3.1: Order's related concepts

Nomenclature	Description
Sales order (SO)	Identifies an independent purchase that can include a range of different products from a range of different sellers.
Merchant order (MO)	Identifies the set of items in a particular sales order that belong to a unique seller.
Item	Corresponds to an independent product within a sales order or merchant order, identifiable by an European Article Number (EAN), Global Trade Item Number (GTIN) and/or Stock Keeping Unit (SKU) code. One item can be sold by multiple sellers.
Offer	Corresponds to a listing from a specific seller containing their information regarding: price, stock, tax, offer fulfillment time, etc. One item can have multiple offers.
Parcel	Corresponds to a package that can be shipped independently by the logistics provider, consisting of one or multiple items.

In order to ensure the seller is familiar with the different concepts, operations and business processes, the seller must successfully go through an operational onboarding process, when joining the platform. Both order fulfillment and return processes are assessed during the onboarding.

3.2.2.1 Onboarding

As mentioned in Chapter 3.1 , no entry fees are necessary in order to join Dott. However, every seller must go through an operational onboarding process. This process ensures that every seller acquires the necessary knowledge to successfully operate their online shop. A good onboarding process is able to detect and minimize operational flaws and reduce the number of support tickets later on. It is important to guarantee that sellers are aware of the whole selling process, are familiar with the seller's back office interface and know how to deal with the different possible business scenarios. The three main operational onboarding stages are the back office tour, the seller's quiz and the test-order.



Figure 3.1: Onboarding steps

Step 1 - Back office tour

The back office tour consists in an instructional video that introduces how to operate the seller's back office and how to manage the most common order scenarios.

Step 2 - Seller's quiz

The seller's quiz is a collection of multiple-answer questions regarding the whole experience of selling through Dott's marketplace. This stage is only successfully completed if the obtained score is higher than 50%. Otherwise, the seller must repeat the quiz.

Step 3 - Test-order

To complete the operational onboarding process, a test-order must be successfully finalized. A product selected by the seller is ordered and evaluated by Dott's Seller Operations Team. The team assesses the quality over the order's packaging and the compliance with the packaging guidelines. The order's fulfillment time is also assessed. After evaluating the packaging, the product is returned and the seller must follow the order return flow.

Besides ensuring that sellers meet the required service levels, this process also ensures all the necessary seller information, such as, shipping address, offer fulfillment time and stock are correct.

3.2.2.2 Order fulfillment

After the buyer completes a purchase and the payment is authorized, the seller receives a notification and all the necessary information becomes available in the seller's back office. Then, the process follows the steps presented on Figure 3.2.

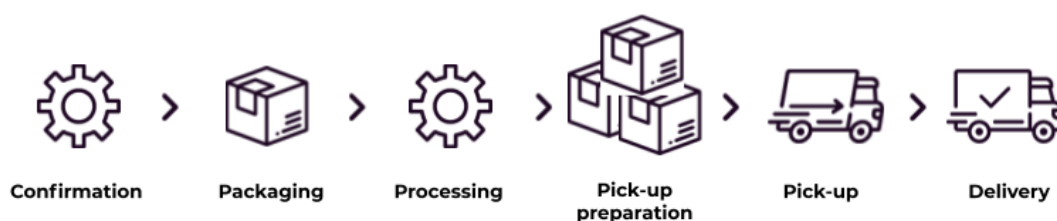


Figure 3.2: Order fulfillment steps

Step 1 - Confirmation

The seller must verify if there is enough stock available and in good condition for the items that make up the MO and check the different offers' fulfillment times, in order to guarantee that the preparation time can be met. After this, the order can be confirmed in the seller's back office. If any of the conditions mentioned above are not met, the seller can partially confirm the order, selecting only the available items or cancel the entire order instead. When an item is cancelled, the offer is automatically deactivated in the seller's online shop. This is the only moment in the process where the seller can independently cancel an order. It is considered an out-of-stock (OOS) situation.

The order confirmation in the seller's back office generates the necessary shipping labels. If any additional shipping labels are required, the seller must make a request to the Sales Support Team in this stage of the process.

Step 2 - Packaging

After the confirmation of the order it is important to pack the MO's items according to the packaging best practices' manual. It is also necessary to print the shipping label and position it on one of the sides of the package, making sure all fields are visible. Packaging deserves careful attention, specially when it comes to fragile items, such as glass bottles.

Step 3 - Processing

Processing an order indicates that the order is ready to be collected by Dott's logistics partner. Therefore, an order must only be processed in the seller's back office when the order is packed and ready to ship.

Step 4 - Pick-up preparation

Everyday at 7.30pm, all the MOs processed until then are aggregated and a pick-up is scheduled for the next business day. After scheduling the pick-up, an e-mail is automatically sent to the seller with the aggregated acceptance certificate which must be printed in duplicate. It is advised that all processed orders are separated in a designated pick-up area in order to facilitate the pick-up.

Step 5 - Pick-up

The seller must deliver all the processed orders, whose tracking numbers are listed in the aggregated acceptance certificate, to the logistics provider' courier. The seller must also ensure that one of the copies of this certificate is signed by the courier and is kept for at least 30 days. This is the only proof of delivery and is essential if an order is lost by the carrier.

Step 6 - Delivery

Dott's logistics provider - CTT - will ensure the delivery of the order to the end-customer. The customer can track the order's status through CTT's tracking online platform.

3.2.2.3 Order return

Dott has a free return policy, allowing buyers to return their products for free until 14 days after receiving an order. Most orders have an associated "Easy-return" shipping label, allowing the customer to independently return a product. However there are some exceptions: orders from Spain,

from sellers with own shipping and cargo orders. In these situations, buyers have to contact Dott's customer support team. When a seller receives a return the following steps must be followed:



Figure 3.3: Order return steps

Step 1 - Receive return

In the first place, as the seller receives the order from the courier, it must ensure the returned order is in good conditions and is not damaged. In case the package is damaged, the seller must sign the delivery proof with reservations, informing the courier about the situation. Afterwards, the seller can access the seller's back office.

Step 2 - Check order status

The seller must search for the order in the seller's back office, through its SO number, and check in which status the order is: "Processed - without open incidents", "Processed - waiting for the seller" or "Finalized". For each order status the seller must act accordingly.

- **"Processed - without incidents"**

There are two case scenarios for a seller receiving a return with this status:

1. When a buyer returns a product in a CTT collection point without opening the return in the buyer's profile page.
2. When a delivery fails and the buyer does not pick-up the order from the CTT collection point within 5 days.

- **"Processed - waiting for the seller"**

This order status corresponds to the situation where the buyer has opened a return in the buyer's profile page or has requested the return by contacting Dott's customer support team, who opened the return in the system.

- **"Finalized"**

In order to guarantee the best possible customer experience, sometimes Dott reimburses the order, thus being received by the seller in the "Finalized" status:

1. Order damaged during transportation.
2. Order misdirected during transportation.

3. Misdirected return.
4. Order returned to the sender without open incident within 48 hours after the delivery.
5. Order with no CTT pick-up indication.

When an order is "Processed - without incidents", the seller must follow the steps mentioned below, starting on Step 3. If the order is "Processed - waiting for the seller", the seller can proceed from Step 4. If the order is in the "Finalized" status the seller does not need to make any actions. However, if the seller wishes to reject the return, he needs to contact Dott's Sales Support Team.

Step 3 - Open return

Access the order's details and open a return.

Step 4 - Accept or reject return

The seller must accept the return if all products described in the incident's details are in good conditions and were properly received. However, if one or more products described in the incident's details were not received, if one or more products received are not listed in the incident's details or if any of the received products is not in good conditions the seller can reject the return request.

In case of rejected request, the seller must contact Dott's sales support team and send photos of the product and packaging, justifying the rejection motive. If the return is not accepted within 7 days, Dott's sales support team might contact the seller.

Step 4 - Item received

In this step the seller must confirm that the items described in the incident were properly received.

Step 5 - Refund

In order to finalize the process the seller must create a refund in the seller's back office. Sellers must refund the buyer in a maximum period of 7 days after receiving the order.

3.3 Metrics for operational performance evaluation

Considering that Dott has no direct control over the seller's order fulfillment or return operations, it becomes crucial to develop metrics that allow the monitoring and assessment of seller's operational performance.

3.3.1 Order fulfillment

Processed on time

Every offer has an associated fulfillment time defined by the seller. This time must provide a realistic prediction of the time it takes for the seller to prepare the order. It is used to estimate the delivery date presented at the checkout. The metric below measures the percentage of orders processed within the established OFT.

To clarify, the OFT is the time, measured in followed hours of business days, between the timestamp when the payment is authorized and the timestamp when the order is processed by the seller.

$$\text{Processed on time (\%)} = 1 - \frac{\sum \text{Orders processed after fulfillment time}}{\sum \text{Processed orders}} \quad (3.1)$$

Dott sets an operational target level of 97% for it's sellers.

Order fulfillment time delay

Besides the percentage of delayed orders, it is important to monitor the degree of the delay. This metric measures the time, in business days, between the predefined offer's fulfillment time and the real preparation time.

$$\text{Order fulfillment delay} = \text{Real order fulfillment time} - \text{Order fulfillment time} \quad (3.2)$$

Out of stock (OOS)

It is possible the occurrence of the scenario where the seller no longer holds the items ordered by the buyer, creating a OOS situation. The following metric measures the percentage of items cancelled by the seller from the total number of paid items. It indicates that a product was cancelled before confirmation and comprises both partial and total OOS situations, thus being calculated in items.

$$\text{Out of stock (\%)} = \frac{\sum \text{Items cancelled by the seller}}{\sum \text{Paid items}} \quad (3.3)$$

In terms of OOS, Dott's operational target is to stay below 3%.

Items refunded before processing

When the seller has already confirmed the order in the seller's back office but can not comply with it, Dott's Sales Support Team must be contacted so that the order can be refunded. This metric measures the number of items refunded before processing from the total number of paid items.

$$\text{Items refunded before processing (\%)} = \frac{\sum \text{Items refunded before processing}}{\sum \text{Paid items}} \quad (3.4)$$

There is no established target for this indicator.

3.3.2 Order return

In order to monitor the order return process, the number of returns and refunds is measured, as well as, the following metrics:

Return rate

Percentage of the total processed items returned to the seller.

$$\text{Return rate (\%)} = \frac{\sum \text{Returned items}}{\sum \text{Processed items}} \quad (3.5)$$

Refund rate

Percentage of total processed items refunded by the seller.

$$\text{Refund rate (\%)} = \frac{\sum \text{Refunded items}}{\sum \text{Processed items}} \quad (3.6)$$

3.3.3 Communication

Because Dott is not the owner of any of the products sold, Dott might not have all the necessary information regarding product's specifications, for example. Therefore, in order to answer the buyer's questions fast and effectively, sellers must always be available and answer Dott's Sales Support Team in a timely manner.

Dott is responsible for mediating communications between buyers and sellers. There should not be any direct contacts between sellers and buyers, with the exception of post-sales (warranty) questions that can happen through a dedicated communication channel located in the buyer's profile page, in the website.

As mentioned in the contract, sellers must answer Dott's Sales Support Team in less than 24 hours. The established SLA is 97

Seller support 24h SLA

Percentage of outbound tickets from Dott's Support Team replied by the seller within the 24 hours SLA.

$$\text{Seller support 24h SLA (\%)} = \frac{\sum \text{Seller replies within 24 hours}}{\sum \text{Tickets sent by Dott's Support Team}} \quad (3.7)$$

Seller support unreplies

Percentage of outbound tickets from Dott's Support Team with no reply from the seller.

$$\text{Seller support unreplies (\%)} = \frac{\sum \text{Cancelled items}}{\sum \text{Paid items}} \quad (3.8)$$

Dott's operational target is to stay below 3%. Seller unreplies are included in the Support 24H SLA as an unreply means that the seller did not reply in 24 hours, as contracted.

3.3.4 Customer Experience

Net promoter score

The Net Promoter Score (NPS) is a measure of customer loyalty and satisfaction. The buyers receive an e-mail with a NPS questionnaire, 30 days after the first purchase, asking how likely they would be to recommend Dott, in a 0-10 scale. Then, based on the buyers answer, they're

classified as follows: between 0-6 are “Detractors,” between 7-8 are “Passives,” and between 9-10 are “Promoters.”. The NPS is then calculated as demonstrated on equation 3.9.

$$\text{NPS} = \frac{\text{Number of promoters} - \text{Number of detractors}}{\text{Number of respondents}} \times 100 \quad (3.9)$$

The NPS score can range from a low -100, if every customer is a detractor, to a high of +100, if every customer is a promoter. Dott does not have a target regarding this indicator.

Customer satisfaction

The customer satisfaction metric (CSAT) is used to rate the interaction with Dott’s Customer Support Team. After contacting the support, the buyer receives a questionnaire asking to rate the service in a scale from 1-5 (1 being "Very unsatisfied" to 5 being "Very satisfied").

$$\text{CSAT} = \frac{\text{Number of satisfied customers (4 or 5)}}{\text{Number of survey responses}} \times 100 \quad (3.10)$$

Customer reviews

After receiving an order, a feedback form is sent to the buyer so as to gather feedback from the customer. The buyer is asked to rate his experience, in a scale of 1-5 (1 being the lowest and 5 being the best), in 4 different areas: product, delivery, delivery time and packaging.

The rating given to the product and packaging are inherently connected to the seller, while the delivery rating provides the buyer’s perception on Dott’s logistics provider. The rating on the delivery time depends both on the seller fulfillment time and the delivery service.

The rating and comment regarding the product corresponds to the reviews seen in Dott’s product page. At the moment, the seller itself does not have any visible rating on the website.

The main operational metrics presented are summarized in Table 3.2. The target minimum levels sellers must achieve for each KPI is also displayed when available.

Table 3.2: Summary of the main operational KPIs

	KPI	target
Order fulfillment	Processed on time	90%
	Order fulfillment delay	2 days
	Out of stock	3%
	Items refunded before processing	-
Order return	Return rate	-
	Refund rate	-
Communication	Support 24H SLA	85%
	Support unreplies	3%
Customer experience	NPS	-
	CSAT	90%
	Reviews	4

Chapter 4

Problem Analysis

In this chapter, sellers' core processes are mapped, while some specific process variants are reviewed and defined. The main seller operational misconducts are identified and its impact on customer experience is assessed. Complementary metrics for measuring seller performance are created and the most important KPIs are selected. Sellers are segmented according to their operational performance levels and a seller performance score is proposed. Also, dashboards for visualizing and monitoring specific processes are developed.

4.1 Mapping sellers' processes

The central interactions between the main e-marketplace stakeholders are presented on Figure 4.1.

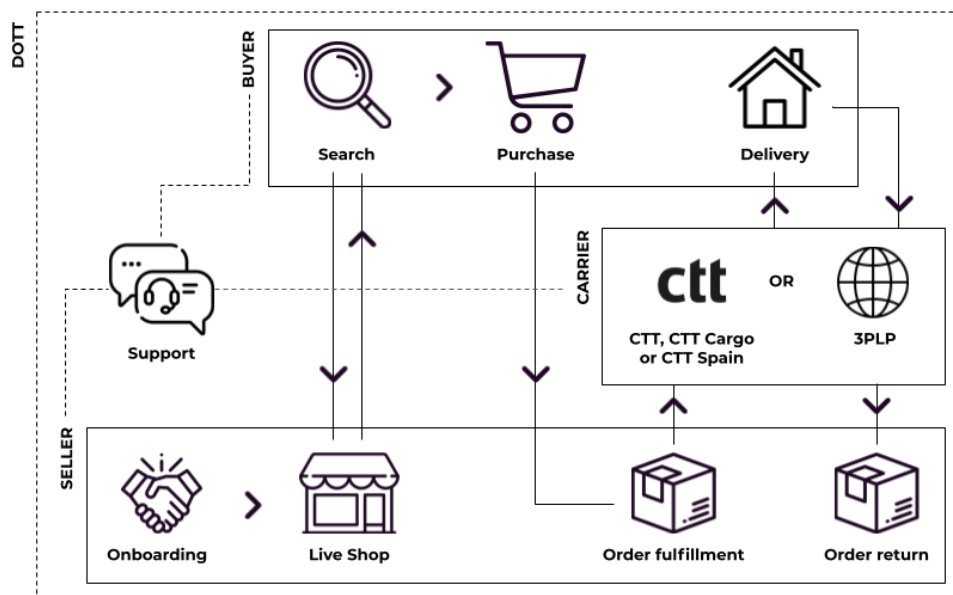


Figure 4.1: Stakeholders' interaction

To master operations in e-commerce it is important to fully understand its processes and continuously evaluate them, especially when performance relies on external partners. Most sellers' processes were not mapped or up to date. Therefore, in order to properly understand sellers' responsibilities, have visibility over the different flows and ensure a higher level of control over operations, it was imperative to create flowcharts to correctly identify the most important stages of the processes, choose the most suitable KPIs and single out other improvement opportunities. Consequently, the operational onboarding process was reviewed and the order fulfillment and order return flows were mapped, both for regular sellers who ship via CTT and international sellers who, exceptionally, have to independently take care of the shipping, relying on a third party logistics provider (3PLP).

4.1.1 Onboarding

The operational onboarding process, presented in Chapter 3.2.2.1, was not up to date with the current information and was not being fully effective. Therefore, the process was revised, updated and mapped. The main goal of the operational onboarding is to prevent support contacts and operational mistakes from the seller by making them aware of the different flows beforehand. The main problems with the process were:

- The back office tour was often skipped by the seller;
- The seller's quiz content was not up-to-date;
- The test-order's quality control was responsibility of Dott's Seller Operations Team;
- The process was not properly automated and monitored.

In order to address these problems, the process was modified and divided in just 2 Steps as follows. The complete sellers' operational onboarding process map is presented in Figure A.1 from Appendix A.

Step 1 - Seller's quiz

The back office tour was not being effective as most sellers did not watch the lengthy video, proceeding directly to answering the quiz. In order to simplify the process, the back office tour was combined with the seller's quiz. The quiz was divided in 5 sections - profile configurations, catalog and offer's management, order fulfillment, returns and refunds, and communication - each preceded by a short video regarding the topic. Watching the videos was made mandatory in order to proceed to the next section of the quiz.

The goal of the seller's quiz is to minimize the number of tickets sent by the seller to the Sales Support Team by educating the seller over the most important topics. An analysis over the most frequent contact reasons was conducted in order to understand the topics and questions that should be covered in the quiz (Figure 4.2). All questions were revised, updated and new questions were added according to the most frequently asked questions from the topics mentioned in the graphic below. At the same time, new videos were created from scratch together with the Seller Success

Team. The quiz was also made available in Spanish in order to cater to Spanish sellers, who did not need to complete the quiz before.

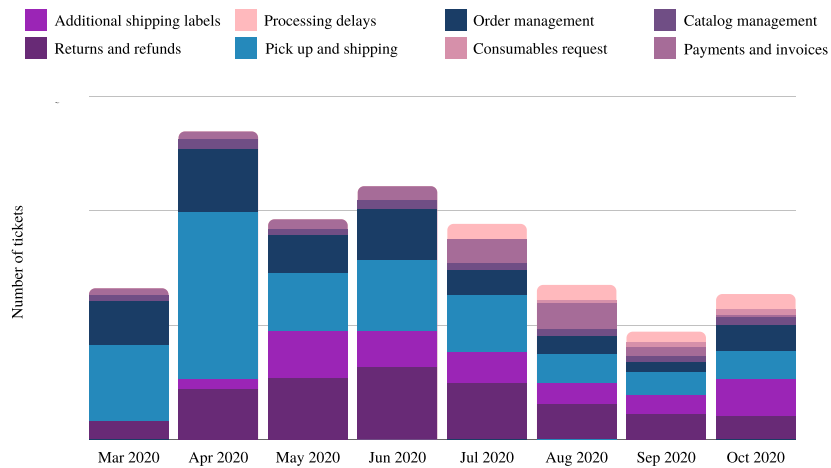


Figure 4.2: Number of tickets received by Dott's Sales Support Team per contact reason

The quiz's success score was also revised and sellers must now have at least a 75% score in order to successfully complete the quiz, otherwise it must be repeated. This ensures a higher level of proficiency over the presented topics.

After passing the seller's quiz, the seller's Account Manager can proceed with an activation request. The activation request form was changed so as to include the test-order request form as well - one product of the seller is selected in order to perform a test-order ensuring that the seller goes through every stage of the order and return flows.

Step 2 - Test-order

The test order within the onboarding process was suspended in May 2020 amid the pandemic situation, due to the large number of companies joining Dott during this period and the logistics operational constraints felt at the time. It was imperative to reinstate the process.

The test-order quality control was responsibility of the Seller Operations Team. This required extra effort and time from the team. Because of that, this step was in the process of being delegated to CTT's Logistics Team, which owns the information regarding the correct packaging for its services. The orders are placed by Dott's Seller Operations Team and are now delivered to CTT's logistics center. As soon as it arrives to CTT's Logistics Team, the packaging is evaluated and then the order is returned. A SLA of 2 business days was established for the order evaluation time since arrival.

CTT must check if the received item corresponds to the ordered item and must evaluate the packaging as "Correct", "Wrong - without damages" or "Wrong - with damaged item". A product is always returned to the seller, even if CTT evaluates it's packaging as "Wrong - with damaged

item". However, if the product is damaged in such a way that it's impossible to return (e.g. broken bottles), the item is sent to destruction. In this situations Dott Sales Team must assess who takes responsibility for the associated costs.

There are some products that can not be returned to the seller, for example, perishable food items, as the seller is not able to resell them. In this situations the product is sent to Dott's office and is donated to charity. In this scenario, as well as when the seller is from Spain, a return shipping label must be manually created by the Sales Support Team. All these cases are mapped in Figure A.1 from Appendix A.

To sum up, there are three evaluation stages for the test-order:

- **Offer fulfillment time:** The preparation time of the order - time between the payment and the processing of the order - must be within the time indicated by the seller in the offer. If there is a delay higher than 2 business days the seller must be paused.
- **Packaging:** The product will be delivered in CTT's logistics centre and will be evaluated by CTT's logistics team. If the seller sent the wrong product or if the product is packed poorly with a negative impact on the product, the seller must be paused.
- **Refund:** After the evaluation, the product is returned to the seller who has to open the return and process the refund within 7 days. If there is a delay higher than 2 days the seller must be paused.

Whenever a seller cancels or fails in the test-order, the seller must be paused by the AM - status that inhibits him from selling - until the test order is repeated and successfully completed. If a seller fails the test-order more than once, the situation must be analysed between the Seller Operations and Seller Success Teams. Notifications were set-up to automatically provide feedback to the seller and the AM over the status of the test-order.

4.1.2 Order fulfillment

Sellers are responsible for a set of actions so as to fulfill the received orders. The flowchart for the order fulfillment process is presented on Figure A.2 from Appendix A. The great majority of sellers ship their orders through CTT, Dott's stakeholder and main logistics provider. However, as mentioned before, there are some exceptions to this, for example, international sellers with "own shipping".

Own shipping

CTT only operates in the Iberian Peninsula, but sellers who operate outside Portugal and Spain can still join Dott by independently taking care of the shipping. These sellers are referred to as sellers with "own shipping". At the moment, the number of sellers with "own shipping" is very limited but, in order to scale the business, there is an intention of increasing the focus on the acquisition of international sellers. As a result, it is important to map the flow for "own shipping" sellers and understand the main limitations.

Normally, the order fulfillment flow is fully integrated with CTT's services. However, in this situation, the seller is able to choose their own third party logistics provider. Due to the lack of integration and visibility over these orders it is important to define and monitor steps that ensure the seller is providing a good customer experience and that allow Dott's Customer Support Team to answer buyer's questions regarding the order.

During the onboarding steps, sellers with "own shipping" must provide information regarding the average pick-up and shipping times. This information is inserted in the sellers' back office and is important to estimate the delivery date at the checkout. The fulfillment process for these sellers was mapped within the order fulfillment flow (Figure A.2 from Appendix A) after the confirmation step. The partial process map is presented on Figure 4.3. Sellers must insert the order's tracking information in the seller's back office, allowing the Customer Support Team and the buyer to track the order. This action makes the parcel status shift from "Initial" to "In Transit".

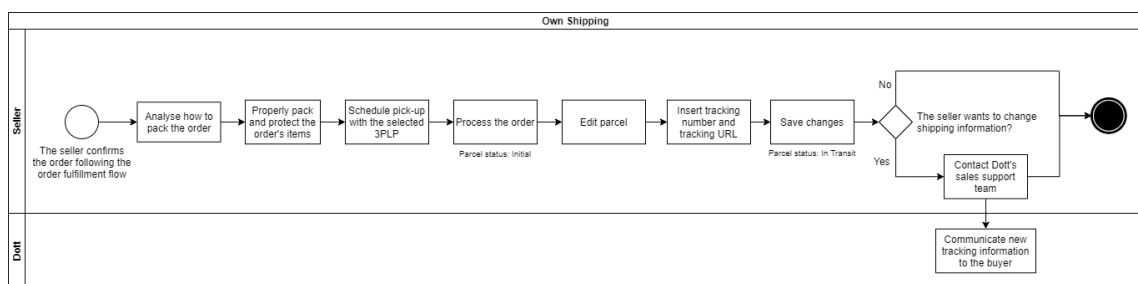


Figure 4.3: Partial order fulfillment flow for sellers with own shipping

As there is no integration with other logistics partners, there is no visibility over the delivery date. Therefore, for now, the seller is responsible for marking the Parcel as "Received", when the order is delivered.

4.1.3 Order return

The order return process varies if the order has an associated "Easy return" shipping label or not. With an "Easy return" shipping label the buyer can directly return a product in a CTT collection point or schedule a pick-up at his address. However, without this label the buyer must contact Dott's Customer Support Team who must then manually create the necessary return shipping label. This happens for cargo orders, sellers from Spain and international sellers with "own shipping". However, when delivered to the seller, all returns must be handled following the same flow, depending on the order status. The process is mapped in Figure A.3 from Appendix A.

Own shipping

Returns from own shipping sellers are one of the situations mentioned before, where the process has to be handled by Dott's Customer Support Team. The process was mapped and presented in Figure A.4 from Appendix A. Sellers with own shipping must provide their return policy, which must be available in the seller's shop. This information is important so that Dott's Customer Support Team can provide the best information regarding how the buyer can proceed with the return.

4.2 Sellers' operational performance impact on customer experience

Considering the different steps sellers must take on the different processes presented in the previous section, sellers' main process deviations and misconducts will be pointed out. Subsequently, its impact on customer experience will be accessed through a quantitative analysis over the available NPS and CSAT survey responses for the affected orders, providing an answer to **RQ1**.

4.2.1 Identifying sellers' operational misconducts

Monitoring and measuring seller performance is crucial to guarantee sellers are following the defined processes and complying with the company's SLAs. In order to choose the most suitable KPIs for evaluating seller performance it is important to understand which process deviations can happen and define what constitutes an operational issue.

Every time a seller does not comply with the established processes or does not meet the defined SLA's, the seller is committing an operational misconduct. According to the contract sellers can be paused and, therefore, prevented from selling through the platform if their performance levels are below required.

One of the most common operational issues is related with OOS situations, when a seller cancels an order (total or partially) before confirmation. This is due, most of the times, with the fact that stock information is not updated in real-time and most sellers are not integrated into Dott's API. This is the only situation when a seller can independently cancel an order. If a seller wants to cancel an order after the confirmation stage, the Sales Support Team must be contacted. Therefore, it is also important to monitor situations when the Support Team refunds an order before the processing action.

Instead of contacting the Sales Support Team, sometimes sellers process an order, return and refund it straightaway. This action sends contradictory messages to the buyer and should be avoided at all costs, being fundamental to immediately flag and educate the sellers regarding this situation.

Another frequent operational misconduct is related with the offer's fulfillment time. Whenever an order is processed after the order fulfillment time, it is considered a delayed order. When an order has a delay greater than 3 days, the seller is notified and must provide a new shipping date. If the seller does not reply within 24 hours or can't comply with the order, the order is cancelled by the sales support team.

Regarding returns, they can happen for several different reasons that can be imputable to the seller, to the buyer or to the logistics provider. When an order is returned because of a mistake from the seller, when the wrong product is sent out, for example, it also constitutes an operational misconduct.

In the order return process itself, the seller is also responsible for managing the return and reimburse the customer. The seller must refund the buyer until 7 days from the return delivery date. If the refund is created after that period, it is considered a delayed refund.

Sellers' operational performance goes beyond the order fulfillment and return processes. Sellers must also comply with Dott's Support SLAs. Regarding the communication with Dott, the celebrated contract with sellers establishes that sellers must reply to Dott's Support Team or the buyer in the first 24 hours from receiving the contact. Therefore, if the seller does not reply or takes more than 24 hours, it is considered an operational flaw as well.

To sum up, the main sellers' operational misconducts are:

- Items cancelled by the seller before confirmation (OOS)
- Items refunded before processing
- Items cancelled by the Support Team
- Items processed and refunded in the same date
- Items processed after fulfillment time
- Seller controllable returns
- Items refunded with delay
- Support ticket without reply
- Support ticket replied with delay

4.2.2 Impact on customer experience

In order to understand the impact of the main operational issues presented before on customer experience and answer **RQ.1**, the following table was created with the NPS and CSAT survey responses for each type of operational misconduct. The data collected comprises all orders received during the company's lifetime - from May 2019 to December 2020.

Table 4.1: Operational misconducts' impact on customer experience

Operational issue	NPS answers	NPS	CSAT answers	CSAT (%)
Out of stock (total)	1216	-36.51	1734	71.51
Out of stock (partial)	176	12.5	264	79.55
Items refunded before processing	494	-61.94	930	64.73
Items cancelled by the Support Team	334	-53.89	514	74.32
Items processed and refunded in the same date	100	-40	156	75.64
Items processed after fulfillment time	7,860	30.2	6,168	72.92
Seller controllable returns	430	-26.05	980	75.31
Items refunded with delay	190	-32.63	534	76.03
Items without operational issues	25,432	44.35	12,392	75.10

Due to confidentiality reasons, the number of orders affected by each operational issue is not presented and the number of survey answers was scaled. As expected all these situations provide a bad customer experience when compared to a situation where an order had no operational issues. Having in mind that the NPS survey is only sent after the first purchase, and considering the negative NPS results (high number of detractors), these customers are not likely to buy on Dott again and can be a source of negative word-of-mouth.

Orders processed after fulfillment time have a different impact on customer experience regarding the degree of the delay. As presented on Figure 4.4, the greater the delay the more negative the NPS becomes. The same happens regarding refunds, the longer it takes for a seller to refund the customer, the more negative is the customer experience.

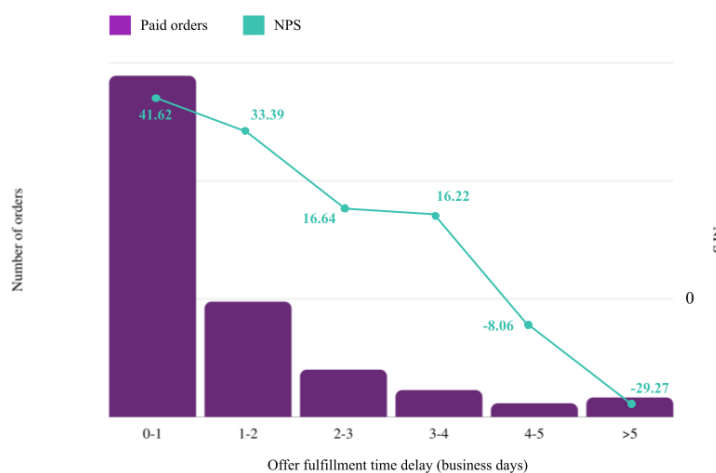


Figure 4.4: Order fulfillment delay's impact on the NPS

4.3 Measuring and monitoring seller performance

Considering the mapped processes on Chapter 4.1 and bearing in mind the sellers' operational misconducts presented in the previous section, complementary metrics were designed to provide more valuable insights over the different flows and monitor the detected issues, allowing greater control over seller operations. Additionally, dedicated dashboards were built for the operational onboarding flow and for monitoring sellers' with "own shipping" performance.

4.3.1 Design and redesign of seller performance metrics

4.3.1.1 Order fulfillment

Non-processed items

The OOS metric only includes items cancelled by the seller before confirmation. However, as seen in Chapter 4.2.1, thus moving away from the established order fulfillment process, sellers can cancel an order in other several different ways. Therefore this new metric corresponds to the

true cancellation rate, aggregating all non-fulfilled items: items cancelled by the seller, cancelled by the support, refunded before processing, and processed and refunded in the same date.

$$\text{Non-processed items (\%)} = \frac{\sum \text{Non-fulfilled items}}{\sum \text{Non-pending action items}} \quad (4.1)$$

Non-pending action items are all items that have a final status ("Processed", "Cancelled" or "Finalized"), disregarding all items still awaiting action from the seller.

Considering that this metric represents the real OOS, gathering all cancelled items through the different possible process deviations, the target value is kept at 3%.

The same approach was replicated but in terms of orders. In this case, an order is only considered cancelled when all the MO's items are cancelled. Orders that are partially confirmed and then processed have a "Processed" status.

$$\text{Non-processed orders (\%)} = \frac{\sum \text{Non-fulfilled orders}}{\sum \text{Non-pending action orders}} \quad (4.2)$$

Fulfillment defect rate

In order to understand if a seller is complying with the order fulfillment process as a whole, it is important to aggregate the different indicators of seller performance in the different fulfillment stages. In order to do so, the fulfillment defect rate was created. This indicator represents the percentage of the total number of non-pending action items that had an operational flaw in the fulfillment stage.

$$\text{Fulfillment defect rate (\%)} = \frac{\sum \text{Items not fulfilled or fulfilled with delay}}{\sum \text{Non-pending action items}} \quad (4.3)$$

Own shipping

It is important to guarantee sellers with own shipping insert the order's tracking information in the sellers back office. The seller must insert the tracking number and tracking URL so that it is possible to track and trace the customer's order.

$$\text{Parcels with tracking info} = 1 - \frac{\sum \text{Parcels missing tracking information}}{\sum \text{Parcels}} \quad (4.4)$$

An operational target level of 95% was defined as all orders must contain the associated shipping information. As there is no visibility yet over the delivery of the order, the seller has the responsibility of following the order and marking it as "Received" when delivered. In order to monitor parcels' status the following metric was created:

$$\text{Received orders} = \frac{\sum \text{Orders with "Received" status}}{\sum \text{Orders}} \quad (4.5)$$

4.3.1.2 Order return

Seller controllable return rate (SCRR)

The return rate can be a good indicator of the quality of the products offered by a seller: an offer with a very high return rate can indicate a poor quality offer. However, as mentioned before returns can happen for several different reasons. Therefore, an extended analysis into the return rate was conducted.

Returns should be avoided as they provide additional operational costs and more effort to the buyer. Some returns are a natural result of the buyer's intentions or expectations while others result from fulfillment errors or listing mistakes. For that reason, it is important to take the return reason into consideration. A return does not necessarily translate a bad customer experience, thus becoming essential to identify the returns that happened because of a seller operational issue. The return reasons that are due to seller's operations are:

- Package was fine but product is damaged
- Product is different from what was ordered
- Wrong product received
- Missing parts or accessories
- Poor quality or defective item
- Product does not match website description
- Product different from the website image
- Product delivered too late (when there is an offer fulfillment time delay)

Having this in consideration, a new return rate was created so as to assess returns imputable to the seller.

$$\text{Seller controllable return rate (SCRR)} = \frac{\sum \text{Returned items with seller return reason}}{\sum \text{Processed items}} \quad (4.6)$$

At the same time, in order to understand to what extent returns are due to sellers' operations, the wrong returns rate was created, representing the percentage of returns that are due to sellers' actions.

$$\text{Wrong returns} = \frac{\sum \text{Returned items with seller return reason}}{\sum \text{Returned items}} \quad (4.7)$$

Refund rate

The refund rate was calculated as the total number of refunded items over the number of processed items (Chapter 3.3.2). However, items can be refunded before processing, as mentioned beforehand. In order to overcome this, two new refund rates were created:

$$\text{Total refund rate} = \frac{\sum \text{Refunded items}}{\sum \text{Paid items} - \sum \text{Cancelled items}} \quad (4.8)$$

The refunded items include items refunded before processing, items refunded after processing and items processed and refunded in the same date. However, items refunded before processing and items processed and refunded in the same date can be considered as cancellations, as they are not related with a return. Therefore, the complementary return rate in Equation 4.9 calculates the percentage of processed orders that were refunded after processing.

$$\text{Refunds after processing} = \frac{\sum \text{Items refunded after processing}}{\sum \text{Processed items}} \quad (4.9)$$

Late refunds

As mentioned in the onboarding process, sellers have a maximum of 7 days to refund a customer after receiving a return. It is important to understand if sellers are complying with this deadline. Therefore, the following metrics were created:

$$\text{Refunded on time} = \frac{\sum \text{Returns delivered and refunded on time}}{\sum \text{Delivered returns}} \quad (4.10)$$

The refund time corresponds to the time a sellers takes to handle a return, from the moment the return is received to the moment the buyer is reimbursed. A refund is considered to be on time when it happens until a maximum period of 7 days after the seller receives the return.

$$\text{Refund time} = \text{Time between receiving a return and completing a refund} \quad (4.11)$$

When a seller processes and refunds an order in the same date, a return is created in between. These items are not considered in the mentioned metrics as they are not considered as processed items but as cancellations.

The main operational metrics presented are summarized in Table 4.2.

Table 4.2: Summary of the main operational KPIs

	KPI	target
Order fulfillment	Non-processed items	3%
	Fulfillment defect rate	-
	Parcels with tracking info	95%
Order return	Seller controllable return rate	-
	Wrong returns	-
	Total refund rate	-
	Refunds after processing	-
	Refunded on time	85%

4.3.2 Data visualization

This section follows the seven step process defined by Fry (2007) and presented in Chapter 2.5 in order to build interactive dashboards for two of the processes mapped - the operational onboarding and sellers' with "own shipping". The Acquire and Parse steps are not covered as all information, actions and interactions that happen in Dott's website, back office and connected services is acquired and integrated into Dott's databases by Dott's Data Team, who is responsible for parsing all the information and making it available for consultation to the all the different Teams.

Because not all the available data is of interest when building more specific reports or dashboards, the third step - Filter - ensures that only the important and relevant information is selected. It is necessary to consider the KPIs that will be displayed thus to support the right data collection. Finally, after filtering data, data mining methods are employed in order to calculate some of the KPIs.

Data preparation was possible through the design and re-design of queries using SQL to retrieve data through Google's Big Query. This enables the manipulation of data and the selection of the relevant information. A query was built regarding the onboarding process by filtering all the relevant information for orders created by a specific Dott account. For the own shipping dashboard, only orders from sellers with "Own Shipping" defined as their shipping option were selected. The dashboards were built using Google's Data Studio which has integration with Google's Big Query, allowing data importation through SQL queries.

All dashboards share the same structure and filters as the rest of the dashboards from the Operations' Team Report, to ensure consistency and standardization. At the top-right corner of the dashboards, a seller and date filter were added allowing the selection of the right time period or immediately check the situation of a specific seller.

4.3.2.1 Onboarding

New sellers are constantly joining Dott. It is important to follow the operational onboarding process and guarantee sellers are complying with the established service levels and successfully completing the flow. Therefore, a dedicated report was created in order to monitor the process. The complete dashboard is presented on Figures B.1 and B.2 of Appendix B

The dashboard presents two sets of scorecards to summarize the whole process at one glance (Figure B.1 from Appendix B). The first one provides an onboarding overview, with the number of new sellers, the number of quiz answers, the average quiz result, the number of sellers that failed in the quiz, as well as, the number of test-orders requested in the chosen time period. The second one emphasizes test-order success, presenting the success rate of the three evaluation stages: OFT, packaging and refund.

It is important to monitor which sellers do not complete the operational onboarding process successfully and, therefore, need to be paused by the Account Manager. Pausing a seller at this stage prevents the seller from providing a bad customer experience further on. The dashboard

provides a table with the list of sellers to pause (Figure 4.5). It is possible to see all sellers that did not complete the process with success during the considered time period and their current status.

The onboarding process is accompanied by the seller’s Account Manager. In order to measure AM’s effectiveness, a bar chart was added, indicating, for the chosen time period, the number of sellers who successfully completed or failed the entry on the platform per AM (Figure 4.5).

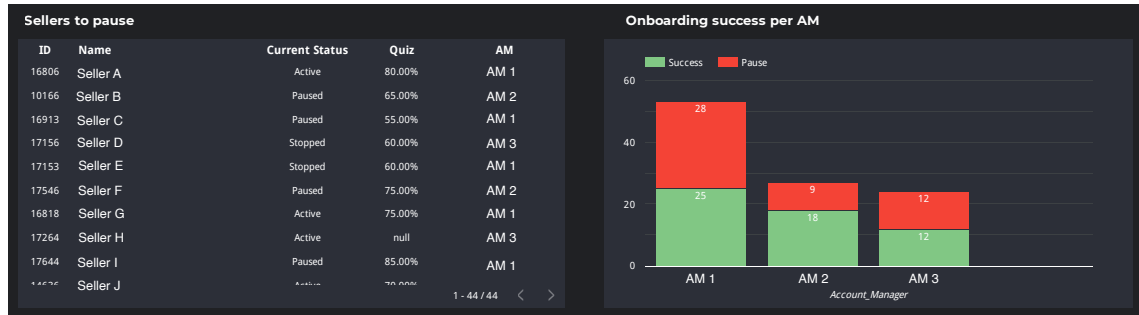


Figure 4.5: Sellers to pause and distribution per Account Manager

A table with all test-orders’ details was also included (Figure B.2 from Appendix B), making it possible to search for a particular order or seller through the available filtering options. Every time the order fails in one of the evaluation steps, the order is flagged through the use of color, allowing the quick visualization of failed test-orders.

In order to understand and monitor the main reasons a seller failed the operational onboarding, and act upon it, a stack bar chart was added, indicating the test order’s fail reasons per week (Figure 4.6). It is possible to see exactly how many orders failed and what was the respective reason.

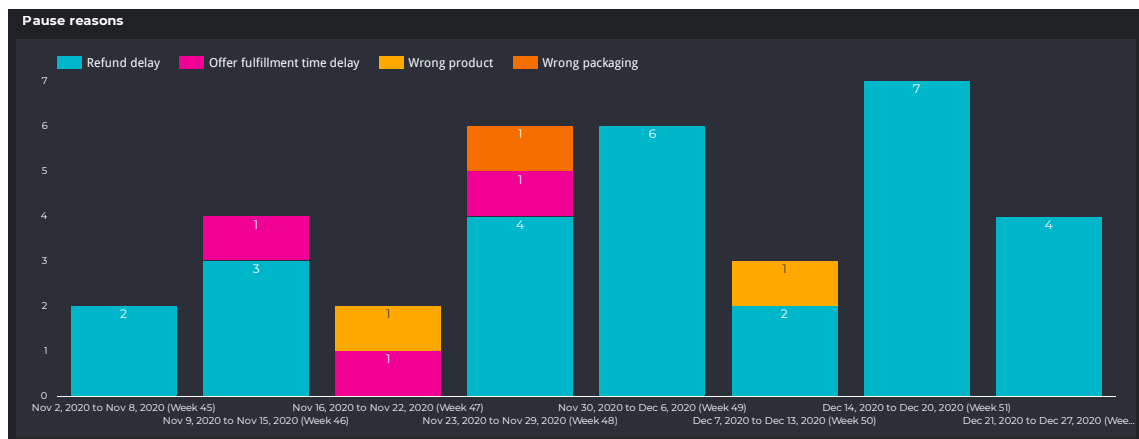


Figure 4.6: Reasons to pause

4.3.2.2 Own shipping

The number of sellers with own shipping is not very significant yet but there is a strong desire in increasing the number of international seller. It is imperative to have a well established and monitored process beforehand. The complete process dashboard is presented on Figures B.3 and

B.4 from Appendix B. In order to understand how many own shipping sellers operate and which carriers are used a table was created alongside a bar chart that presents that distribution (Figure 4.7).

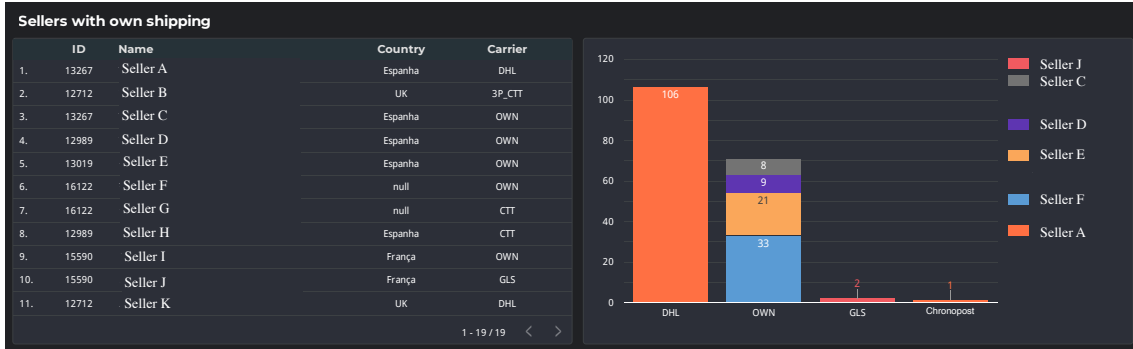


Figure 4.7: Sellers' with own shipping

Applying the metric created in Chapter 4.3.1.1, the following graph (Figure 4.8) shows the total number of parcels as well as the number of parcels without tracking number and the number of parcels without tracking URL per week. The line presents the percentage of parcels with tracking information. A request was made to the Data Team in order to make the tracking URL information available at Dott's data warehouse. However, the history regarding that information is still not visible, which explains the high number of missing tracking URLs' parcels in December.

A parcel can be in the "Initial", "In Transit" and "Received" status. It is important to monitor parcel status evolution (Figure 4.8). The goal is to make the number of parcels in the "Initial" status null because this status indicates that the order has been processed but the tracking number and tracking URL have not been provided yet. At the moment, a parcel only transitions to the "Received" status when a buyer or the support team marks the parcel as received.

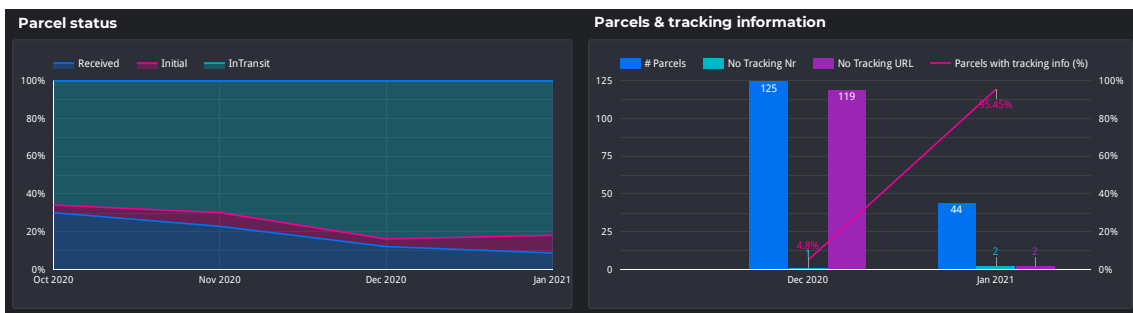


Figure 4.8: Evolution of parcels' status and tracking information

A table with a queue of processed orders without tracking information and a table with a queue with all order's details were also added - Figure B.3 from Appendix B- allowing to check the information regarding a specific order if needed, through the seller ID, name or SO filter.

All this information regards own shipping's specificities. However, all other metrics regarding seller performance (number of paid MOs, GMV, processed on time, non-processed items, among

others) are visible, both in a seller performance overview table and through evolution graphs - Figure B.4 from Appendix B - that enable monitoring KPIs trends.

4.4 Assessing sellers' operational performance

Dott's sellers are a heterogeneous group composed by different sized companies with different operational structures. Due to the growing number of sellers using Dott, it is impossible to analyse each situation separately. Therefore it becomes imperative to internally benchmark sellers against each other, regarding their performance levels. To evaluate Dott's sellers and hence answer **RQ2**, two approaches were considered:

1. **Sellers' segmentation** dividing sellers in groups according to their operational performance levels and attribute a label to each.
2. **Seller performance score** creating a weighted score considering the most relevant operational performance KPIs.

In order to do so, seller operational performance was divided in two dimensions as follows. For each approach, the best metrics within each dimension were selected.

- **Service quality** regarding the quality of seller operations within the order fulfillment and order return flows as well as the contact availability with Dott's Support Team.
- **Product quality** regarding the quality of the products and packaging provided by the seller.

4.4.1 Sellers' segmentation

Dott has over 1,400 sellers from which more than 1,100 are currently "Active". All sellers share the same goal: having better online sales. However, there is high variability among them. While some are big retail stores located in urban districts with dedicated logistics for e-marketplace sales, others are dropshippers, while others are local producers in the countryside having their first digital experience, for example.

It is important to classify sellers according to their operational performance as a whole, rather than just analysing the individual KPIs, seen in the previous chapters. To have a better understanding and visualization of how the sellers perform, a partitioning clustering algorithm was run so as to identify the different operational performance patterns.

Ideally, the formed clusters should be composed of sellers with similar operational performance levels. Therefore, it was necessary to find the best variables to evaluate seller performance and that would make sellers comparable.

Having the right and relevant features is key to run an effective clustering algorithm. Considering the different dimensions, the following metrics were selected:

Table 4.3: Sellers' operational performance variables for clustering analysis

Dimension	KPI
Service Quality	Processed on time (%)
	Non-processed items (%)
	Support first reply time (bH)
Product Quality	Return rate*

Instead of using the Support 24H SLA metric, the support first reply time (measured in business hours) was used in order to understand how long the sellers in each cluster took to answer Dott's Support Team.

Also, the return rate used was not the return rate presented on Equation 3.5, instead a normalized return rate was calculated, considering the category of the products sold, as explained below.

Return rate*

The return rate can be a good indicator of the quality of the products of a seller. However, some categories have naturally higher return rates than others: fashion items, for example, tend to have slightly higher return rates because of the inability for the buyer to try the product and the fit beforehand. Dott's return rate per category is presented on Table 4.4.

Table 4.4: Return rate per category

Category	Return rate	Category	Return rate
Health and Beauty	2.30%	Informatics and Electronics	4.10%
Market and Gourmet	3.21%	Image, Sound and Home Tech	4.69%
Home and Gardening	2.74%	Books	4.27%
Office	2.37%	Sports	6.37%
Fashion	6.79%	Music, Films and Gaming	1.21%
Animals	2.03%	Vehicles accessories	2.59%
Baby, Children and Toys	5.06%	Watches and Jewelry	2.82%
Mobile and Communication	2.48%	Tickets and Vouchers	0.56%
Appliances	1.51%		

A seller can sell items from multiple categories. Having this in mind, for each seller, the return rate per category was calculated and compared to the overall category's return rate (Equation 4.12).

This new normalized return rate indicates if the seller is under or over performing compared to the category's overall rate.

$$\text{Normalized return rate} = \frac{\frac{RR_{1,1}}{RR_1} \times P_{1,1} + (\dots) + \frac{RR_{1,17}}{RR_{17}} \times P_{1,17}}{P_1 + (\dots) + P_{17}} \quad (4.12)$$

Where:

- $RR_{1,1}$, is the return rate from seller 1 in category 1;
- RR_1 , is the overall return rate from category 1;
- $P_{1,1}$, is the processed items from seller 1 in category 1;
- P_1 , is all processed items from category 1.

The data was collected from Dott's sales covering its complete lifetime, from May 2019 to the end of December 2020, thus to include the maximum amount of information possible. Only sellers with more than 10 MOs were considered because sellers with low order's volume do not provide the most reliable information. Using Google's Research Colab platform, a k-means clustering algorithm was applied.

The data was prepared so that rows correspond to observations (sellers) and columns are variables, any missing value in the data was removed or estimated. The data was standardized to make variables comparable.

The number of clusters was defined using the Elbow method. This method looks at the total within-cluster sum of square as a function of the number of clusters. When adding an additional cluster does not marginally improve the total within-cluster sum of squares, the number of clusters is defined. As seen in the graphic from Figure 4.9, the selected number of clusters was 6. However, an additional cluster was considered, aggregating all sellers with less than 10 orders.

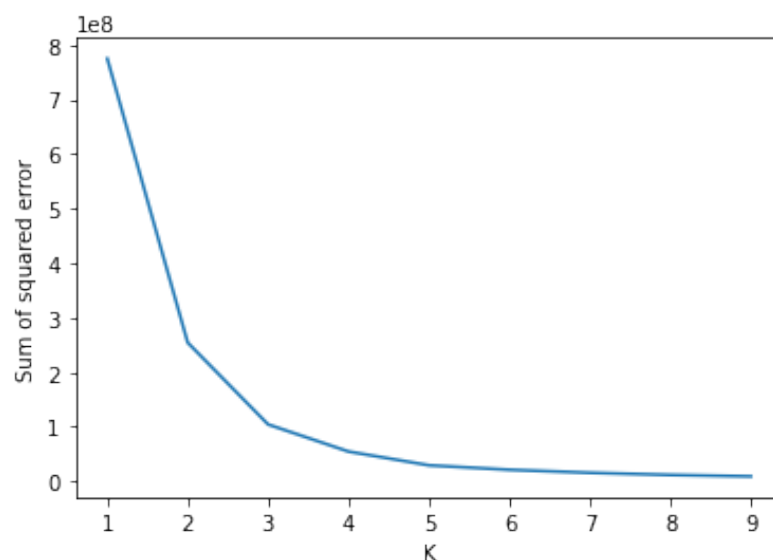


Figure 4.9: Elbow method plot

The results from the clustering algorithm are presented in Table 4.5 which shows the average number of paid MOs, processed on time, non-processed items, return rate and support reply time, as well as, the number of sellers in each of the six clusters obtained. Also the overall average values for each variable are presented, as well as the total of sellers included (714).

Table 4.5: Average operational indicators per segment

Cluster	Paid MOs	Processed on time	Non-processed items	Return rate*	First reply	No. Sellers
0	5315	79.81%	5.04%	1.02	10.3	22
1	200	43.42%	6.31%	0.94	4.8	154
2	90	78.07%	7.54%	5.86	6.5	43
3	310	91.29%	3.35%	0.79	6.1	457
4	168	57.63%	43.42%	1.97	5.5	31
5	292	68.75%	14.24%	1.00	164.5	7
Grand total	421	78.13%	6.14%	1.19	7.5	714

For each cluster a qualitative classification label was attributed as seen in Table 4.7. Cluster 0 corresponds to the "Top Sellers", the group of sellers with the highest orders' volume. Cluster 1 - "Low Performers" - combines sellers with a low operational performance level, given the very low percentage of processed on time orders. In Cluster 2, the high return rate is noticeable, compared with the other segments. Cluster 3 combines the sellers with the highest operational indicators, the best processed on time and non-processed items average as well as the best return rate. However, this segment is composed of 457 sellers, a further analysis must be conducted in order to properly identify the "Top performers" within this cluster. Table 4.6 presents the sellers from Cluster 3 further divided according to the same variables. The segment 3.3 grouped the "Best Performers", the sellers with the highest percentage of processed on time orders and lowest non-processed items, return rate and first support reply.

Table 4.6: Segmentation of Cluster 3

Cluster	Paid MOs	Processed on time	Non-processed items	Return rate*	First reply	No. Sellers
3.1	189	82.41%	6.89%	1.14	4.0	137
3.2	1037	92.16%	3.11%	1.08	22.6	77
3.3	148	96.02%	1.44%	0.49	2.0	243
Grand Total	310	91.29%	3.35%	0.79	6.1	457

On the contrary, Cluster 4 gathers the worst performers with the worst processed on time and non-processed items rates and an above average return rate. Regarding the first reply time, cluster 5 rallies the sellers' with the highest first response time, well above the overall response time average.

Table 4.7: Performance level label per cluster

Segment	Performance level	Size
0	Top sellers	22
1	Low performers	154
2	High returns	43
3	Best performers	457
4	Worst performers	31
5	Late repliers	7
6	Low sellers	634

As mentioned before, an additional segment with the sellers with less than 10 MOs was created - Cluster 6. This cluster is composed of 634 sellers with less than 10 MOs. Sellers' with low orders' numbers do not have sufficient information to allow the correct classification of their operational performance. However, it would be possible to attribute 2 labels: "New sellers" grouping all sellers with less than 10 MOs that have joined Dott in less than 30 days; "Low sales sellers" grouping all sellers who have been Active for a longer period but keep a low sales volume (<10 MOs). Strategies for helping this sellers' sell more should be considered.

4.4.2 Seller performance score

As demonstrated before, sellers' operational performance has an impact on customer experience. Aligned with Dott's customer-centric approach, all available information should be put at use in order to improve buyers shopping experience in the platform, displaying more information regarding sellers' reputation and benefiting sellers who provide the best customer experience.

Another approach to classify sellers' performance is by building a Seller Performance Score (SPS) which can be presented in the products' and sellers' web page, as well as, be considered in the best offer algorithm, benefiting the offer from the seller with the best operational performance. This would encourage sellers to adopt operational best practices as their performance becomes increasingly public and influential, driving sales and contributing to the brand's image and reputation.

A good Seller Performance Score would mean the seller is assured to provide an excellent service and a successful shopping experience to the buyer, enabling the seller to establish trust with a potential customer and increasing the visibility of their the products.

For each of the previously defined dimensions, the selected KPIs and respective weights are presented on Table 4.8.

Table 4.8: Seller Performance Score variables and respective weights

Dimension	KPI	Weight	Reference
Service Quality	Processed on time (%)	20%	A
	Non-processed items (%)	40%	B
	Support 24H SLA	5%	C
	Detractors (%)	10%	D
Product Quality	Seller controllable return rate (%)	10%	E
	Reviews (1-5)	15%	F

The Refunded on time metric (Equation 4.10) was also considered, as the time it takes the seller to handle a return also affects customer experience, but, at the moment, Dott has no visibility over the return's delivery date for cargo or international orders so this metric was not taken into account as it would not be possible to measure it equally among all sellers.

The weights were selected according to the frequency and impact of the related issues on the buyer and were discussed within Dott's Operations and Sales Teams. The non-processed items KPI was attributed the biggest weight as it represents the main cause of customers' dissatisfaction.

This score benefits sellers with low cancellations (non-processed items), low number of delayed orders and seller due returns, as well as high and fast Support response rates. Customer feedback is also integrated, using buyers' reviews and NPS survey answers. In this situation, the rating result from the reviews' survey is an average between the grades attributed by the buyer to the product's quality and the order's packaging.

To initiate this score it is necessary to gather enough information, making it possible to calculate it. Therefore, the seller needs to have at least 10 paid MOs, 2 reviews and 2 NPS survey answers. All variables need to be normalized. The SPS can be calculated according to Equation 4.13.

$$SPS = (A \times w_A) + ((1 - B) \times w_B) + (C \times w_C) + ((1 - D) \times w_D) + ((1 - E) \times w_E) + \left(\frac{F}{5}\right) \times w_F \quad (4.13)$$

A prototype was developed and is presented on Figure C.1 from Appendix C. However, this model is intended to be dynamic, analysing the seller's performance on the service standards from the last 6 week period, allowing the seller to improve the score. Nonetheless, concerning buyer's reviews, all reviews are taken into account, from the moment the seller starts selling on the platform. According to the target values and SLAs established and contracted for each metric, the target SPS score would be of 94.60%. It is important to understand which sellers are below the target and find improvement strategies for optimizing sellers' performance.

Chapter 5

Conclusion

This chapter provides the main conclusions drawn by the work undertaken in the company, answers the research questions formulated in Chapter 1.3 and highlights the future initiatives, in the continuation of this dissertation.

5.1 Project's conclusions

This dissertation focused on understanding the major role sellers play in a B2C pure e-marketplace platform. As Dott does not have direct control over the order fulfillment and return processes, partner's operations' efficiency and effectiveness become key for the success of the company, providing a good shopping experience and leading to the growth of customer loyalty.

Considering the company's lifetime, rapid growth and subsequent continuous change, most of the sellers' processes were not mapped or outdated. Therefore, there was a need to update and map these processes so as to get a clearer view of sellers' responsibilities. Process maps were created for sellers' core processes - order fulfillment and order return - considering the specific steps taken by sellers with "own shipping" as well. The operational onboarding process was also reviewed, improved and mapped. The test-orders were reinstated in mid-November and the new seller's quiz became live in December.

Through the mapping of these processes and the continuous interaction with the different Teams, it was possible to identify the most frequent operational misconducts and process deviations taken by the sellers. In order to answer to **RQ1**, the available data was analysed and the NPS and CSAT results were calculated for the orders affected by the sellers' operational errors. It is possible to conclude that sellers' operational performance impacts customer experience as sellers' misconducts result in a negative customer experience, considering the obtained high percentage of Detractors - unsatisfied customers who are likely to recommend against the company.

Considering the mapped processes and the identified sellers' misconducts, complementary metrics were created in order to have better control over operations. Most metrics are already implemented in the different company's operations' dashboards allowing a better understanding of the processes and sellers' performance. For example, instead of analysing the OOS metric

alone, the non-processed items KPI allows a better understanding over seller cancellations as it includes all the situations where the seller intends to cancel an order, following or not the defined processes. This metric is now used to monthly assess sellers' operational performance by the Sellers' Success Team.

Furthermore, the two dashboards created, for monitoring the operational onboarding process and sellers' with "own shipping" performance were also added to the Operations' Team Report. These new reports provide greater control and visibility over these processes and sellers, and, after being well analysed, can provide valuable insights to improve the onboarding service and customer experience for "own shipping" sellers'. For example, an early analysis over the onboarding dashboard concluded that the return and refund process was the main difficulty among new sellers. Therefore, new content and notifications regarding that topic were implemented.

In order to answer **RQ.2**, sellers' operational performance was divided in two dimensions: service quality and product quality. The most relevant operational KPIs were selected - the ones that have a greater impact on customer experience - and used to compare different sellers' performance levels through two different approaches.

Sellers were segmented according to the main operational variables allowing the division of sellers in groups with different operational performance levels, characterized by a qualitative label. It was possible to divide sellers in 7 different clusters. Also, a seller performance score was calculated - a weighted score based on the main operational metrics. Having one common score allows the comparison of sellers' performance as a whole instead of the individual KPIs analysis. Both these approaches serve as a foundation for future works within the company, always with the objective of improving customer experience in the purchase moment.

5.2 Future Work

Sellers' operational performance is constantly under analysis and assessment. Continuous improvement is key in order to continuously optimize operations in e-commerce. As mentioned before, a new sellers' back office is under development. Taking advantage of the mapped processes, it can be important to identify unnecessary and confusing steps that can be eliminated in the new interface.

Regarding the onboarding process, some non-value added activities are still manual (making the order, inserting the return shipping labels, etc.), as such, new solutions must be explored in order to completely automatize the process and make it self service for sellers. Also, it would also be interesting to evaluate it: make sellers rate the process through a survey in order to find improvement opportunities and make the whole process smoother and effortless.

Due to the push for the acquisition of international sellers, the own shipping process is being further analysed in order to become scalable and provide greater control over "own shipping" sellers. Considering the lack of visibility over the order status, new solutions are being explored, such as, web scrapping for extracting the orders' status from a parcels' aggregator, through the tracking information provided by the seller.

As aforementioned, trust is one of the main challenges in online marketplaces. It can be achieved by providing trustworthy information concerning customers' shopping experience, including sellers' performance. As in any e-marketplace, some products are sold by multiple sellers and, at the moment, no information regarding sellers' operational performance or reputation are provided to the buyer, allowing a more informed choice. This dissertation provided the foundation for the development of a sellers' classification system to increase transparency in the seller/buyer relationship.

Both approaches presented to assess seller performance are currently being discussed and developed in order to be implemented. It involves the collaboration of the different Dott Teams. Together with the Sales Team, commercial metrics are also being defined: time in the platform, sales volume, catalog's relevance, among others, to, together with the operational metrics presented, rank sellers in the website.

After this, its up to the Data Team to make all the data and metrics available and create the necessary endpoints to make the information consumable by the Product Team. This team and Product Designers in particular, are responsible for the UX and UI implementation.

A classification approach can be used, for example, for attributing specific badges to sellers' through the segmentation labels. A seller can be a "Top seller" - sellers with higher orders' volume -, "New seller" - sellers who recently joined Dott - or "Top performers" - sellers with exceptional service levels, for example.

The seller performance score can also be displayed in the website, either quantitatively (0-100%) or qualitatively (Bad-Excellent), next to sellers' information in the product and sellers' shop web pages. The calculation of the score must be adapted for sellers with own shipping so as to include the parcels with tracking information metric. It is intended to build a dynamic model in order to calculate the SPS, by iterating the weights attributed to each variable in order to optimize customer experience.

Another initiative is related with the offer recommended by Dott at the "Add to cart" button. Currently, the best offer algorithm is designed in a way that prioritizes the offer's price, selecting the cheapest offer with stock availability, also considering its shipping cost. The goal is to incorporate the seller performance score as an indicator of seller operational performance and, together with the price and delivery date, suggest the offer that will provide the best customer experience.

Considering the importance of customer reviews, sellers' ratings should also be incorporated in the sellers' shop with the average result (1-5 stars) and total number of reviews that the seller has received so far. To do this, it is important to gather the highest amount of information possible. The number of NPS and reviews' survey answers in 2020 was rather low - 7.6% and 5%, respectively. Therefore, it is necessary to analyse and improve the questionnaires: its content, the number of mandatory fields and its frequency. The possibility of creating incentives for the buyer to answer, by giving a discount voucher, for example, should also be considered.

All this new information will certainly impact sales and consumer behaviour. Therefore, before any of these new features become live, together with the Marketing Team, it is important to test and measure its impact on the conversion rate and acquisition costs. Also, sellers need to be

aware of what is being measured and assessed so that improvement strategies can be implemented in order to increase sales. A set of materials need to be prepared explaining the different metrics and providing insights over how to achieve the best results.

This is an ongoing project to be developed in the first two quarters of 2021, considered to be a strategic and fundamental shift towards a more customer-centric shopping experience.

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Appendix A

Mapping sellers' processes

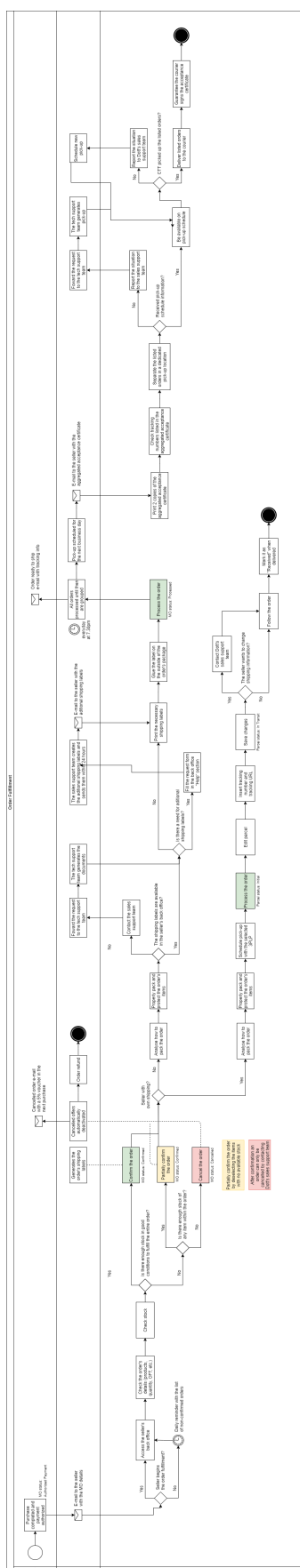


Figure A.2: Order fulfillment

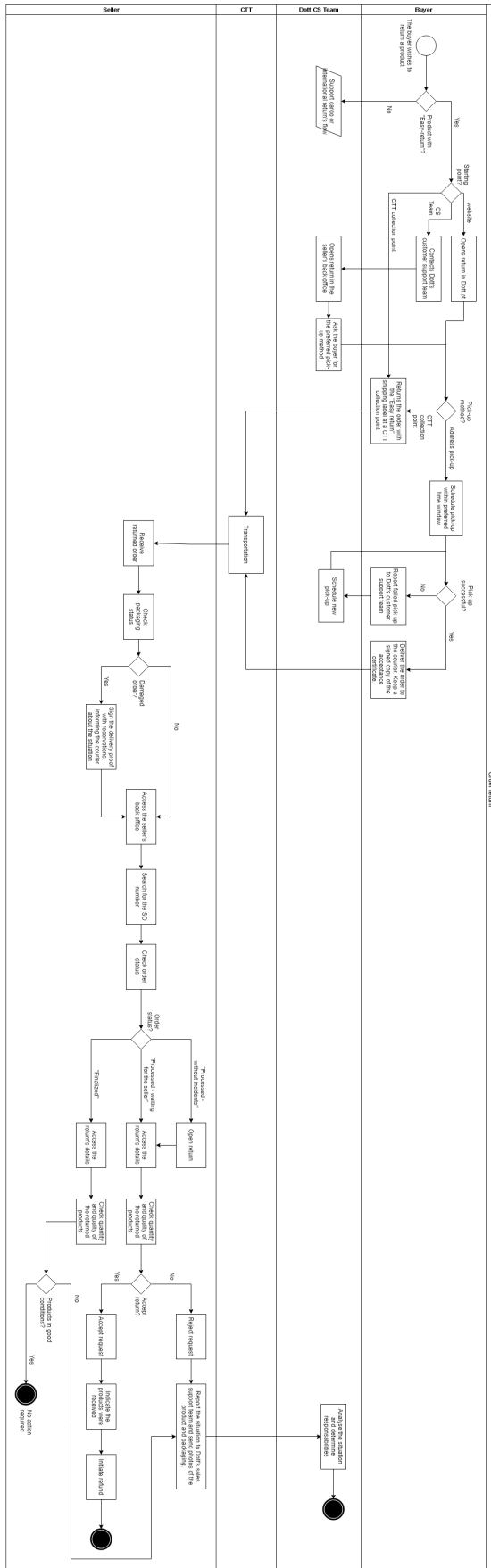


Figure A.3: Order return

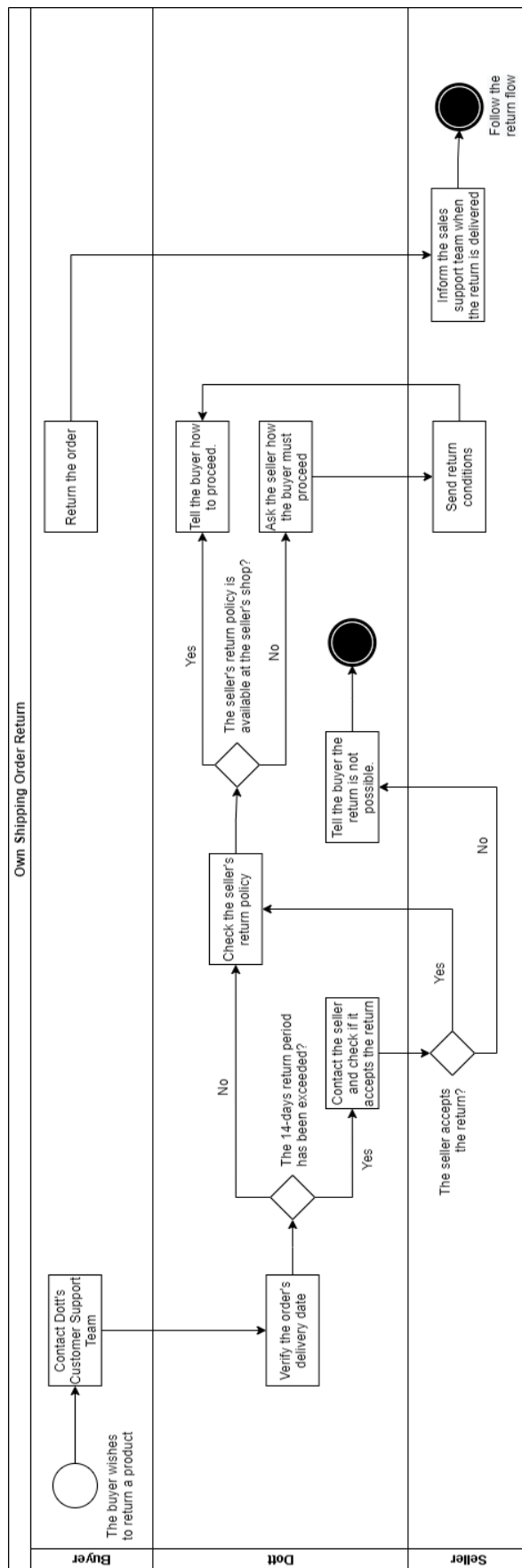


Figure A.4: Order return - own shipping sellers

Appendix B

Process dashboards

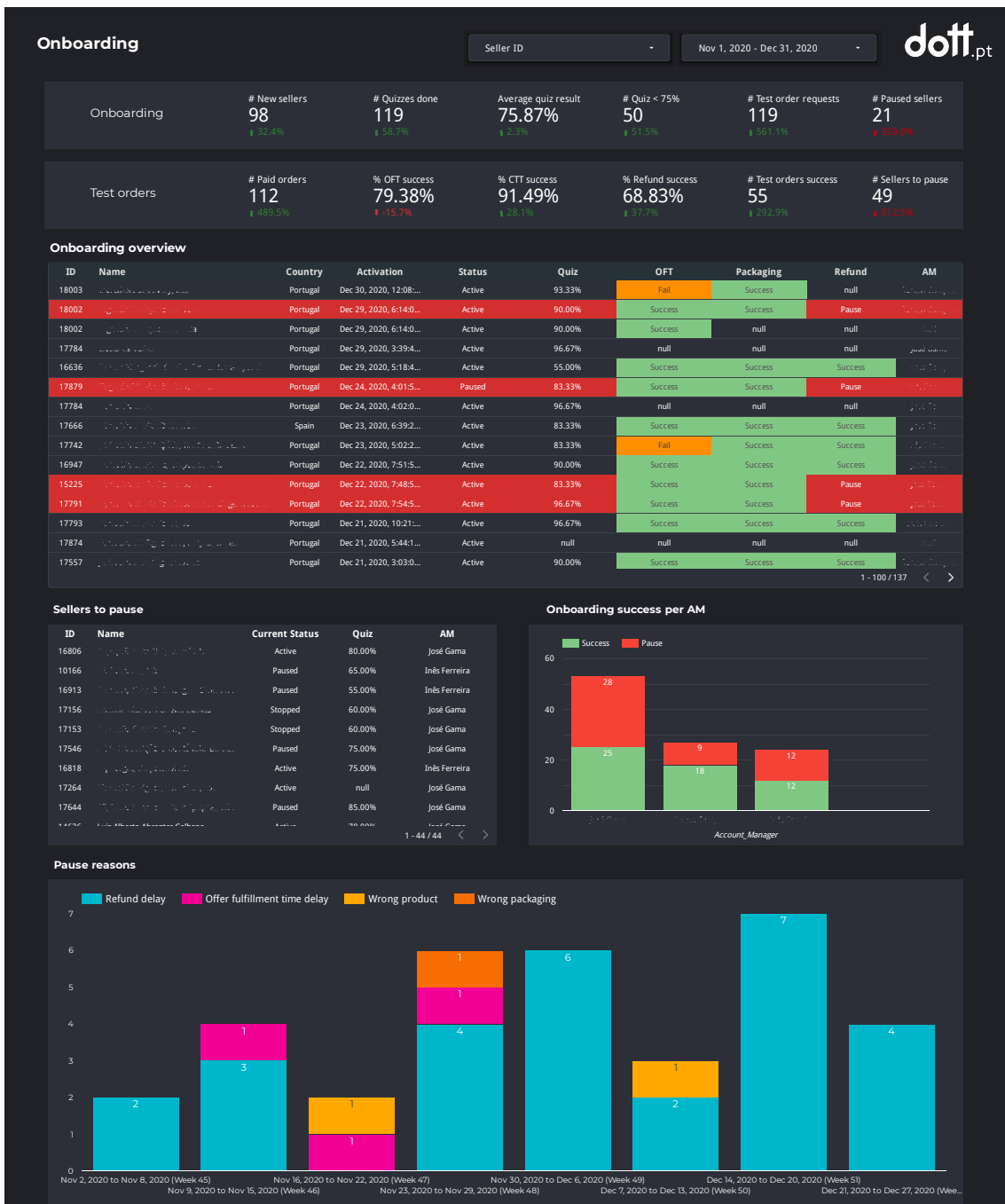


Figure B.1: Operational onboarding dashboard (1/2)

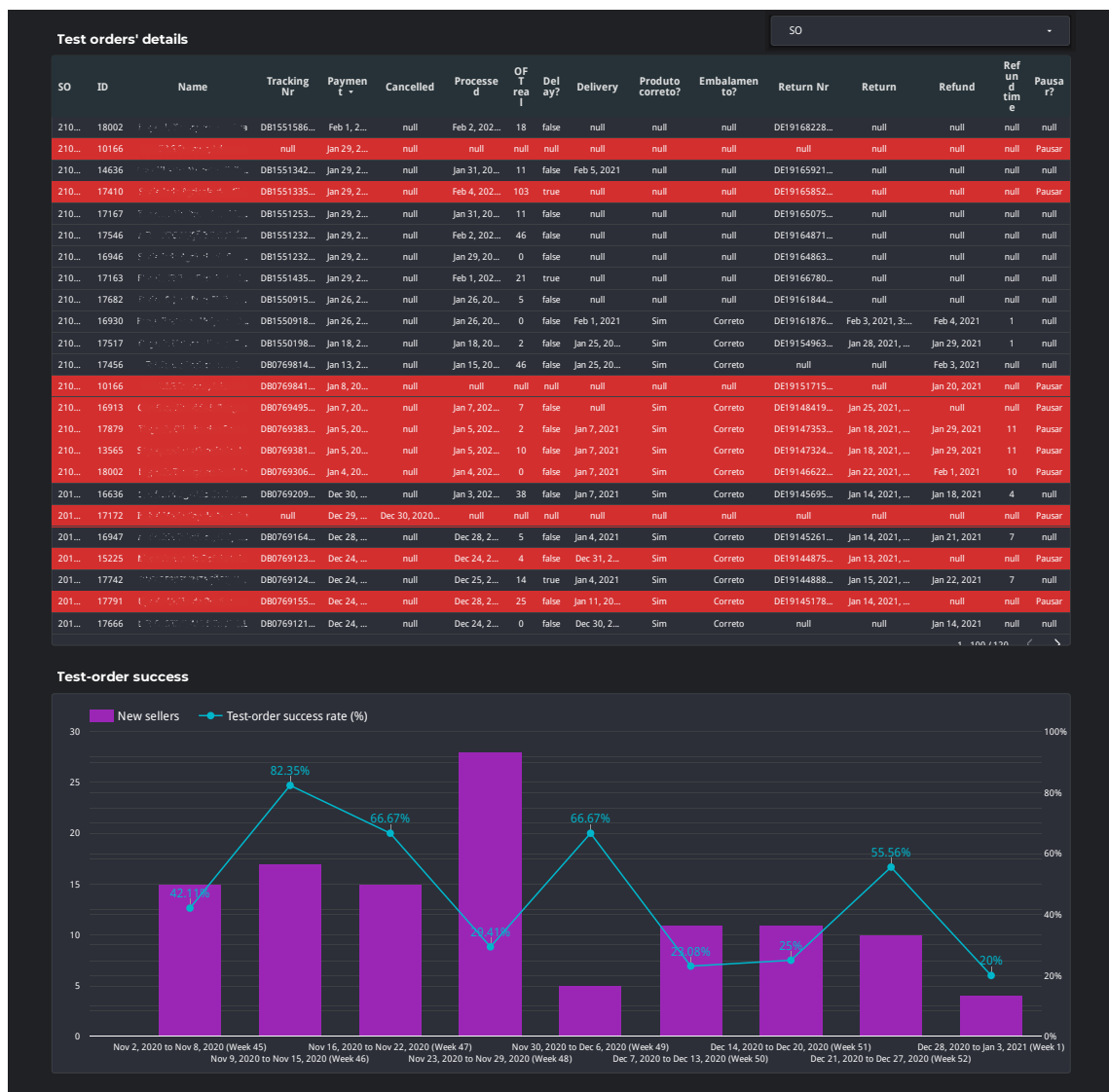


Figure B.2: Operational onboarding dashboard (2/2)

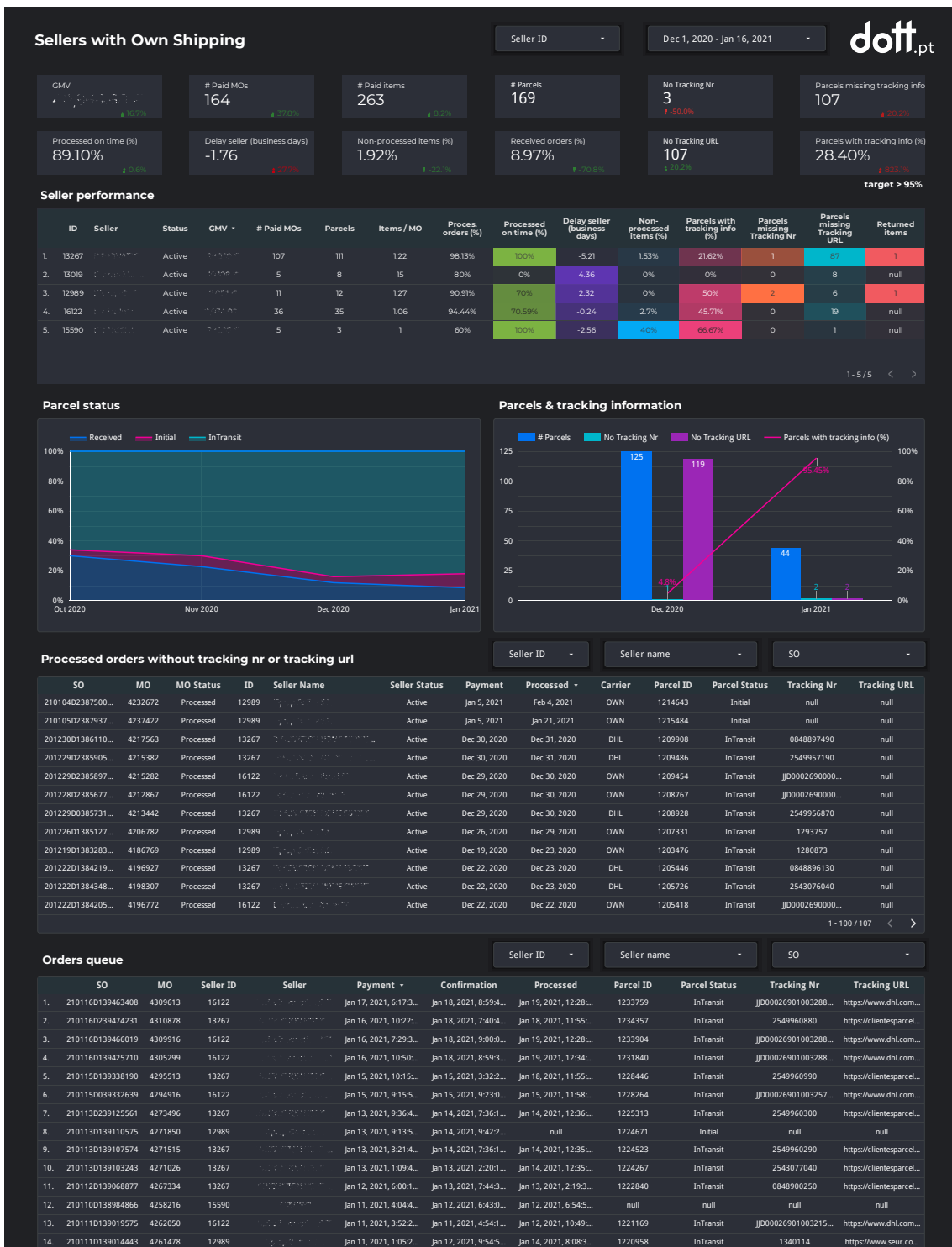


Figure B.3: Sellers' with own shipping dashboard (1/2)

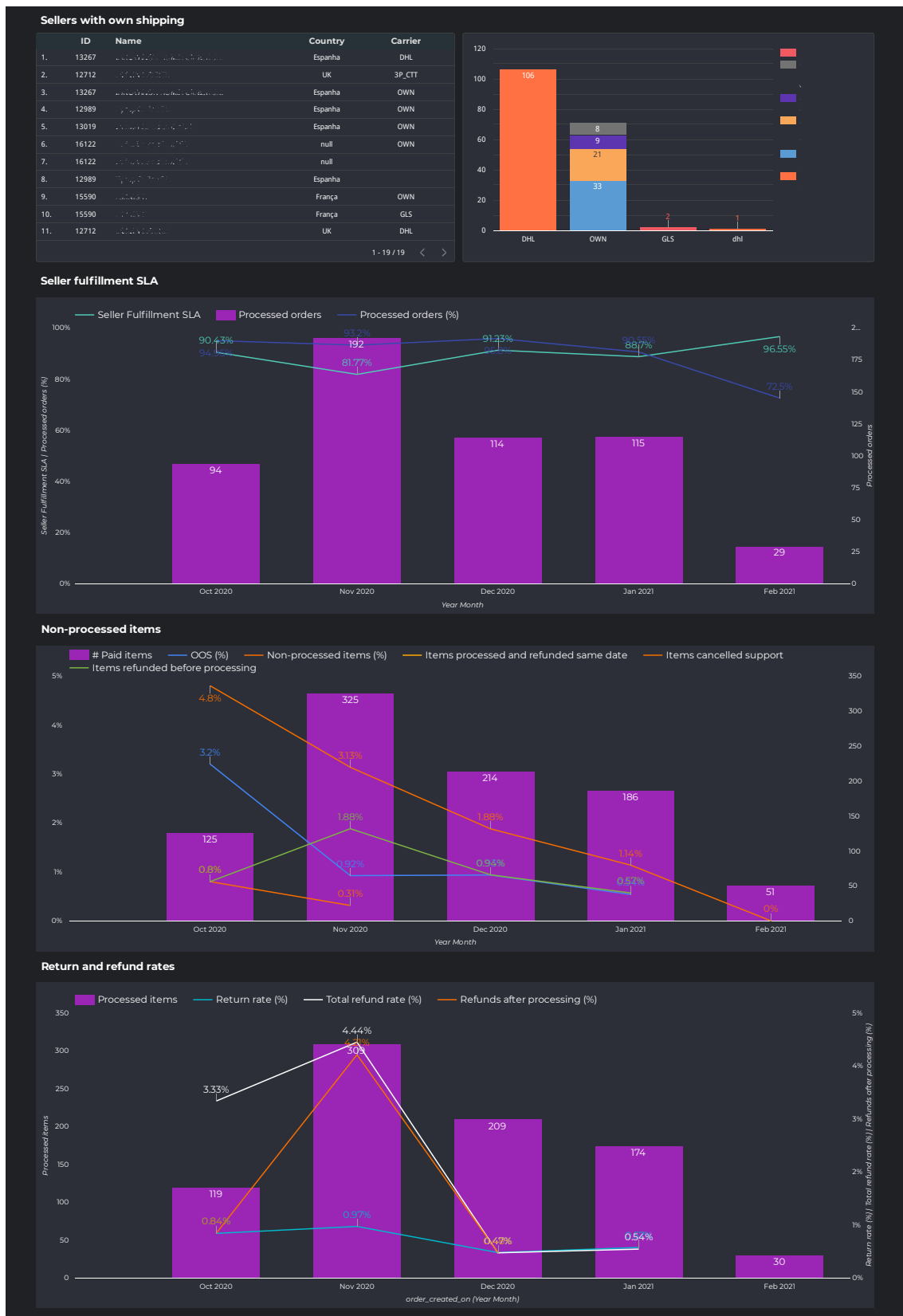


Figure B.4: Sellers' with own shipping dashboard (2/2)

Appendix C

Seller performance score

Seller Performance Score														
		KPI	Processed on time (%)	Non-processed items (%)	SCRR (%)	Support 24H SLA (%)	Detractors (%)	Rating						
		weight	0.2	0.4	0.15	0.05	0.1	0.1						
ID	Name	Status	# Paid MOs	Processed on time (%)	Non-processed items (%)	Returned items	SCRR (%)	# NPS	Detractors (%)	Outbounds	Support 24H SLA	# Reviews	Rating	Score
13892	Seller 1	Active	10457	96.07%	2.46%	548	0.51%	583	11.15%	144	59.09%	574	4.83	94.65%
11175	Seller 2	Active	9771	88.14%	7.99%	1449	3.18%	725	21.79%	598	73.97%	474	4.61	89.70%
11862	Seller 3	Active	9502	92.30%	2.74%	543	0.48%	680	13.97%	245	72.81%	628	4.65	93.84%
11484	Seller 4	Active	9088	67.01%	9.50%	1635	0.87%	932	40.34%	1549	55.59%	702	4.10	81.42%
9995	Seller 5	Active	7437	63.84%	2.44%	284	0.52%	572	13.29%	105	87.64%	496	4.84	99.46%
10131	Seller 6	Active	5837	53.55%	6.94%	201	0.51%	448	15.63%	105	61.18%	291	4.82	93.99%
11683	Seller 7	Active	5768	74.23%	0.22%	435	1.72%	346	17.34%	111	63.27%	275	4.72	90.14%
10132	Seller 8	Active	5451	91.88%	3.06%	630	0.52%	618	24.76%	625	72.34%	469	4.23	91.63%
10741	Seller 9	Active	4881	96.02%	1.78%	742	7.11%	324	28.70%	357	59.43%	238	4.58	91.66%
10202	Seller 10	Active	4671	90.62%	0.40%	348	1.85%	361	14.13%	79	87.50%	215	4.62	95.29%
10423	Seller 11	Active	4397	85.57%	3.56%	194	0.65%	402	12.94%	51	68.75%	336	4.83	92.39%
11742	Seller 12	Active	4275	87.68%	1.35%	123	0.05%	296	13.51%	39	97.22%	254	4.90	95.30%
12043	Seller 13	Active	4108	78.85%	8.87%	237	1.64%	323	24.77%	288	59.54%	242	4.69	86.86%
10676	Seller 14	Active	4073	66.72%	0.35%	196	0.97%	271	14.76%	136	75.00%	227	4.87	90.06%
14360	Seller 15	Active	3769	87.89%	7.58%	278	3.34%	302	19.21%	120	82.30%	150	4.87	90.98%
9991	Seller 16	Active	3769	84.08%	5.70%	359	1.30%	258	27.13%	137	88.28%	147	4.57	90.19%
11749	Seller 17	Active	3668	70.10%	17.25%	303	1.67%	273	30.04%	161	55.63%	175	4.61	80.86%
11929	Seller 18	Paused	3550	52.87%	8.69%	389	1.83%	259	22.78%	203	60.39%	162	4.42	81.41%
9881	Seller 19	Active	3321	66.11%	1.57%	297	0.55%	241	21.16%	132	52.63%	132	4.65	87.32%
11636	Seller 20	Active	3293	89.45%	1.24%	256	0.40%	202	12.87%	55	69.57%	205	4.73	93.97%
10360	Seller 21	Active	2946	85.32%	1.94%	110	0.37%	228	11.94%	47	62.50%	197	4.69	92.54%
11433	Seller 22	Active	2914	67.18%	14.80%	169	2.11%	257	24.51%	224	74.08%	234	4.64	86.72%
10181	Seller 23	Active	2749	92.74%	12.42%	173	0.30%	188	13.83%	51	86.05%	130	4.81	91.07%
9826	Seller 24	Active	2733	99.85%	4.85%	469	1.49%	186	17.20%	33	80.00%	168	4.89	94.86%
11146	Seller 25	Active	2571	92.98%	1.13%	126	1.77%	179	14.53%	80	66.18%	129	4.78	94.30%
13871	Seller 26	Paused	2472	99.63%	0.46%	210	0.45%	188	17.02%	64	55.17%	108	4.75	95.23%
10172	Seller 27	Active	2467	89.09%	2.90%	295	1.20%	208	12.50%	128	62.73%	123	4.84	93.05%
11678	Seller 28	Active	2299	87.13%	0.07%	205	1.49%	165	16.36%	56	82.00%	100	4.77	94.18%
12925	Seller 29	Active	2278	99.78%	1.06%	348	0.98%	129	29.46%	174	67.70%	64	4.67	94.15%
13462	Seller 30	Active	2233	98.02%	2.07%	268	0.71%	142	17.61%	104	60.53%	123	4.81	94.56%
14499	Seller 31	Active	2163	77.35%	8.13%	103	0.99%	108	23.15%	70	33.33%	32	4.85	86.12%
13709	Seller 32	Active	2148	99.20%	4.65%	79	0.08%	123	15.45%	24	47.37%	102	4.81	93.42%
14234	Seller 33	Active	2113	91.47%	8.37%	75	0.45%	101	20.79%	54	17.39%	47	4.82	88.30%
9912	Seller 34	Active	2093	84.09%	0.06%	111	0.11%	131	12.21%	8	97.14%	101	4.92	93.25%
9971	Seller 35	Active	2081	99.13%	1.45%	75	0.44%	145	13.10%	28	76.00%	151	4.85	96.77%
10212	Seller 37	Active	2006	97.10%	2.19%	447	0.53%	231	33.33%	116	69.97%	175	4.40	92.22%
16025	Seller 39	Active	1992	67.00%	0.00%	67	0.00%	268	11.57%	21	52.63%	26	4.83	87.53%
11642	Seller 40	Active	1944	84.63%	0.45%	67	0.33%	143	14.69%	22	61.54%	141	4.90	93.11%
10679	Seller 41	Paused	1857	44.86%	23.58%	185	0.30%	141	36.17%	110	40.66%	132	4.76	72.43%
13974	Seller 42	Active	1839	89.73%	0.28%	77	1.98%	97	14.43%	36	72.41%	76	4.97	94.65%
13654	Seller 43	Stopped	1831	95.06%	3.56%	205	3.59%	111	23.42%	84	69.74%	50	4.39	91.97%
10669	Seller 45	Active	1793	89.15%	5.92%	188	3.19%	142	23.94%	99	71.91%	65	4.68	90.54%
10173	Seller 46	Active	1749	85.65%	0.50%	238	1.44%	105	19.05%	29	84.62%	69	4.32	92.68%
12607	Seller 47	Active	1742	87.77%	0.31%	188	0.50%	89	7.87%	35	51.72%	95	4.60	93.36%
11934	Seller 48	Active	1640	96.31%	3.71%	302	1.23%	105	23.81%	50	60.00%	72	4.90	93.02%
12990	Seller 49	Paused	1618	99.94%	0.95%	46	0.33%	134	19.40%	2	100.00%	19	4.88	97.39%
12759	Seller 50	Active	1578	81.84%	6.57%	316	3.32%	146	46.58%	277	67.53%	84	3.97	84.91%
12980	Seller 51	Paused	1577	48.88%	19.78%	32	0.32%	108	16.67%	19	42.86%	106	4.85	76.98%
10411	Seller 52	Paused	1567	54.82%	10.99%	89	0.35%	201	22.89%	81	88.06%	140	4.70	93.04%
10123	Seller 53	Active	1533	71.25%	1.92%	181	2.39%	154	19.48%	108	71.63%	94	4.58	88.89%
11932	Seller 54	Paused	1505	83.99%	4.46%	798	2.99%	133	26.32%	63	83.43%	112	4.43	89.98%
15372	Seller 55	Active	1505	94.37%	16.74%	199	3.41%	124	31.45%	90	37.04%	8	4.78	84.94%
13742	Seller 56	Active	1438	89.80%	1.40%	112	4.30%	77	24.68%	80	97.44%	12	4.60	93.35%
9867	Seller 57	Active	1412	70.67%	4.32%	107	0.74%	119	17.80%	9	88.89%	90	4.85	89.65%
12148	Seller 58	Active	1320	89.94%	3.89%	61	0.29%	69	18.84%	30	82.14%	64	4.89	93.39%
12672	Seller 59	Active	1304	99.23%	0.28%	44	0.99%	102	12.75%	30	96.00%	64	4.91	97.94%
13578	Seller 60	Active	1238	97.61%	1.43%	30	0.13%	49	12.24%	4	50.00%	28	4.70	94.59%
12811	Seller 61	Paused	1138	78.58%	5.40%	127	1.67%	87	16.09%	42	52.78%	117	4.70	88.74%
10322	Seller 62	Active	1138	38.57%	26.45%	34	0.71%	100	20.00%	45	90.00%	79	4.76	74.05%
12754	Seller 63	Active	1108	97.51%	1.69%	47	1.39%	69	8.70%	21	65.00%	46	4.47	94.93%
12646	Seller 64	Active	1065	55.42%	12.65%	114	2.74%	98	22.45%	71	54.90%	49	4.53	80.17%
13749	Seller 65	Active	1062	94.10%	1.41%	94	1.12%	56	19.64%	37	66.67%	85	4.68	93.81%
11900	Seller 66	Active	1056	46.15%	7.30%	105	3.77%	78	32.05%	56	60.00%	55	4.20	78.93%
10292	Seller 67	Paused	1012	94.66%	3.80%	116	1.92%	92	18.29%	13	88.33%	69	4.35	87.50%
12191	Seller 68	Paused	968	88.70%	19.32%	95	0.73%	103	27.18%	78	85.33%	48	4.47	79.40%
13426	Seller 69	Active	976	68.92%	1.69%	66	0.94%	72	19.44%	22	70.00%	38	4.48	92.49%
13256	Seller 70	Active	929	44.90%	0.32%	50	0.06%	57	19.30%	3	100.00%	51	4.58	86.07%
12874	Seller 71	Active	924	90.68%	0.86%	52	0.87%	50	22.00%	14	50.00%	31	4.44	91.85%
13168	Seller 73	Active	904	80.80%	0.56%	62	2.97%	56	12.50%	15	84.62%	73	4.68	92.84%
13719	Seller 74	Active	900	97.49%	1.03%	115	0.00%	76	23.88%	10	50.00%	64	4.88	93.98%
11804	Seller 75	Active	887	63.24%	6.99%	69	3.60%	63	20.63%	64	68.09%	63	4.79	85.23%
10673	Seller 76	Active	876	95.54%	5.13%	37	1.67%	56	19.64%	13	75.00%	11	4.94	93.48%
9857	Seller 78	Active	870	24.79%	4.24%	20	0.38%	46	15.22%	16	54.55%	58	4.91	79.23%
12688	Seller 80	Active	854	99.52%	1.77%	46	1.17%	44	15.91%	16	57.14%	30	4.60	94.48%
12675	Seller 82	Active	842	95.04%	4.10%	57	3.29%	58	20.69%	36	56.25%	39	4.79	92.19%
13897	Seller 83	Active	820	99.76%	0.07%	9	0.00%	49	16.33%	2	0.00%	60	4.55	92.40%
11928	Seller 84	Active	791	92.58%	0.69%	31	0.91%	56	7.14%	11	60.00%	25	5.00	95.39%
9662	Seller 85	Active	790	25.40%	3.99%	60	1.59%	52	15.38%	26	77.27%	54	4.98	90.53%
11170	Seller 89	Active	756	72.23%	0.24%	29	0.00%	53	18.97%	33	35.48%	45	4.92	89.07%
11646	Seller 90	Active	752	81.96%	3.46%	120	6.45%	65	15.38%	100	45.45%	38	4.61	88.99%
11476	Seller 91	Active	741	98.89%	3.22%	35	0.00%	62	9.68%	17	40.00%	47	4.57	93.66%
12815	Seller 92	Active	726	96.13%	0.11%	32	0.76%	42	16.67%	9	88.89%	18	4.91	96.66%
12932	Seller 93	Active	726	87.74%	8.22%	56	1.19%	49	6.12%	52	77.08%	24	4.89	92.10%
10161	Seller 95	Stopped	704	62.44%	8.85%	49	0.88%	56	17.86%	12	60.00%	39	4.82	84.68%
13220	Seller 96	Active	681	99.85%	0.80%	21	0.00%	52	11.54%	5	25.00%	58	4.96	94.67%