



UNIVERSIDADE CATÓLICA PORTUGUESA

# How to Reduce Stockouts in an e-Marketplace Business Model?

A Case Study of Mercado

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Católica Porto Business School

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# How to Reduce Stockouts in an e-Marketplace Business Model?

## A Case Study of Mercadoão

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presented to Universidade Católica Portuguesa  
in order to obtain the master's degree in Marketing

by

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under the guidance of  
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# Resumo

Os retalhistas têm sentido dificuldade em encontrar estratégias eficazes para reduzir os impactos negativos que a ocorrência de ruturas de stock tem nos seus clientes e no próprio negócio. As ruturas de stock referem-se à inexistência de produto nos pontos de venda e estudos anteriores revelaram importantes impactos das ruturas, tais como a insatisfação dos clientes e a perda de vendas, respetivamente, assim como métodos relevantes para prevenir ou mitigar os efeitos. No entanto, ao contrário dos retalhistas, os operadores de e-marketplaces não possuem os dados de inventário das lojas parceiras e a literatura carece de pesquisa sobre como estes modelos de negócio podem implementar estratégias de redução das suas ruturas e respetivos efeitos.

Esta dissertação foi realizada sob a forma de estágio curricular no Mercado, um e-marketplace da empresa Fonte Online. Assim, esta investigação teve como particular objetivo identificar as atuais estratégias implementadas pelo Mercado para reduzir as ruturas do seu parceiro mais significativo – o Pingo Doce – bem como perceber que medidas complementares podem vir a ser utilizadas para minimizar as percentagens de rutura, assim como reduzir as reações negativas dos clientes face à ocorrência de ruturas de stock nas suas encomendas.

Para atingir esse objetivo, adotamos a metodologia de estudo de caso e os dados foram recolhidos por meio de observação participante e análise de dados secundários. Os resultados sugeriram que o e-marketplace atualmente implementa métodos de redução de ruturas, tais como reuniões diárias, interações com o Pingo Doce, utilização de canais para comunicação de ruturas (WhatsApp) e a Política de Substituição, que é uma estratégia relevante e útil para salvaguardar os interesses financeiros do e-marketplace, pois reduz a percentagem de vendas perdidas.

Além disso, esta pesquisa também sugere que a estratégia preventiva de comunicar de forma transparente os produtos sem stock no site antes da submissão da encomenda, pode influenciar positivamente as reações dos clientes face a este inconveniente, uma vez que reduz a perceção de perda. Por último, foram feitas outras recomendações para abordar algumas dificuldades específicas deste e-marketplace.

Palavras-chave: Raturas de Stock; E-marketplaces; Estratégias preventivas; Estratégias mitigadoras; Mercadão; Pingo Doce

Contagem de palavras: 8948 palavras



# Abstract

Retailers have long been struggling to find effective strategies to reduce their stockout rates as well as the negative impacts of stockouts on their customers and on the business itself. Stockouts refer to products being unavailable at the point of purchase and previous studies have disclosed important stockout impacts, such as customer dissatisfaction and lost sales, respectively, and relevant methods to either prevent or mitigate customers' negative reactions to stockouts. However, unlike retailers, e-marketplace' operators do not own the partner stores' inventory data and the literature lacks research on how these business models can reduce their stockout rates.

This dissertation was carried under the form of a curricular internship at Mercado, an e-marketplace owned by Fonte Online. Therefore, this research had the particular objective of identifying the current strategies implemented by Mercado to reduce their most significant partner's stockout rates – Pingo Doce's – along with understanding what complementary measures can be employed to minimize stockout rates, as well as the measures to prevent or mitigate the negative customer reactions towards the occurrence of stockouts in their orders.

To accomplish this goal, we adopted a case study methodology and data was collected through participant observation and secondary data analysis. Results suggested that the e-marketplace currently employs stockout reduction strategies, such as daily meetings, Pingo Doce's instructions, the use of communication channels (WhatsApp) for reporting stockouts, and the Substitution Policy, which is a relevant and useful strategy to safeguard the e-marketplace's financial interests, as it reduces the percentage of lost sales.

Furthermore, this research also suggests that the preventive strategy of communicating stockouts transparently on the website before the order's

submission, can positively influence customers' reactions to these events, as it decreases the loss perception. Finally, further recommendations were made to address specific difficulties of this e-marketplace.

Keywords: Stockouts; E-marketplaces; Preventive Strategies; Mitigating Strategies; Mercadão; Pingo Doce

Word count: 8948 words



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# Introduction

This dissertation represents the final stage of the master's degree in Marketing from Católica Porto Business School. It was written and developed under the organizational context, in the form of a six-month curricular internship at Mercado, an e-marketplace owned by the company Fonte Online. This internship involved two different areas, as the first four months were spent in the Content Management Department (learning about product assortment and catalogue management) and the last two months working directly on a project specifically related to the Mercado's current stockout challenges, with the e-marketplace's COO, Ricardo Monteiro, who attributed high concerns and motivation to address this topic in the e-marketplace.

Retail stockouts are a subject of growing interest to researchers and practitioners and after a period of sporadic research activity, significant contributions were published in the last decades which substantially extended the body of knowledge on this topic (Campo et al., 2004). However, the recent growth of e-commerce technologies has disrupted the traditional retail environment, leading to more consumers shopping online and while the manner in which consumers shop is changing rapidly, the related literature lacks an understanding of how consumers react to stockouts in an online shopping environment (Peinkofer et al., 2015). Additionally, brand loyalty in the grocery sector of retail is somewhat higher for online purchasing (Dawes & Nenycz-thiel, 2014), however, online grocery shopping is seen as complementary to buying in physical stores, rather than substitutive.

Stockouts have been commonly defined in the literature as the absence or unavailability of a product at the point of sale to respond to the customer's demand, either when there is no product in the store's inventory (neither on the

shelf, nor in the warehouse) or when there is no product in the backroom warehouse exclusively (Sanchez-Ruiz et al., 2018) and studies affirm that these incidents have had significant impacts both on retailers and consumers, as buyers have been reporting lost sales and production disruptions as a result from the stockouts (Dion & Banting, 1995) and consumers have been having adverse reactions to stockouts, impacting both current and future orders (Andersen et al., 2006). Thus, the occurrence of stockouts remains an unresolved problem for retailers as it incurs in serious revenue and image losses, as well as an accentuated customer dissatisfaction (Helm et al., 2013). Hence, a prevalent challenge for online retail supply chain managers is to maintain and manage adequate inventory levels to support and fulfil consumer orders and purchases. Regardless, this challenge is not only about maintaining inventory availability, but also about how to effectively disclose and communicate inventory availability, particularly if a stockout occurs (Peinkofer et al., 2016).

Mercadão, as an online marketplace and delivery agent, has put its efforts into managing the relationships with both customers and partner retailers, with the goal of simultaneously reducing its stockout rates as well as the negative effects stockouts have on the customers and on the business itself. Therefore, the objective of this research is to identify the current strategies implemented by Mercadão to reduce stockout rates, conjecture the complementary measures that can be employed to minimize the stockout rates, and understand what measures from the literature can be applied to prevent or mitigate the negative customer reactions towards the occurrence of stockouts in their orders.

Furthermore, in this case study, we focus on Mercadão's most significant partner store, Pingo Doce, which conveys both the e-marketplace's highest revenues, but also the highest stockout rates. Moreover, as this investigation occurred in the form of a curricular internship, the scope of this research will

cover Mercado's stockout management activities between October 2021 and March 2022.

Hence, this thesis aimed to provide valuable practical insights on the potential effectiveness of current and alternative strategies to reduce stockout rates and of the possible strategies to prevent or mitigate the negative effects of stockouts on Mercado's customers.

This investigation also intended to address an important gap in the literature, as previous studies focus exclusively on stockout management challenges and strategies for retailers and e-retailers, but not for e-marketplaces. Thus, being Mercado an e-marketplace that works with other retailer stores, the business has little to no knowledge of the partners' inventory data and inventory management processes, therefore, this research aimed to additionally propose a new understanding of the challenges faced under the light of an e-marketplace business model.

Through a comprehensive literature review and a critical comparison with Mercado's case study, we intended to gain a better understanding and extract practical knowledge on how to improve Mercado's stockout management strategies and reduce its impacts on both the business and its customers. Thus, we sought to answer the following research questions:

RQ1: What strategies does Mercado currently implement to manage its stockout rates?

RQ2: What complementary strategies could Mercado implement in the future to reduce its stockout rates?

RQ3: What preventive or mitigating strategies could Mercado adopt to reduce the negative impacts of stockouts on its customers?

Lastly, this dissertation is divided into six chapters. In the first chapter, a brief presentation of the company Fonte Online takes place, as well as a presentation of Mercado (the e-marketplace owned by the company) and Glovo, the

company that recently became Mercadão's biggest shareholder. Then, in the second chapter, a literature review is conducted to gain relevant insight on the topic under examination. In the third chapter, the methodology used for this research is detailed. Next, in the fourth chapter, the case study of Mercadão is presented and, in the fifth chapter, the information gathered is discussed and compared with previous studies mentioned in the literature review. Finally, we conclude with the main takeaways of this investigation, address its limitations, and provide some guidelines for future research on the topic.



# Chapter 1 – The Organizational Environment

This research was conducted as an integrating part of a curricular internship at Fonte Online. Then, this chapter presents Fonte Online and Mercado, the e-marketplace owned by the company. Furthermore, the recent positioning of Glovo as Mercado's biggest shareholder is also detailed.

## 1.1. Mercado

Mercado is an online marketplace (see logotype in Figure 1) that was founded in 2018 by the entrepreneurs Gonçalo Soares da Costa (CEO) and Ricardo Monteiro (COO). Their aim is to turn Mercado into a highly competitive q-commerce (quick commerce) and e-commerce (electronic commerce) alternative for the Portuguese consumers. Mercado's value proposition is related with the convenience and time saving service offered to consumers, as well with the unique and customized service provided. Indeed, Mercado believes that a customer-centric business model is absolutely necessary in the post-pandemic period, as companies have to differentiate themselves and add value to consumers, going beyond quality or price (Soares da Costa, 2021).

Mercado works as an online shopping centre, where customers can simultaneously buy products from different online stores. At the moment, there are twelve active online stores, namely: Recheio, Ornimundo, Gleba, Control, LEV, Firmo, Phunk, Decathlon, FC Porto, Quinta do Saloio, Odisseias and Pingo Doce, being this last brand the responsible for the largest share of the company's revenue. Pingo Doce is a brand owned by the company Jerónimo Martins, an international group based in Portugal, that operates in the Food Distribution and Specialized Retail sectors (Jerónimo Martins, 2022). However, Pingo Doce is a

supermarket chain that, unlike Continente, Auchan or El Corte Inglés, does not have its own online store and delivery channel. Therefore, Mercadão is responsible for managing the Pingo Doce online store (even though Mercadão does not hold Pingo Doce's inventory data) and is also the brand's exclusive delivery partner. Moreover, at the moment, the closest competitors to Mercadão's business model are 360Hyper, Glovo and Uber Eats.

The prices Mercadão charges for each product are similar to those charged at the partner's physical store, although, some prices may be slightly lower or higher. However, even if the price in the partner's physical store changes, the customer will always pay the price he/she saw at the time of completion of the order. The only additional cost for the customer is the delivery fee applied to purchases lower than 100 euros. Plus, Mercadão currently delivers to more than sixty areas (Mercadão, 2022). Thus, brand's core value proposition is to ensure a short delivery window (buyers can receive their orders within two hours from their order submission on the website) with an extremely personalized service. For instance, for each order, one personal shopper is assigned to pick and deliver the products of the order, while maintaining an active communication with the customer.



**Figure 1:** Mercadão logotype

**Source:** Mercadão

## 1.2. Fonte Online

The e-marketplace is the most well-known venture owned by the company Fonte Online, which was founded in 2014, in Porto, Portugal, by the two Mercadão leaders and by Elísio Santos, whose current position in the company is as a board member. Fonte Online now employs over 150 employees and its mission is to generate innovative business models and singular value propositions that enrich consumers' lives. Moreover, besides Mercadão, the company's project portfolio includes Vinha (an online retail store specialized in Portuguese wines) and Cabazes.pt (an online retail store specialized in Portuguese baskets). The company focuses on creating and managing online businesses through excelling in web design, web development, business operations, marketing, and customer support. In addition, Fonte Online provides business consulting services to assist large and small enterprises throughout the creation, development, and management of their online businesses.

## 1.3. Glovo

In an attempt to strengthen its delivery activity in the Iberian Peninsula, Glovo (see logotype in Figure 2) became, in 2021, Mercadão's biggest shareholder and also acquired the Spanish company Lola Market (see logotype in Figure 3), a similar e-marketplace for grocery shopping, having, for example, Lidl, Carrefour, and Minipreço as partner stores (Sousa, 2021).

Moreover, Lola Market operates in Spain while Mercadão is exclusive to Portugal, but the two companies have a portfolio of more than 30 partners combined in both countries. However, both platforms maintain their respective

identities, operate independently of Glovo and are also under the leadership of Gonçalo Soares da Costa, CEO of Mercadão, as the objective is to replicate the success of Mercadão and Lola Market in all countries in which Glovo operates, initially expanding in Poland and Italy (Sousa, 2021).



**Figure 2:** Glovo logotype

**Source:** Glovo website



**Figure 3:** Lola Market logotype

**Source:** Lola Market website

# Chapter 2 – Literature Review

In this chapter, we review some relevant concepts regarding the impacts of stockouts either on the businesses themselves and on the consumers. Furthermore, we assess the strategies in the literature used to prevent and to mitigate the customer's negative responses to stockouts.

## 2.1. The negative effects of stockouts on businesses

Retailers have long been struggling with the inability to supply the items that customers demand, and when they demand them (Amorim et al., 2021) and according to Sanchez-Ruiz et al. (2018), even though the stockout rates have remained stable in the retail sector (5-10%), there are several factors that are behind stockouts and that can influence the frequency under which they occur, such as the category of the product, the product rotation, the retail format (whether they are convenience stores, supermarkets or hypermarkets), the day of the week or even the time of the day.

As a consequence of not meeting consumer's demand, retailers have been experiencing negative effects. For instance, customer service is negatively affected, causing financial losses to the retailer, customer dissatisfaction intensifies, and brand and/or store loyalty decreases (Sanchez-Ruiz et al., 2018).

As customers commonly receive orders where products have been substituted, where orders are only partially fulfilled, or where products have been removed from the order all together, upon these failures, the customers may change their future purchase behaviours by purchasing less frequently or making purchases of lower value. Regarding the impact of failure on future purchases, while failure has a minimal impact on churn, it actually severely

impacts both the time until the customers make the next purchase and the basket value of that purchase. Therefore, failures incur substantial costs to the online grocery retailer, not just through the loss of potential sales at the time of the failure, but also because of the impact on the customers' future purchases. In addition, with each failed product, a customer is increasingly likely to spend less on the next purchase and make that purchase later in time, and the combined effect is that failures have a substantial impact on the annual revenues per customer. Thus, these actions inevitably come to affect the retailer's brand loyalty, brand trust and, therefore, future sales (Amorim et al., 2021).

## 2.2. The negative effects of stockouts on consumers

In the physical store scenario, consumers are reported to notice, react, and respond to the presence of a stockout (Fitzsimons', 2000). Consumer reactions to stockouts may be influenced by several factors, such as personal commitment to the stockout option, store loyalty, or the perception of product uniqueness.

For instance, when consumers have a high personal commitment to the stockout option, they tend to react rather negatively to the stockout, reporting lower satisfaction with the decision process and showing a higher likelihood of switching stores on subsequent shopping trips, whereas when personal commitment to the stockout option is low, consumer response can actually be positive, as the stockout may decrease the difficulty of making a product selection (Fitzsimons', 2000).

Furthermore, the authors Zinn & Liu (2008), who studied the differences between the intended and the actual customer responses to stockouts, concluded that store loyal customers are likely to actually delay or quit the search in response to the stockout. Helm et al. (2013) add that store loyal customers will

excuse a unique and not recurrent stockout situation, but even though they may be less likely to switch stores, results show evidence of postponement or even cancellation. Moreover, store loyal customers are also less likely to follow-up on a stated intention of switching stores, and those who perceive an item as unique are more likely to follow-up on an intended behaviour to delay the purchase but less likely to follow-up on a stated intention to switch stores (Zinn & Liu, 2008).

Regarding the online retail environment, the occurrence of stockouts have had a persistent negative impact on consumers' assessment of both their overall online transactional experience and repurchase intentions (Dadzie & Winston, 2007). Regarding the impact on future purchases, stockouts are reported to severely impact both the time until the customer makes the next purchase and the basket value of that purchase and the authors Andersen et al. (2006) concluded that for each item in stockout, the customer is estimated to wait a quarter of a day longer for his/her next purchase, and this purchase has a basket value that is 0.7% smaller. The impact on future purchase behaviour does, however, depend on the type of product that fails to be delivered as well as on which customer experiences this failure. For instance, customers seem to be more tolerant towards failures for perishable products (Dadzie & Winston, 2007) and Peinkofer et al. (2015) concluded that customers are actually less dissatisfied when a price promoted product fails to be delivered than when a non-price promoted product does. Furthermore, other authors add that consumers infer product popularity and product uniqueness when the product is in stockout due to the perception of a high demand, however, as the perceived uniqueness of hedonic products increases, the customer's propensity to switch stores to purchase the products in stockout actually increases (Ezhil et al., 2021). Regarding the type of customer experiencing the stockout, customers with a more extended purchase history with a given retailer are reported to be less sensitive to failures than first-time shoppers (Amorim et al., 2021).

Thus, consumer response to inventory shortage is an important issue for e-vendors, mainly because of the high risk associated with the online environment such as the effects of abundant information access, the high service expectations of the online customers and the low switching costs (Dadzie & Winston, 2007). As stated in the literature, switching to competitor online stores is said to be greatly affected by the way shoppers encounter the non-available item (Gruen et al., 2021). For instance, based on the consumer thinking style and attribution theory, Ma et al. (2018) investigated why consumers react differently toward stockouts and concluded that analytic thinkers focus on the attributes of out-of-stock products and evaluate out-of-stock events more negatively than holistic thinkers. Furthermore, the strength of negative emotions also affects the consumer's stockout responses, meaning that buyers that experience more negative emotions are more likely to defect from the website (Gunness & Oppewal, 2020).

### 2.3. Strategies used by retailers to prevent customers' negative responses to stockouts

Considering the difficulty of measuring how stockouts affect both current and future demand, businesses have taken strategic approaches to prevent their customers negative responses to stockouts, namely through better inventory management policies (Patil & Divekar, 2014). However, alternative methods have also gained popularity among researchers.

Regarding the physical store' environment, according to Ezhil et al. (2021), retailers can influence the customer's behavioural outcomes by specifying the cause of the stockouts and, as a consequence, the customer's intention to spread a negative word of mouth decreases. Other authors also agree on the benefits of

explicitly signalling the temporary character of a stockout, for example, by leaving the shelf space of the stockout product empty (Campo et al., 2004). Moreover, information elaboration was also stated to positively improve the customer's evaluation of the stockout situation, especially by analytic thinkers (Ma et al., 2018).

In the online environment, the topic of inventory status disclosure has been gaining relevance in the literature as well, namely for online grocery retailers. For example, Breugelmans et al. (2005) concluded that making stockouts not immediately visible creates confusion and intensifies the consumer's loss experience, thereby reducing the tendency to buy in the category. Therefore, these findings indicate that online grocery retailers have an interest in pursuing open and transparent stockout policies. Moreover, terms such as "out-of-stock," "sold out," and "unavailable" are commonly used by retailers to communicate a product or brand stockout, and research demonstrated that, *ceteris paribus*, framing a product or brand stockout as "sold out" produces fewer negative product and website reactions than framing it as "out-of-stock" or "unavailable" (Peterson et al., 2020). In addition, the suggestion of a replacement product is said to facilitate the substitution decision and prevent the purchase cancellation, while also substantially increasing the suggested item's choice probability, yet this effect disappears when higher-priced items are suggested (Breugelmans et al., 2005).

## 2.4. Strategies used by retailers to mitigate customers' negative responses stockouts

Regarding the management of service failures such as stockouts in the physical retail environment, most research has focused on stockout preventive

mechanisms, whereas stockout mitigating, recovery or compensating mechanisms have been mostly overlooked (Dong et al., 2015).

In the online environment, authors argue that better a inventory management (preventive strategy) plays an important role in augmenting customer satisfaction levels, which in turn helps e-commerce companies in the long run (Patil & Divekar, 2014) but, according to Bhargava et al. (2006), stockout compensation methods improve market efficiency, increase the retailer's sales and profit, yields greater revenues, lower unit costs, and increases consumer surplus and market coverage and, compared to a backorder policy (placement of an order for the products that are temporarily out of stock) without compensation, a stockout compensation policy improves profits and social welfare.

Furthermore, still regarding the online environment, Andersen et al. (2006) evaluated the use of discounts as a mitigating strategy in the occurrence of a stockout and concluded that even though offering discounts to encourage customers to backorder rather than cancel their orders is widely used in practice, that was the least profitable scenario for the online retailers. However, research conducted about the online apparel sector showed that financial compensation, as a mitigating method, was actually the most effective strategy to compensate and soften the stockout impacts on the customers (Kim & Lennon, 2011).

Moreover, since customers frequently receive orders where products have been substituted, orders are only partially fulfilled, or products have been removed from the order completely, and Amorim et al. (2021) concluded that customers may change their future purchase behaviours either by purchasing less frequently or by making purchases of lower value. However, even though partial fulfilment and substitutions help the retailer control lost sales at the moment of purchase, it also negatively impacts the customer's future purchase behaviour. In addition, substitution has even a larger negative impact on future

purchase behaviour than partial fulfilment does. Nevertheless, the authors suggest that this small difference is offset by the larger cost of lost sales associated with not substituting (Amorim et al., 2021). Thus, according to the authors, these results support the idea that retailers should keep improving their substitution policies and processes while proactively avoiding them.

## Chapter 3 – Methodology

This dissertation was developed in an organizational context, during a six-month internship at Fonte Online (the company responsible for the management of the e-marketplace Mercado) and the main goal of this research was to answer the following research questions – “What strategies does Mercado currently implement to manage its stockout rates?”, “What complementary strategies could Mercado implement in the future to reduce its stockout rates?” and “What preventive or mitigating strategies could Mercado adopt to reduce the negative impacts of stockouts on its customers?”.

Therefore, we considered that the research approach that best served the objectives of this study was a descriptive qualitative approach, more specifically, a single case study (Yin, 2009), once the aim was to gain in-depth knowledge about one particular case, as well as to allow multi-faceted explorations of complex issues in their real-life settings (Crowe et al., 2011). Since our intention was to explore under-researched problems in the company, and also generate new ideas, strategies or even solutions that could be implemented in the near future, the case study approach revealed to be an appropriate methodology. Indeed, case studies are very advantageous to provide information for decision making or to discover causal links in settings where cause-and-effect relationships are complicated and not readily known (deMarrais & Lapan, 2003). Moreover, since case studies are usually developed over a relatively short period of time, from a few weeks to a year, it appears to be a useful and appropriate approach for this research.

A case study research design usually includes qualitative data collection methods, allowing researchers to obtain original knowledge and insights from multiple sources of information, usually through survey data, interviews with

supervisors and/or observation of day-to-day activities (Yin, 2009). In this research, we used two qualitative data collection methods, namely participant observation (mostly through the active presence in meetings with the most relevant departments and accompanying Mercadão' personal shoppers throughout the entire picking, stockout encounters and delivery processes) and also secondary data analysis (company official records).

Finally, we chose the brand Pingo Doce (see brand's logotype in Figure 4) to analyse, due to the strong presence it has in the Mercadão platform. Indeed, this not only is the brand with the highest profitability for Mercadão, but also the one with the highest stockout rates from all the other e-marketplace partners. In addition, in this study, we focus on the stockout rates and impacts from October 2021 to March 2022, due to the internship duration.



**Figure 4:** Pingo Doce logotype

**Source:** Mercadão website

# Chapter 4 – Case Study

## 4.1. Introduction

Mercadão, like every other e-marketplace or online retailer, aims to guarantee a great customer service that ensures customer satisfaction and, of course, affects positively the customer's repurchase intentions. However, as an e-marketplace, Mercadão works simultaneously with several online stores that manage their own inventory operations, meaning that Mercadão has no knowledge or control over the existing inventory of each partner store and, in this specific case, Pingo Doce's. Therefore, it is challenging for Mercadão to predict when a product or a product category will be in stockout.

## 4.2. Mercadão' Processes

In this section, we present Mercadão's most relevant processes related to the stockout management operations. We describe the teams involved, the catalogue management and picking location attribution methods, what is a stockout in the context of this business and how the Substitution Policy and the refunds are applied, how the personal shopper's platform works, and how outdated images can often limit their agility in the stores.

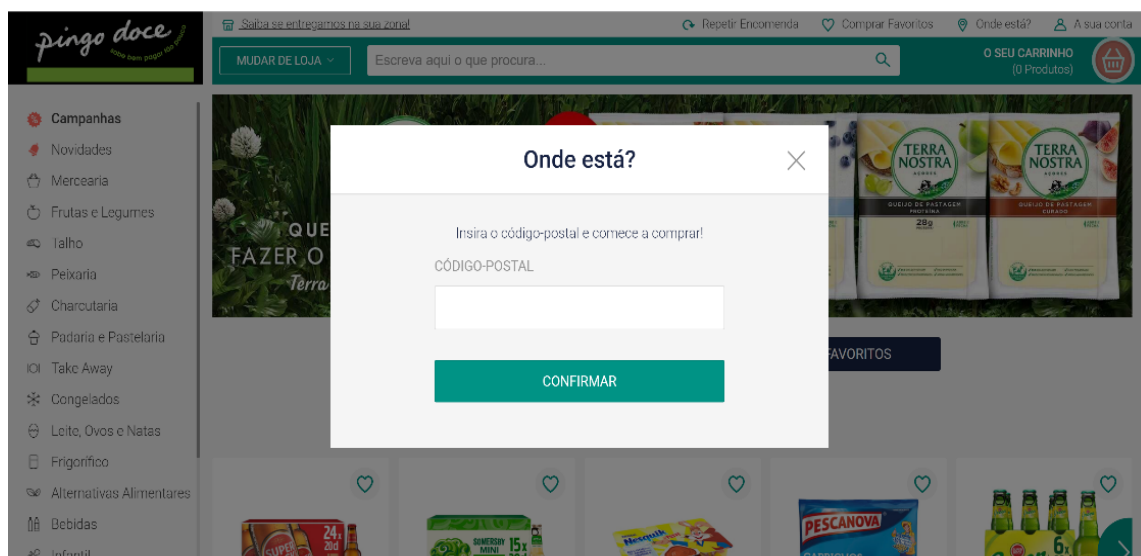
#### 4.2.1. The Teams

Throughout the internship, the people and the departments that were the most insightful for the development of this research were the Content Management Department, namely Alexandra Matos (Content Manager) and Diana Oliveira (Assortment Manager), who work closely with the Pingo Doce' Assortment Department in order to continuously update the Mercadão' website with new products, promotions, or product withdrawal from the website; the Operations Department, specifically, Mónica Pereira (Head of Content) and José Lobo (Operations Manager), who were in charge of controlling the processes from the Pingo Doce and Mercadão relations to the personal shoppers' management; and, finally, Ricardo Monteiro, the COO. Together, all these departments and people worked towards the reduction of Mercadão's stockout rates.

#### 4.2.2. Catalogue Management and Picking Location Attribution

Pingo Doce's products are added to the Mercadão website based on the list of products that the brand allows Mercadão to create, the "Retailer Products" list, sent weekly by Pingo Doce, which tells Mercadão which are the products that can be added to the website or, otherwise, which products should be removed from the website (due to discontinuation or more permanent inventory shortages). The Content Management team keeps active contact with Pingo Doce and updates, at least weekly, the website according to this list. In addition, created products can easily be turned either online or offline in the back-office, without the need to permanently eliminate any of these products in the system.

Moreover, Mercadão has its specific approach when it comes to managing which products are online and offline to each customer. When the customers sign up into their Mercadão account, they are required to insert their zip code (see Figure 5), which redirects them to the correspondent online catalogue associated to the nearest physical store to the customer's location, which will be where the personal shopper will pick the ordered products. Thus, the customers will be shopping in the correspondent online catalogue to that physical store. In addition, these catalogues are divided into four clusters, which correspond to the extent of products available in each physical Pingo Doce store, which are the "Hiper", the "Mega", the "Super" and the "Pequeno" catalogues. Therefore, the zip code that the customer inserts, will redirect the personal shopper to a specific "Picking Location" that, in theory, contains all the products contemplated in the corresponding online catalogue. Additionally, there are the Madeira and Açores catalogues. However, in this study, the focus will remain on the continental stockout issues.



**Figure 5:** Box where the customers insert their zip-code

**Source:** Mercadão website

### 4.2.3. Stockouts and the Substitution Policy

Stockouts occur when customers do not receive the products they have ordered on the Mercado's website.

Moreover, when customers place an order, they should previously define if they accept substitutions for possible out-of-stock products in their orders or if they want to receive a refund for the products they paid for and did not receive. On the one hand, if the customers choose to deactivate the policy, no product substitutions will be made, and the customers will be refunded later on. On the other hand, if they choose to activate the policy, and if there's a product in stockout, the personal shopper suggests a replacement product from a large list of alternative options for that specific product in their platform. Regardless, the personal shopper's platform limits the list of product substitutes to the correspondent online products of that specific store's catalogue and the personal shopper is therefore limited to choose either from the suggested list or search manually for a substitute product that is available for selection.

If the policy is activated, the personal shopper contacts the customers to inform of the order's eventual stockouts and questions the customers if they would like to replace the stockouts and, if so, by which products. If the policy is deactivated, the personal shopper contacts the customer to inform of the missing products, but cannot proceed with any replacements, since once the orders are submitted, it is no longer possible to change the status of the Substitution Policy. Plus, the customer is the only agent responsible for switching the status of the policy, thus, even if the customer wishes to make a replacement of a stockout product under a deactivated Substitution Policy, the personal shopper is not allowed to do so.

#### 4.2.4. The Shopper's Platform

When the customers submit their orders on the website, these orders are attributed to personal shoppers, according to their picking locations. The personal shoppers receive the orders in the platform and, as soon as they accept the order, they can begin the picking process. The products do not have to be picked in the exact order that they appear but, instead, they should be picked under a certain logic, for example, the heaviest products first, then house and bazar' products, then general groceries and, finally, all the fresh, frozen, and take-away products (to ensure temperature maintenance for as long as possible).

For each product that the personal shopper picks, he/she has to scan the product's EAN (European Article Number) and see if it matches the ordered one, check the product's expiration date, confirm the ordered quantities, and then stack it carefully in the shopping cart. If the ordered product is in stockout, the personal shopper proceeds with the Substitution Policy process, but only at the end of the picking stage, after gathering all the stockout products, so the customer is informed of the missing products and is asked about the possible replacements all at once. After picking all the products and taking care of all the replacements, the personal shopper initiates the delivery stage in the platform and, after delivering the order to the customer, the personal shopper declares the order as finished.

#### 4.2.5. Outdated Images

An additional inconvenience happens when a product's image is not updated. For instance, if Mercadão has a specific image for a product (which is the one shown to the personal shopper in the platform), and that product's brand has

renewed its image and Pingo Doce has not sent those images to Mercadoão to be updated on the website, the personal shopper may have difficulty in identifying that product, or even perceive it as a stockout. In addition, this also causes confusion to the customers since they expect a product with a certain image or label and are delivered a different one. However, there is a WhatsApp group where the personal shoppers gather the outdated product images and share with the Content Management team the updated ones that they found at the store, so they can contact Pingo Doce and ask them to send Mercadoão the new images. Nevertheless, this communication channel often gets too crowded and vital information gets lost. On the other hand, it also may happen that the personal shoppers may not do an effort to collaborate, since they have no incentive to do so nor are they paid extra to do these reports.

### 4.3. The Metrics and the effects on the business

As stated before, Pingo Doce is the Mercadoão's partner that represents both the e-marketplace's highest revenues and the highest stockout rates. Primarily, it is necessary and important to understand the three most relevant metrics used by Mercadoão to measure and assess the impact of stockouts (derived from the Pingo Doce online store) on the business. Those metrics include Gross Stockout (%), Net Stockout (%) and Lost Sales (%). Gross Stockout (%), represents the percentage of ordered products that were not delivered (partial stockouts are not considered). This is a gross measure, as it ignores the substitutions made to compensate the stockouts. Net Stockout (%) represents the percentage of products that were not delivered, but with consideration of the substitutions made to replace the stockout products (not considering partial stockouts either). Finally, Lost Sales (%) represents the percentage of the price delivered over the

total original ordered price, being considered as the Net Stockout in value. In Table 1, we provide an example of a customer's order (registered in the back-office), that illustrates an order with total row fulfilments, partial row fulfilments, total stockouts and the execution of a full row substitution.

Row Nr	SKU	Product Desc	Ordered Qty	Delivered Qty	Original Total Price	Total Price	Notes
1	43218	Banana Importada - Unidade 0.2 Kg	3	1.8	2.97	1.78	
2	868788	Garraão de Água Pingo Doce	5	5	3.35	3.35	
3	48150	Leite UHT Meio Gordo Pingo Doce	6	0	2.88	0	
4	838456	Massa Esparguete Pingo Doce	4	0	2.2	0	
5	559259	Atum Posta em Azeite Pingo Doce	8	8	7.92	7.92	
6	10757	Esparguete Milaneza		4		3.4	As a replacement of row 4

**Table 1:** Example of an order with substitutions

**Source:** Mercadão

As we can see in Table 1, this customer's order included 5 different products (rows 1 to 5), and row 1 was in partial stockout, rows 3 and 4 were in total stockout, and 1 substitution was made to avoid the stockout of row 4 (row 6 as a replacement of row 4). As 2 of the products rows ordered were in stockout (from rows 3 and 4), to calculate the order's Gross Stockout (%), we divide the 2 products in stockout by the total products ordered, therefore, the Gross Stockout (%) =  $2/5 = 40\%$ . To calculate the order's Net Stockout (%), we consider the 2 products in stockout minus the replacement product ( $2-1 = 1$ ) and divide them by the total number of products rows ordered (5). Thus, the Net Stockout (%) =  $1/5 = 20\%$ . Finally, to calculate this order's Lost Sales (%), we subtract from 1 the order's total price divided by the order's original price, so this order's Lost Sales (%) equals  $1 - (\text{Order's Total Price}/\text{Order's Original Price}) = 1 - (16.5 - 19.3) = 14.8\%$ . Thus, the constraints induced by stockouts lead not only to loss of sales

both to Mercadoão and Pingo Doce, but also to customer dissatisfaction with the overall service provided.

#### 4.4. The causes behind stockouts

Through meetings with the COO, the Operations Department, the Content Management Department (also responsible for the product assortment), and a few personal shoppers, it was possible to identify some of the main causes that originate the stockouts. Moreover, it was also possible to distinguish the in-store issues from external issues that lead to stockouts.

##### 4.4.1. Pingo Doce' related causes

Regarding the in-store issues, which are related to any shortcoming or limitation performed directly by the Pingo Doce' staff or suppliers, they include the following aspects:

- 1) The product is available in the warehouse, but the shelves have not been restocked in time for the purchase by the personal shopper;
- 2) The product is unavailable in the warehouse;
- 3) The suppliers are late and do not deliver the stock in the foreseen period of time;
- 4) The demand surpassed the supply in an unpredictable manner and there is not sufficient stock to prevent stockouts.

#### 4.4.2. Mercadão and personal shoppers' related causes

Regarding the external stockout causes, that are related to the personal shoppers' handicaps, Mercadão's Substitution Policy, or system/back-office shortcomings, those causes include:

- 1) The product is available in the store, but the personal shopper cannot find it;
- 2) The personal shopper does not try to ask Pingo Doce' staff for help in order to find the product or to check its availability in the warehouse;
- 3) The personal shopper is not very experienced yet and has a low familiarity with the store' product locations;
- 4) The customer has their Substitution Policy disallowed, therefore, the personal shopper cannot proceed to avoid the net stockout, since it is not possible to change the policy's status after the order is submitted by the customer;
- 5) The customer is unaware of the Substitution Policy or lacks information regarding its benefits and has the policy deactivated unintentionally;
- 6) The customer intentionally chooses to disallow the Substitution Policy due to personal preferences or negative past experiences with the policy;
- 7) The personal shopper is not allowed by the system to suggest any other product from the physical store that is not in the correspondent online store catalogue (this can happen even if the product is created in the system, but is offline, or if the product is not created yet in the back office);
- 8) The products' images on the Mercadão's website are not updated and the personal shopper does not identify the product in the store.

## 4.5. Strategies used by Mercadão to reduce stockouts

To counter these challenges, the Operations and the Content Management teams work together to minimize future stockouts. Hence, there are three ongoing projects that aim to fulfil this purpose, which are presented below.

### 4.5.1. Daily Meetings

Every morning, the two departments analyse the stockouts of the previous day, detect patterns, and put offline the products that have been in stockout for a long time or, at least, have repeatedly been out of stock. In addition, the Assortment Manager further contacts the Pingo Doce assortment team to check if Mercadão can proceed with putting the products offline or not. Moreover, the manager checks with the Pingo Doce assortment team which products should be kept online and which should be removed from the website. This information is based on Pingo Doce (unshared) inventory data.

### 4.5.2. Pingo Doce' Instructions

Pingo Doce informs Mercadão whether there are discontinued products or brands or if there are any recurrent products in stockout in the physical stores (according to each catalogue cluster), or if there are any permanent inventory shortages that will consequently cause more stockout situations for Mercadão. Therefore, if Pingo Doce does not have sufficient stock to ensure supply in the physical stores, the brand will most certainly not be capable of supplying the extra online orders.

### 4.5.3. WhatsApp Groups

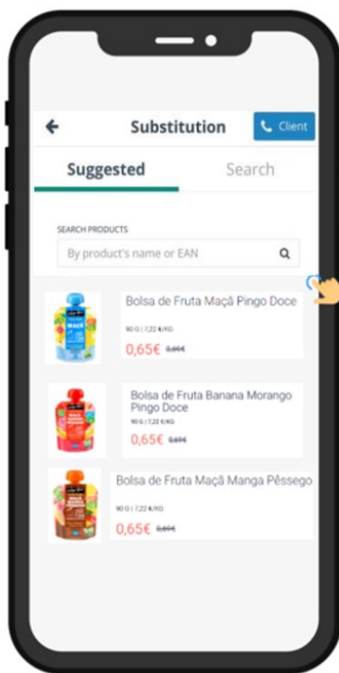
Additionally, the Content Management team shares a communication channel (WhatsApp groups) with several Personal shoppers that inform the team of stockouts in real-time, allowing the team to keep track of these stockouts and further question the Pingo Doce assortment team about the occurrences.

## 4.6. Strategies used by Mercadão to mitigate the negative impacts of stockouts on consumers and on the business

### 4.6.1. The Substitution Policy

Mercadão works with a Substitution Policy (which is optional to the customers, as they have the option to either activate or deactivate it on the website). An activated policy will prevent the growth of the Net Stockout rates and the percentage of Lost Sales but, most importantly, it will mitigate the impact of the stockout on the customers. In other words, substitutions alleviate the perception of the missing ordered items. The substitutions allow the personal shopper to, in face of a product stockout, replace the missing product by the equivalent ordered amount of a similar product from the “Suggested” products list or the personal shopper can search manually for a replacement product that does not appear on that list (see Figure 6). Anyway, the personal shopper must always contact the customers to inform them of the product (or products) in stockout and ask them which substitutions they would prefer, given the options in the physical store. However, the personal shopper cannot take any item of the

physical store, since they are only allowed to substitute a stockout for a product in the physical store that is also in the correspondent online store catalogue. Indeed, the personal shopper's platform does not show all the products created by Mercadão, but only the ones that correspond to that physical store online catalogue and the products that are actually online. Hence, the products that are offline cannot be considered by the personal shopper, even if they exist in the physical store.



**Figure 6:** Example of a product substitution in the personal shopper's platform

**Source:** Mercadão

#### 4.6.2. Refunds

On the other hand, in case the customers choose to deactivate their Substitution Policy, no substitutions will be made to replace the products in stockout at the physical store. Therefore, Mercadão can only proceed with compensating its customers by refunding them back with the value of the out-of-stock purchased products in their orders.

## 4.7. Case Study Conclusions

The strategies implemented by Mercadoão for stockout reduction may generate product instability on the website, as products are inconsistently online or offline. Moreover, as Mercadoão's customers are not notified of the stockouts in their orders until the actual moment when the personal shopper encounters the stockout, the customer expectations will not be fulfilled, and this might compromise future purchase intentions.

Even though the Substitution Policy plays a key role in delivering a replacement for the stockout products and transmitting a feeling of order completion, customers who are loyal to certain brands, are even more dissatisfied with these inconveniences. Furthermore, these procedures started to be implemented only in early November 2021, meaning that little or no action was taken regarding stockout occurrences until then.

As we can see below in Figure 7, the Pingo Doce's stockout rates were at their highest level in October 2021 and, even though measures were implemented in the beginning of November 2021, the rates increased gradually, due to events such as the "Black Friday" and Christmas season (when shopping is usually in mass and stockouts are more common). When these events ended, the stockout rates began to lower until February 2022, but they began rising once again until March 2022. Thus, we can conclude that the methods used have reached their full potential and are not enough to allow the e-marketplace to reduce nor stabilize the stockout rates.



**Figure 7:** Evolution of Gross and Net stockout rates from October 2021 to March 2022

**Source:** Mercado

## Chapter 5 – Discussion

Through the case study, we could identify the strategies that Mercadão follows in order to manage its stockout rates. Since Mercadão has no control over the Pingo Doce's inventory data, the e-marketplace is highly dependent on the brand's orientation on this matter.

Firstly, as stockout management and reduction strategies, the Content Management and Operations teams meet daily to analyse the previous day stockouts per catalogue' cluster and proceed with registering what products they consider that have alarming or consistent stockout numbers and, consequently, check with the Pingo Doce' assortment manager if they can effectively remove those products from the website (they are put offline). Secondly, Pingo Doce periodically informs and updates Mercadão on which products should be included or removed from the website, and this information based on Pingo Doce (unshared) inventory data. Thirdly, the Content Management team uses WhatsApp groups to maintain constant contact with the personal shoppers that report product stockouts in real-time. Finally, Mercadão uses a Substitution Policy to combat the stockout situations and deliver a replacement of the missing products to the customer, aiming for a decrease in the customer's sentiment of loss and compensation for the inconvenience caused, but also to recover the lost sales of the products that could not be charged to the customers due to being out-of-stock.

Mercadão's Substitution Policy works both as the e-marketplace's mechanism to recover the financial losses caused by the Gross Stockouts, as well as a mitigating mechanism when it comes to moderating the customers' negative reactions to product stockouts in their orders. Nevertheless, according to Amorim et al. (2021), orders where products have been substituted may lead the

customer into purchasing less frequently or making purchases of lower value in the future. Additionally, the authors also imply that partial order fulfilments have a less negative effect on the customer's reaction than substitutions have, even though substitutions help control the lost sales of the orders.

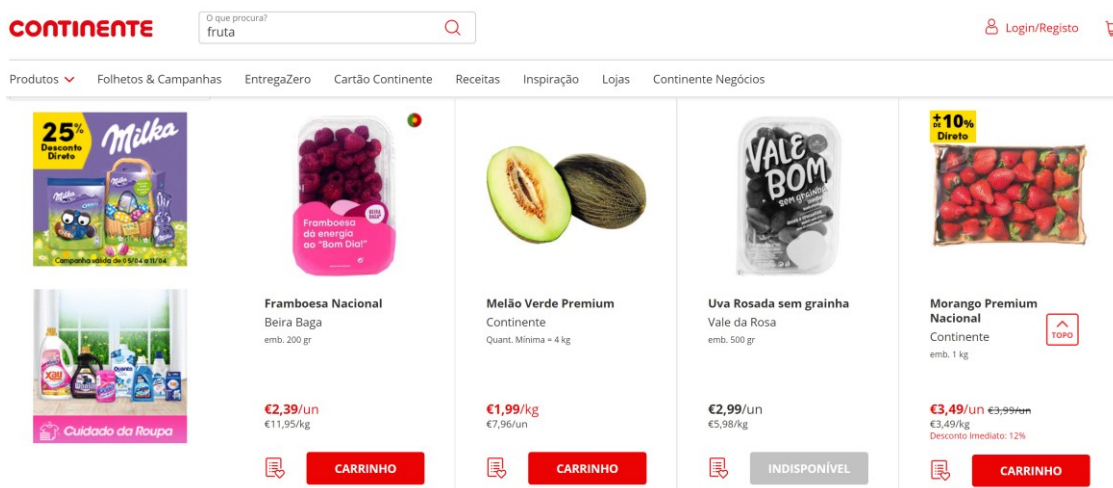
Furthermore, past research suggests financial compensation as a mitigating and reaction' softening method to refund the customers for the inconvenience (Kim & Lennon, 2011). However, other authors believe that this is the least profitable scenario (Andersen et al., 2006). Indeed, even though customers could be satisfied with the refund of the total value of the stockouts occurred in their orders, Mercadão does not obtain any benefits from this action as opposed to the benefits yielded by the Substitution Policy. Stockouts always contribute to the aggravation of the Gross Stockout rates but, at least, the Substitution Policy contributes to lower the Net Stockout rates, as well as the Lost Sales of the orders.

Moreover, besides the stockout mitigating strategies, none of the strategies mentioned in the literature meant to prevent the negative impact of stockouts on consumers are being implemented by the e-marketplace. For instance, many authors suggest that the disclosure and overall transparency in the communication of the products' stockout status can influence the customer's behavioural outcomes and situation assessment positively, implying that when stockouts are not immediately presented to the customers, this creates confusion and intensifies their loss experience and decreases their tendency of re-purchasing in the stockout product' category (Breugelmans et al., 2005; Campo et al., 2004; Ezhil et al., 2021; Peterson et al., 2020). Other benefits to this practice are related to a decrease in the customer's intention of spreading a negative word-of-mouth (Ezhil et al., 2021).

Although this measure could be beneficial, Mercadão has been apprehensive with the possibility of implementing it. Instead of simply removing products from the website by changing its status to "offline", (which leads the customers

into thinking that the product they are searching for is not commercialized by Mercadão), it could be an interesting alternative to show the customer the product availability on the website rather than the product disappearing completely or being constantly switching from online to offline – appearing and disappearing from the website.

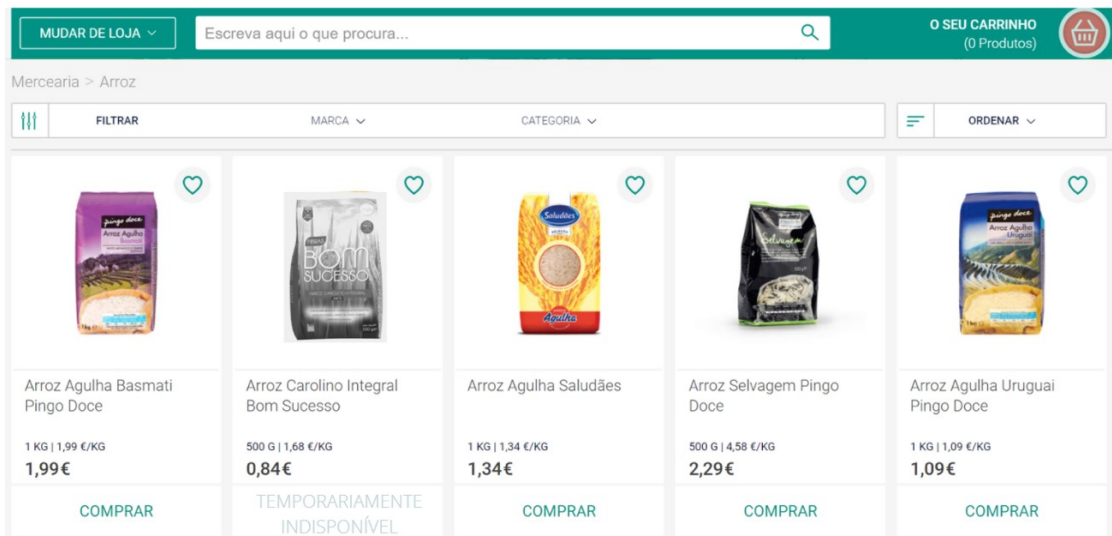
For instance, similarly to other online grocery stores, such as Continente Online, the products that have been put “offline” due to temporary stockout situations (see Figure 8), could remain visible on the website, but with the label “Temporarily Unavailable”, which could avoid the withdrawal from the e-marketplace.



**Figure 8:** Continente’s disclosure of out-of-stock products

**Source:** Continente website

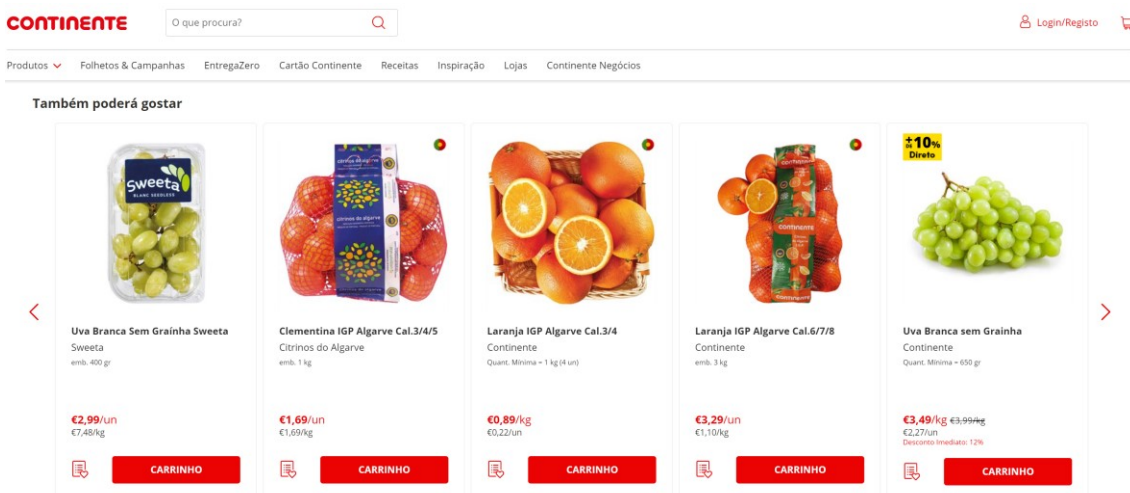
However, Peterson et al. (2020) suggest that, even though the most common terms used for communicating product or brand stockouts are, for example, “out-of-stock”, “sold out” or “unavailable”, the term “sold out” actually produces fewer negative reactions. Regardless, as these are written in the English language, an adaptation should be considered for the portuguese language (like Continente), as seen below in Figure 9.



**Figure 9:** Prototype of a stockout disclosure option on the website with the caption “Temporariamente Indisponível”

**Source:** Own elaboration

Furthermore, the suggestion of a replacement product could even facilitate the substitution decision while simultaneously reducing the order’s cancellation rate and increasing the suggested item’s choice probability (Breugelmans et al., 2005). The brand Continente, for instance, suggests product alternatives to the unavailable product. As seen in Figure 8, the product “Uva Rosada sem grainha” appears as “Indisponível” but, after clicking the item, the suggestions contemplated in Figure 10 appear.



**Figure 10:** Suggestion of product alternatives by the Continente brand

**Source:** Continente website

Besides the previously presented recommendations based on the literature, the case study allows for other relevant suggestions which will be discussed next.

In order to tackle some limitations in the platform, for instance, when the personal shopper is not allowed by the system to suggest any other product from the physical store that is not in the correspondent online store catalogue, the personal shopper should be allowed to choose any product ever-created in the back-office and make the product/product row substitution, regardless of whether it is online or not, or whether that substitute is contemplated in the corresponding online catalogue. Thus, if the product has been created before, when the personal shopper searches for it in the platform, it should appear for selection, despite its status (see Figure 11). Therefore, when the personal shoppers identify a suitable substitute in the store, they should be able to take it to the customer, unless the product has not been created before in the back-office. In that case, the personal shopper should contact Mercadão' Assortment Manager and notify them, so that the Assortment Manager can check in the "Retailer's Products" list if that product is listed for possible creation or, if it is not on that list, question Pingo Doce if they can create that product for the website. If the personal shopper has more options to proceed with the substitutions, this will also lead to a reduction of the Net Stockout rates.

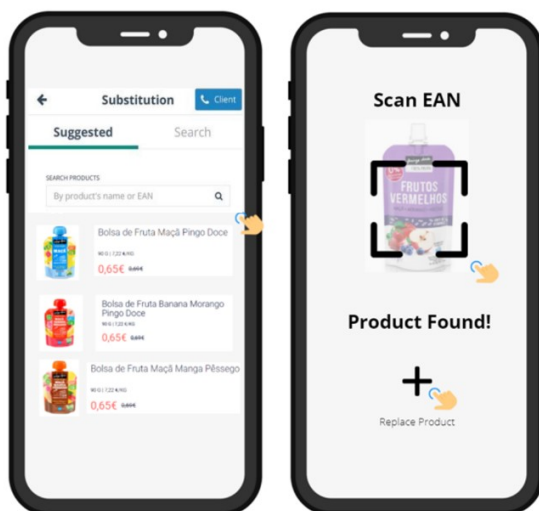


Figure 11: Prototype of a platform' feature modification

Source: Own elaboration

Furthermore, the case study has shown that customers are often unaware of the fundamental to increase customer knowledge about this policy. On the one hand, in order to keep the customers enlightened of what is the Substitution Policy, what are its benefits, updates or changes in the policy, the Marketing team should consistently create informative content about substitutions. To do so, the Marketing team should create awareness about this topic through Mercadão's social media' communication. Content related with the Substitution Policy should also be regularly published in Mercadão newsletter, and new customers might be targeted with SMS marketing content related to the policy. On the other hand, it is important that Mercadão understands the reasons that lead its customers to deactivate the Substitution Policy (since, by default, the policy is activated), the reasons for their eventual dissatisfaction with this policy, or even their recommendations for the improvements in the future. To accomplish the goals, Mercadão should develop a survey. Furthermore, the customers who deactivated the Substitution Policy could also receive an incentive to activate the policy, such as 3 or 6 months of free deliveries from any Mercadão store or other relevant benefits. Another suggestion would be for Mercadão to make the deactivation of the Substitution Policy more difficult. For example, the buttons that appear at the end of the "Shopping Cart" (see Figure 12) could disappear and the client would only be able to deactivate the substitutions in the settings of their Mercadão' account (see Figure 13).



**Figure 12:** Current substitution buttons located in the “Shopping Cart” area

**Source:** Mercado website



**Figure 13:** Current substitution buttons located in the customer’s “Settings” area

**Source:** Mercado website

Moreover, to facilitate the personal shoppers’ agility and in-store and staff familiarity, personal shoppers training should be reviewed and improved. For example, personal shoppers should be instructed to confirm the existence of the product in the warehouse (checking with a Pingo Doce employee) before contacting the customer to inform them of the stockout. Not every Pingo Doce

employee will be helpful, nor will they have the time to spare to the personal shopper, hence the value of establishing friendly and collaborative relationships with the staff.

Finally, to encourage the personal shoppers to collaborate by reporting outdated product' images, Mercadão should provide them incentives to do so. For instance, there could be a contest in which the top three Personal shoppers who identify and report the most outdated images, win a bonus that could either be in form of a basket filled with Pingo Doce products or simply a monetary reward at the end of the month. Additionally, the top three Personal shoppers across the country that report the most outdated images, could be published, and congratulated in the personal shopper's newsletter under the heading "Detectives of the Month".

# Conclusion

This research aimed to understand the methods employed by an e-marketplace to reduce their stockout rates, but also to identify potentially effective strategies to prevent and mitigate the negative effects of stockouts on the customers.

Based on a qualitative case study analysis of Mercado's current processes and practices towards stockout rates' management, and further comparison with the preventing and mitigating strategies presented in the literature, we concluded that Mercado's Substitution Policy may be a relevant and useful to reduce both Net Stockout rates and the percentage of Lost Sales per order. Also, this method is equally defined as a mitigating strategy to safeguard the e-marketplace's financial interests, although it may not be the most favourable solution to reduce the customer's negative reactions, as partial order fulfilments yield less negative behavioural outcomes than orders with substitutions do. Nevertheless, this research also suggests that preventive strategies, such as stockout communication, disclosure, and transparency can positively influence customers' reactions to these events. Plus, according to the literature, the suggestion of a replacement product could also facilitate the substitution decision, while also preventing the order's cancellation. Additionally, specific practical solutions to tackle some practical challenges experienced by Mercado to lower stockout rates were further elaborated.

The case study research approach was indeed insightful to comprehend the business's ongoing processes, challenges and opportunities for future growth and development. Being inserted in this environment, actively participating in projects, organising, and going on field trips, having the chance to work with

experienced teams and, simultaneously, conducting research aligned with Mercadão's interests and concerns, led to a very rich and dynamic experience.

However, a few constraints have limited the scope of this research. For instance, this thesis was developed in the organizational context (under the form of a six-month internship) and, until the theme of this investigation settled, many adjustments had to be made in order to research a topic that was deeply aligned with the organization's interests and concerns. As a result of this lively professional and time-consuming experience, this research was developed under a brief period of time. Thus, the research approach was conducted accordingly, which may have hindered other methodological approaches, such as quantitative data analysis, namely surveys or computational methods to measure the impacts of the currently implemented strategies.

Nevertheless, throughout this investigation, new questions were raised. For instance, it would be relevant in future studies to analyse which strategies, preventive or mitigating, can be the most effective to reduce the negative effects of stockouts either on businesses or on consumers. Additionally, a survey could be conducted to evaluate how customers would respond to the disclosure or communication of a stockout on the website, and which terms would have the least negative or the most positive effect on the customer – “out-of-stock”, “unavailable” or “sold out”, and what translations could be adapted to the Portuguese language. Lastly, it could also be relevant to study the effects that stockouts related to the Pingo Doce brand have on Mercadão's customers and how it affects future purchases and future purchase intentions.

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