

How can customer experience improve retail operations sustainability?

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Abstract. Consumer needs drive supply chains, so they are arguably the main actors in the process. Nonetheless, consumers are unaware of their ability to contribute to stock management and the sustainability of retail operations, from the reduction of stockouts and waste to the minimization of energy-environmental impacts, through the centralization of stock in distribution and consolidation of last mile delivery in pooling systems. For this to happen, companies must provide channels that allow consumers to actively participate in the process and negotiate delivery times and prices through sustainable purchase options, through a crowdsourcing strategy in phygital stores. This paper explores two alternative strategies, maintaining or changing the current physical retail business model, based on the increase in online commerce and the use of mobile devices and applications in the purchase process. The first is applied in physical stores in a gaming context through a consumer-facing augmented reality mobile application that rewards users for identifying stockouts and informing the need to replace products in the shelves. The second involves the transformation of physical stores into a showroom format, where desired products are read through a QR Code or using artificial intelligence through a mobile application, in which virtual shopping carts are created and deliveries can be fulfilled via home distribution centers, collection points or drive-in.

Keywords: Customer Experience, Sustainability, Inventory Management, Retail Operations, Logistics and Supply Chain, Innovation.

1 Introduction

Despite the growth of e-commerce, according to TimeTrade [1], consumers continue to prefer to buy products in physical stores, as they value product experimentation and immediate purchase. Digital technologies have changed the nature of business-to-consumer relationships and the role of the consumer has increased in terms of participation and interactivity [2], as mobile devices and connectivity became part of marketing strategies and in-store experiences [3]. Currently, more than anticipated needs or simple

experiences of consuming products or services, consumers value the interaction with the product, a more active participation [4] with new and unique experiences [5]. Considering that the result of these interactions improves customer shopping experience, which increases the probability of having a positive impact on sales, retail must adapt its strategy and business model in response to consumer behavior, which implies the hybridization of the physical spaces of the stores through the integration of intelligent technologies in the physical channel.

Bearing in mind that stockouts result in a bad shopping experience and have a negative impact on the value of retailer sales, the causes have been studied. Literature refers not only to the difficulty in predicting real needs and converting them into physical flows on-time, but also to the inefficiency of operations, both in terms of inventory control and management and in store operational management. For this reason, this paper explores the extent to which new experiences can allow direct involvement between the consumer and the store, providing customers with the ability to play an active role in the management of stocks and transport, in order to minimize disruptions and the underlying environmental footprint, ensuring the sustainability of retail operations.

2 Literature review

Stock and Boyer [6] define supply chain management as the management of a network of relationships within the company and between interdependent organizations and business units consisting of material suppliers, purchasing processes, production sites, logistics, marketing and related systems that facilitate the forward and backward flows of materials, services, financials and information from the original producer to the final consumer with the benefits of adding value, maximizing profits through efficiencies and achieving customer satisfaction.

According to Rousseau [7] we can define retail as the activity of selling goods and services to final consumers, and retailer as an economic agent that sells products and services to final consumers. Retailers purchase goods and services using different sources of supply and deliver them to consumers in small quantities appropriate to their purchasing power and to meet the needs of the final consumer. To ensure the efficiency of operations, supply chains need to configure the intended strategy in the long term and plan in aggregate form in the medium term to guarantee the success of the activities necessary for the day-to-day of retail stores. Figure 1 presents a framework that aligns supply chain planning with demand and the respective physical and informational flows. According to Grewal et al. [3], to achieve success, retailers must allow their business models to evolve and create experiences and offers through all channels.

According to Hoogveld & Koster [9], the evolution of omnichannel retail is a major challenge as retailers need to change their business model to integrate their key resources across all channels, through an analysis of customer behaviors both digitally and at physical touch points, studying their decision-making process. According to Hübner et al. [10] and Marchet et al. [11], backend fulfillment, last mile distribution and returns processing management are some of the key processes of omnichannel logistics. According to Lorente et al. [12], online orders are prepared for shipping in

fulfilment centers such as: distribution centers/warehouses, which encompass physical store supply processes simultaneously with orders from online, fulfillment centers/dark stores that act as warehouses allocated to respond exclusively to online orders, and physical stores, which are additionally integrated with the online channel and have the capacity to respond to requests from this channel.

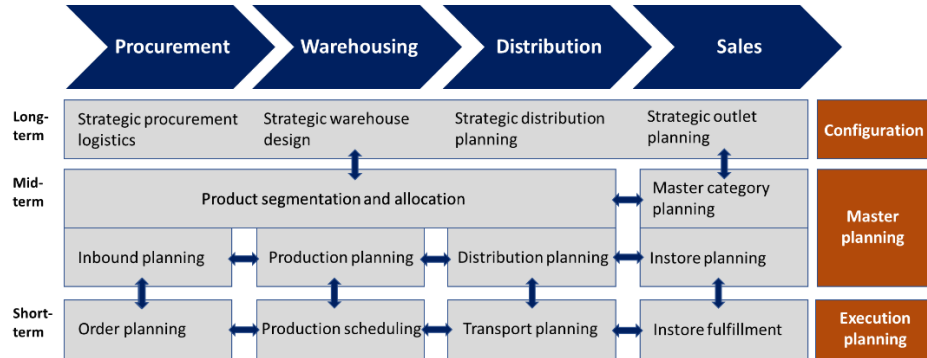


Fig. 1. Retail demand and supply chain planning framework

Source: [8]

In retail, the consumer experience indicator can be considered as Customer Shopping Experience (CSE), defined according to Choi et al. [13] as a summary of the interaction between the customer and the retail company that begins before the customer enters the store and ends long after leaving the store. According to Longo et al. [14], the improvement of CSE can be a benefit and decisive factor with the objective of regaining market share in the physical spaces of retail stores. In line with this perspective, Kale and Ulusoy [15] state that retail professionals have adopted a vision oriented towards building experiences where retail environments are transformed into theaters of interactions with the consumer to provide entertainment experiences. According to the Forrester report [16], marketing and technology play a driving role in CSE growth, with 72% of companies saying that investing in the customer experience is their priority and 63% of business professionals marketers valuing investments in technology to achieve this same goal.

A report by Conversant [17] highlights that 58% of consumers start their shopping journey online and complete their purchase offline (webrooming), while 46% start their journey in-store and end online (showrooming). According to Marktest E-Commerce Barometer [18], in Portugal, the number of respondents who admit to searching online and then buying in a physical store dropped from 83.7% to 81.4%, while the number of respondents who say viewing products in physical stores before buying online increased from 56.1% to 65.7%.

In this context, mobile commerce (m-commerce) practices, showrooming, phygital and smart stores are mentioned in the literature as the main trends in the scope of omni-channel retail, with a special focus on the physical space of the store, with the objective of differentiating the offer and the consumer experience.

The phygital experience is defined, according to Belghiti et al. [19] and Verhoef et al. [20], by the hybridization process of the physical (point of sale, products) and the digital (touch screens, connected mirrors, NFC, QR Codes) at the same time and in the same

place. From a marketing point of view, according to Moravcikova & Kliestikova [21], the phygital concept - agglutination of (physical and digital), brings together conventional sales promotion tactics with digital brand activation strategies in an integrated solution, in order to respond effectively to the consumer's alternation between the offline (store) and online worlds (search for information about products, prices and respective reviews), offering consumers the convenience of online channels together with the authentic experience from the physical store. According to Goethals [22], there are four different types of phygital experiences: informational, transactional, entertainment and support. Informational experiences serve to provide the client with additional information, such as object recognition and voice assistants; transactional experiences stimulate the customer throughout the purchase journey and is the most used in retail, examples can be self-service at checkout and coupons through beacons; entertainment experiences aim to entertain and engage the customer in the store and are mainly used during campaigns, usually in the form of interactive games using various types of technology; and finally, support, in which the objective is to add value to the customer, helping them during their purchase journey in the store, for example, through augmented reality – wayfinding. Different types of phygital experiences can be combined, for example, entertainment (fun) and informational (educational) through gamification systems. Zichermann and Cunningham [23] consider the term gamification as a process of “game- thinking” and game mechanics that aim to involve users and solve problems. Subsequently, according to Huotari [24], this concept was defined from a service perspective as a process of strengthening a service with a view to enhancing the “gameful experiences” to add value to the service user experience. Today, consumers are already committed to phygital experiences. According to research conducted by International Council of Shopping Centers [25] mobile devices are already used in stores during the purchase journey. Customers aged between 20 and 37 are the ones who use mobile devices the most in stores. According to Emarketer [26] regarding US digital consumers, the main action of consumers when using in-store retailer mobile applications is to look for promotions and personalized offers.

Technological development related to the Internet of Things (IoT) can create dynamic environments - intelligent spaces - capable of responding to human behavior and needs, in which objects and people interact. According to Kotler et al. [4] sensor technologies within the IoT launch new opportunities for marketers and retail companies that can take advantage of their potential to monitor consumer behavior, communicate with consumers through highly targeted and personalized offers based on collected data, and promote a convenient, interactive, and technological consumer experience in the physical space of the stores, through machine-to-machine communication. According to Sahni et al. [27], different software and applications are being developed within the scope of IoT and computer science, not only to capture data related to consumer behavior within the store but also to respond contextually to consumer interactions. According to Moravcikova & Kliestikova [21], smart stores can be seen as an evolution of the phygital store, in the sense that the central objective is the same, that is, a hybrid, more dynamic and faster shopping experience. Hwangbo et al. [28] consider this type of store is one of the most recent evolutions of retail stores that deploy new technologies that create immersive and authentic experiences for the consumer.

3 Supply Chain vs Retail Operations

In retail, distribution centers manage stocks and, in accordance with replenishment policies, send the products to the stores. Stores, in turn, receive, store and stock shelves with products for sale. This business model can lead to excess stock and high inventory costs if the expected sales in the store do not occur, or stockouts, if shelf replenishment is not carried out or the product does not exist in the store due to delays in deliveries or inaccuracies of existing quantities. To supply stores according to expected needs, based on historical sales data, distribution centers, in addition to trying to minimize inventory costs through centralization and obtaining economies of scale in the purchasing processes, try to minimize transport costs in shipping of products to stores by maximizing transport capacity and optimizing routes. For this to happen successfully, retail companies need to integrate as much information as possible so that it is possible to meet consumer needs with the desired level of service across all channels, supported by constant trade-offs between inventory costs and transport costs to ensure the sustainability and efficiency of operations. With data analysis tools, it is now possible to integrate and relate large volumes of information from multiple sources to support the best decisions for the business based on outlined assumptions and considering existing constraints. However, on the other hand, despite technological advances also in terms of product traceability, such as the Radio Frequency IDentification (RFID), retailers do not separate, in their systems, the existing stock in the store's warehouse from the existing stock on the shelf, which causes the products to be dispersed throughout the store in more than one location. This fact brings disadvantages, as in addition to compromising the accuracy of the existing stock and consequently the needs for replenishment, it forces an increase in the time spent internally in handling the products and in controlling stock ruptures on the shelf. Last year, according to NielsenIQ [29], supermarket shelves registered an availability rate of 92.6% and the disruptions cost US retailers 82 billion dollars. When the customer perceives that the desired product is not available, a fifth of individuals postpone the purchase, while 10% go to another retailer and 16% go to online. According to Gruen et al. [30], having a direct impact on financial performance, stockouts are estimated to represent as much as 4% of sales, which is equivalent to the almost 5% average that retailers spend on logistics operations in accordance with PwC [31]. Most of these costs are caused by store operations, represented in 38% by product handling and 7% by having items in stock in the store [32], with the remaining 28% due to handling in the distribution center, 5% to inventory and 22% to shipping [33].

4 Strategies to reduce the impact of stockouts

Through a crowdsourcing strategy in phygital stores, pursuing common goals such as minimizing environmental impacts, improving the shopping experience, and avoiding stockouts and waste, consumers can and should have an active participation. This strategy, according to Nakatsu et al. [34] involves the outsourcing of problems and tasks, which have already been performed by the employees of a company, to an undefined and anonymous group of people who come together to solve these problems and tasks.

Customers can participate by helping to forecast real demand, both in the current business model, through a mobile application in a gaming format that rewards interaction by identifying stockouts and triggering the need for replacement, as in the store business in showroom format, in which customers scan product QR codes (Figure 2 - Amazon GO), or use NFC (Figure 3 - Pingo Doce GO) and create virtual carts where online purchase value and the delivery periods vary according to what social responsible customers are willing to contribute to the sustainability of operations.

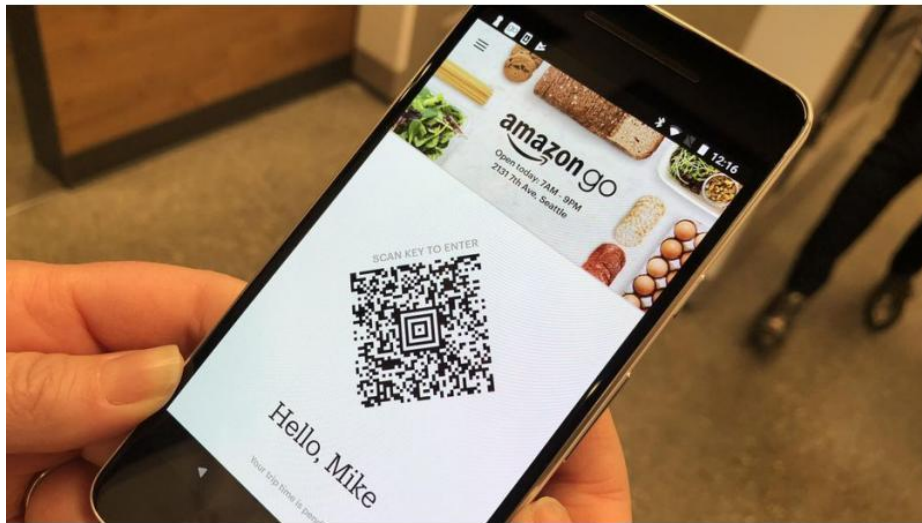


Fig. 2. QR-Code
Source: [35]



Fig. 3. NFC
Source: [36]

In this scenario, stock is shipped directly from the distribution center to the agreed delivery point, avoiding inventory costs and transport costs regarding the continuous shipment of products to the stores, as it allows transport partnerships to be created in the last mile that minimize environmental impacts through flexibility in the delivery time agreed by consumers. In this format, multiple purchase options can be activated in the application, with varying purchase price quotes depending on the selected delivery period, based on the consolidation of loads and shipment to the customer, and calculations subject to the expected demand and respective gaseous emissions.

5 Main conclusions and future work

Given the growth of e-commerce driven by the pandemic, the growing use of mobile devices in retail stores and the use of technology as a source of information and interaction for personalized offers, companies were forced to strategically reconfigure their logistics and marketing operations to secure profit margins, including the transformation of physical stores. In this context, considering the issue of disruptions and the impact it generates on customers and retail companies, this paper addressed the major retail trends in terms of customer interaction and satisfaction in physical stores and the extent to which these can help to minimize stockouts at the point of sale and ensure the sustainability of operations through personalized offers and purchase options based on environmental impacts. Noting that QR codes and NFC technology are already part of the retail industry and that the objective is to improve customer shopping experience, this paper suggests the use of mobile applications featuring virtual carts that could be operated by pointing the cameras in customers' mobile devices or by reading product QR codes in a showroom format. In a gaming scenario, an application could ask customers to carry out inventory-related "missions" inside the store, rewarding them with loyalty points and/or product offers, while allowing them to contribute to the sustainability of operations. In this way, customers could improve their shopping experience and that of the next customer, as they could help to avoid stockouts by intervening in the process or by practicing showrooming, improving the efficiency of shelf replenishment and ongoing supply operations to stores. Given the importance of improving customer shopping experience, future work towards the development of the alternatives under study includes analyzing the environmental impact of existing operations and studying the financial and environmental impact of incorporating the new business model in showroom format with direct deliveries from distribution centers.

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