

Examining the Business Model of Replenishment Subscriptions: a Longitudinal Case Study

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Abstract

Subscription boxes continue to rise globally as consumers demand these services for a growing number of products such as cosmetics, fashion or pet food. Nonetheless, the increasing customer expectations, along with the complexity of internal operations, particularly for replenishment subscriptions, have made many of these businesses gone bankrupt in their early days. To tackle this problem, our study aims to developing the business model of replenishment subscription boxes to find the keys to viability that ensure sustained growth. To achieve this, we applied the Business Model Canvas (BMC) framework to a state-of-the-art subscription business. We used a longitudinal case study that lasted four years, which enabled us to build a complete view of the development of the business over time. Our study shows that the success of replenishment subscription boxes lies in the ability of companies to provide a highly personalized service to subscribers to reduce the churn rate, which is key in order to meet the needs of different customer segments within the subscription business. Moreover, replenishment subscription businesses need better allocation of resources to marketing strategies because of the high cost of free trials. They also need process standardization from the early development stages. These two factors will enable exponential, sustainable growth through market and product development.

Keywords

Subscription box; Subscription retailing; Replenishment subscription; Business model Canvas; Sustainable business model.

1. Introduction

Subscription retail services, a model that started out with magazine and newspaper subscriptions, has gone through a diversification process in recent years. Of special note in the field is the subscription box, a term applied to subscriptions for physical products that are managed online and offer a service in which customers receive a box at their home containing one or several products linked by a specific theme, and where the price and frequency of the boxes are predefined (Mimoun et al., 2015). Subscription box models

continue to proliferate globally and are now present in many sectors such as fashion, cosmetics, food, or entertainment (McCarthy and Fader, 2017). Growth in this new face of e-commerce is based, mainly, on the changing preferences of consumers, attracted by the personalization, savings, and convenience subscription boxes offer (Tao and Xu, 2018).

Consumers are seeking new functionalities in their web-based purchasing. Surprise and convenience stand out as two aspects of this new shopping experience. When customers opt to subscribe to a box based on a specific theme, they look for the surprise in each new delivery (Gupta et al., 2020). They find convenience by outsourcing regular, time-consuming tasks such as going to the shops or searching for products online (Tao and Xu, 2018).

Depending on how much importance they place on those aspects, subscription boxes can be classified into three main types: replenishment, surprise, and curated boxes. Replenishment subscriptions are predefined and contain basic articles that can be regularly found in the consumer's shopping cart (Rudolph et al., 2017). Surprise boxes contain items that the consumer does not choose, but lie within the predefined theme (Rudolph et al., 2017). One variant of this type is the sequential box, where the order of the boxes is predefined (Rudolph et al., 2017). Curated subscription boxes contain products selected by experts to meet the tastes and expectations of the consumer (Rosenbaum, 2011). Curated boxes reach the highest point of adaptation to the

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consumer's interests in what are called customized boxes (Rosenbaum, 2011).

What most appeals to firms launching any of these models onto the market is the thought of ensuring recurring revenue and a solid customer base (Rudolph et al., 2017). However, the viability of these business models has to be questioned on seeing that so many firms have disappeared shortly after reaching the market. Many of these failures are start-ups (McCarthy and Fader, 2017), and are conditioned by deficient integration of their value proposition and logistics strategy into e-commerce (see e.g., Rodríguez-García et al., 2021). Increasing customer demands (Bischof et al., 2020) and complex operations, together with numerous errors in service, have led to a large number of customers abandoning their subscriptions early on, leaving the firms to go bust (McCarthy and Fader, 2017). Replenishment models are particularly critical in this aspect, which is due to their two main features: the search for a long-term relationship with customers, in line with their recurrent purchase; and the need for a greater level of monitoring of operations to ensure that the commodities are replenished (Rudolph et al., 2017; Bischof et al., 2020).

Many authors in the literature have studied these customer demands in research focusing on how customers are acquired. They analyze the features valued most by consumers when they take out the subscription (see e.g., Chen et al., 2018; Bischof et al., 2020; Bray et al., 2021). Of note is the study by Bischof et al. (2020) as it includes possible actions to reduce the perceived risk of subscribing, one of the biggest handicaps of these models compared to one-off purchases. Furthermore, an effort has also been made to analyze isolated elements of the business model such as the value proposition or customer behavior (see e.g., Tao and Xu, 2018; Lee et al., 2019; Tao and Xu, 2020). However, the economic viability of these models does not depend on the behavior of any of these elements individually (Magretta, 2011).

Only a few studies have looked in isolation at the subscription box business model (see e.g., Warrillow, 2015; Rudolph et al., 2017; Andonova et al., 2021). Nonetheless, the literature on subscription boxes still lacks support from a strong theoretical framework that enables analysis of the business model as a whole and serves as the basis for ensuring the model's viability, which represents a common gap in e-commerce literature (Rodríguez-García et al., 2016).

From the three main types, we have chosen to study replenishment subscription boxes because they are operationally the most demanding, which is a handicap when it comes to making the model profitable. Furthermore, while the literature has mainly focused on attracting subscribers, our research underscores customer loyalty as key to the survival of subscription box models. Thus, both research and practice will benefit from the complete structuring of the business model for that type of box. Another contribution of

our work will be defining the key elements that must be taken into account to ensure the viability of the business model. This can be summed up in the following research question:

RQ: What are the key aspects for the viability of the business model of the replenishment subscription box?

To respond to this research question and ensure the viability of a growing sector, we used a longitudinal case study of a firm in the sector and we applied a theoretical framework to the business model. The chosen framework was the Business Model Canvas, by which we could determine the most relevant features of these subscription models and observe the relevance of those features as the business model evolved. Thus this approach to the replenishment subscription box business model is based on discussing the key aspects a firm in the sector must take into account in order to grow sustainably: ensuring not only that customers are acquired, but that they are also kept while fulfilling service levels and keeping the most important costs under control.

The paper has the following structure: after this introduction, there is a general literature review on business models and a specific literature review on studies of the replenishment subscription box business model. The third section describes the methodology used. In section 4, the Business Model Canvas is applied to develop the case study business model. In section 5, we discuss the aspects that are key to the viability of the replenishment subscription box business model based on the current literature. The final section contains the conclusions, explains the limits of the work and points out future areas for research.

2. Literature Review

2.1. Literature on business models

There has been a noticeable increase in interest in analyzing firms from the perspective of the business model over recent years (Mettler, 2014). Besides being inherently practical and bringing research and management closer together, this type of analysis has recently provided numerous definitions and different ways of structuring the business model (see e.g., Johnson et al., 2008; Osterwalder and Pigneur, 2010; Magretta, 2011; Cestero et al., 2018; Ojasalo and Ojasalo, 2018), giving rise to several applications and ways of understanding such models.

Before the term "business model" was adopted, Porter (1985) created the value chain, a model that enabled analysis of the activities carried out by an organization and its interrelations in such a way that it was possible to detect which ones generated and sustained value for the customer and the firm itself. This integrated vision of operations was complemented by Magretta's (2011) value proposition to

become one of the most complete frameworks for business model analysis. In the meantime, Drucker (1994) defined the “theory of business” as the way in which a firm makes money; the theory was later taken on board by Lewis (1999) to analyze the dotcom boom at the end of the 20th century. Drucker’s original theory is based on three assumptions about what a firm should or should not do in terms of its environment, its mission, and the core competences needed to achieve that mission.

More recently, Chesbrough (2007) laid down the main functions of the business model: to articulate the value proposition and explain the created value, to identify market segments, to define the structure of the value chain, to determine the complementary assets needed, to specify the mechanism for generating revenue, and to estimate the cost structure. In addition, Johnson et al. (2008) created a framework in which the business model was structured around four key elements: the customer value proposition, the profit formula, the key resources, and the key processes. These interlinked blocks are responsible, jointly, for creating and delivering value.

Osterwalder et al. (2005) anticipated the definition of business model, which they called “a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing and delivering this value and relationship capital, to generate profitable and sustainable revenue streams”, and later defined one of the most popular business model analysis frameworks in current use: the Business Model Canvas (BMC) (Osterwalder and Pigneur, 2010). The BMC is a tool that is recognized for its simplicity and utility for both analysis and development of business models (Mettler, 2014). It describes how an organization creates and delivers value (Osterwalder and Pigneur, 2010). This is done by establishing three key elements: the structure of each key component of the company, the interconnection between components, and value generation through those interconnections. The BMC is structured into nine blocks distributed over four business areas: consumers (customer segments, distribution channels and customer relationships), value proposition, infrastructure (key activities, key resources and key partners), and financial viability (revenue streams and cost structures) (Mettler, 2014).

2.2. Literature on subscription box business model

Despite the recent boom in subscription boxes, the literature has only characterized and analyzed some aspects of this business model in firms. Warrillow (2015) analyzed, along with other subscription models, the pros and cons of creating a replenishment subscription box, highlighting the need to establish a differentiating value proposition, create a recognizable brand and manage large amounts of data.

That work also studied the metrics that should be taken into account in order to manage the economic evolution and the profitability of a replenishment subscription box. The author highlights the lifetime value (LTV: net value of revenue generated by a customer during their subscription), the churn rate (the cancellation or dropout rate) and the customer acquisition cost (CAC), which are now indicators used to analyze other subscription service models.

Rudolph et al., (2017) analyzed the value proposition, revenue streams and KPIs of the distinct subscription box types, including replenishment boxes. Finally, Andonova et al. (2021) provided a detailed description of the subscription box industry and proposed a framework for analyzing the offering from such firms that included consumer segmentation, the benefits offered to consumers, product categories, and the competition. Referring to the value, Baxter (2016) stated that for any subscription model to be successful it must offer something extra that sporadic buying of the product does not offer, and not just provide repeat revenues for the firm.

To complete the view of subscription box business models, particularly replenishment boxes, most research focuses on determining which features of a subscription box value proposition affect customer acquisition (see e.g., Tao and Xu, 2018; Lee et al., 2019; Bischof et al., 2020; Tao and Xu, 2020; Bray et al., 2021). A specific contribution in this sector is the comparison that Bischof et al. (2020) make between curated and replenishment boxes, analyzing the possibility of including short delivery intervals and a free returns option to reduce the perception of risk linked to the subscription. Bray et al. (2021) underscore the importance of trials and how easy it is to cancel (more than how easy it is to return) as key elements for acquiring subscribers. Furthermore, the authors establish motives (convenience, ease of use, value received, access to a variety of products, new discoveries) and barriers (commitment, preference for self-selection, poor quality, too many or incorrect products) when acquiring subscription contracts.

In terms of operational management of replenishment subscription boxes, research is scarce and focuses on the major problems of logistics fulfillment these firms have, and the high costs that are incurred (Warrillow, 2015). It highlights the difficulty in deciding the product mix and the monthly contents of the boxes (Bernstein et al., 2020), and supplier management (Warrillow, 2015).

Finally, some studies analyze particular features of subscription boxes that are interesting when compared with other business models. Demand management becomes very important (Bolton, 1998), especially for replenishment boxes, which must cover the customers’ daily needs. To study this point, McCarthy et al. (2017) created a reference framework to identify real demand, including the rate customers are lost and gained, or churn rate. Furthermore,

to ensure that a large number of customers are acquired and the churn rate reduced, the box must be perceived as having a value that is greater than its subscription price, which turns price definition into a differentiating factor (Lee et al., 2019; Dawes, 2014).

On the basis of what has been described, it can be deduced that structuring knowledge on replenishment subscription box business models is important, as is studying in greater depth the most critical aspects that are hindering the viability of these innovative models in the mid-to-long term. The development of these business models has not yet been studied in the literature from a broader theoretical perspective. Neither has it been studied using longitudinal data. Our research seeks to integrate the most relevant aspects of the replenishment subscription box business model, supported by the theoretical framework of the Business Model Canvas. The final objective is to ensure the viability of firms by establishing the key aspects they should consider, and also to provide guidelines to new firms opting for this business model. Our viewpoint is overarching as it includes both acquiring customers and keeping them loyal to the firm, which is one of the main gaps in the literature on subscription boxes (Bray et al., 2021).

3. Methodology

The research uses a longitudinal single case study model. Case studies focusing on a single organization are useful when highly detailed and complete information is required on the processes in an industry (Palos-Sanchez and Correia, 2018; Siggelkow, 2007), which suits a little-explored sector such as subscription boxes. The longitudinal case study was also chosen because of its capacity to identify how certain aspects of the business model evolve in the face of changes and adaptations in the long term (see e.g., Hansen and Bjørn-Andersen, 2013), which is impossible when analyzing discrete, isolated events (Yin, 2014).

To develop the case study, we chose a successful Spanish start-up that had opted for the replenishment subscription box model from the outset. The company provides value for its customers by periodically delivering pet food. It was selected, primarily, because it is one of the first firms to offer this service in Spain and has a fast rate of growth.

Our study was carried out over four years and began with the founding of the firm, which allowed us to see the development of the business model from the start and during different stages of growth. We were able to study how the replenishment subscription box business model should be structured and were witness to the different decisions, both strategic and operational, that were taken over time to ensure the firm's viability. Three methods were used to gather data during the working sessions: interviews, visits to the facilities, and data collection from secondary sources (see

e.g., Gong and Janssen, 2021).

Altogether, there were 37 working sessions, which included interviews with the firm's directors and several visits to the facilities. A total of 31 semi-structured, face-to-face interviews were held, each of which lasted between one and two and a half hours. That was sufficient in order to gather all the information needed on the business model and the decisions taken. There were always two interviewers: one to guide the conversation and one to take notes for later study and discussion. The six visits to the firm's various facilities each lasted approximately three hours, during which two people were also present: one to ask questions and the other to compile the necessary information.

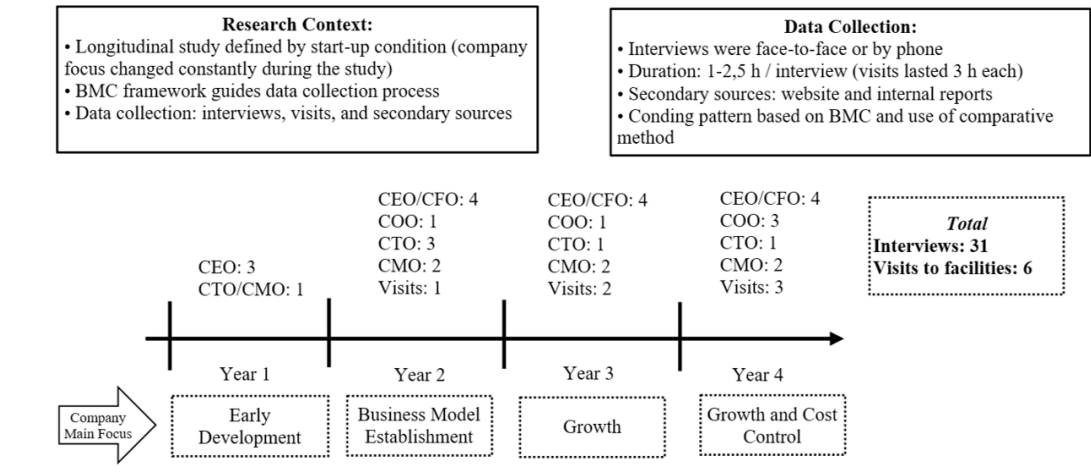
The interviewees were the chief executive officer (CEO), who also acted as the firm's chief financial officer (CFO), the chief operating officer (COO), the chief technology officer (CTO), and the chief marketing officer (CMO), all of whom had in-depth knowledge of all the areas in the firm (Trautrimis et al., 2012). The Business Model Canvas was used as the framework for the initial interviews in order to structure and focus on the issues being dealt with. The BMC was chosen for its simplicity, its capacity to structure information related to innovative business models (Osterwalder and Pigneur, 2010), and because it is the most suitable tool for extrapolating conclusions about business models that have already been implemented (see e.g., Sort and Nielsen, 2018; Joicevski et al., 2019). Moreover, the BMC allowed us to understand how the key components and functions of the replenishment subscription box business model were integrated together in order to give the customer value and generate revenue.

The firm's growth, inherent to its condition as a start-up, greatly influenced the interviews. Thus, during the first year, the conversations centered on the design and launch of an early-stage business plan, while during the second year they focused on validating and adjusting that business plan in order to ensuring the model's viability in the long-term. Later, during the third year, the interviews turned towards how the business model adapted to the growth the firm was undergoing, in both customer numbers and geographical coverage, which included decisions linked to broadening the range of products and services. Finally, during the fourth year, analysis began on how increasing costs, related to fast growth, were putting at risk the viability of the model.

The visits were focused on the operational aspects of the business plan such as the importance of the different operations carried out by the firm or the resources needed to offer the final product to the customers.

Figure 1 summarizes the interviews with the company directors, the visits made to the facilities, and how all these events were distributed over the four years of the study.

Figure 1 Research development throughout the 4 years of follow-up.



The initial approach to analyzing the data was a first-order analysis that included complete codification of the semi-structured interviews and informal conversations (Van Maanen, 1979). The coding pattern for data analysis was based on the nine blocks in the Business Model Canvas, and on subcodes for analyzing the various elements and features within each block. Short phrases uttered by the interviewees were used, when possible, or codes created by the analysts. Using the constant comparative method, we repeatedly compared the data over time and between interviews and visits in order to discern the main concepts of interest (Hübner et al., 2016). Once the initial solutions were obtained, they were shared among the researchers and discussed until agreement was reached (Lincoln and Guba, 1985). The interviewees also received a summary of the preliminary results. Apart from some suggestions for minor modifications, which were made, the summary met with general approval.

4. Examining the business model of the replenishment subscription box

4.1. Value propositions

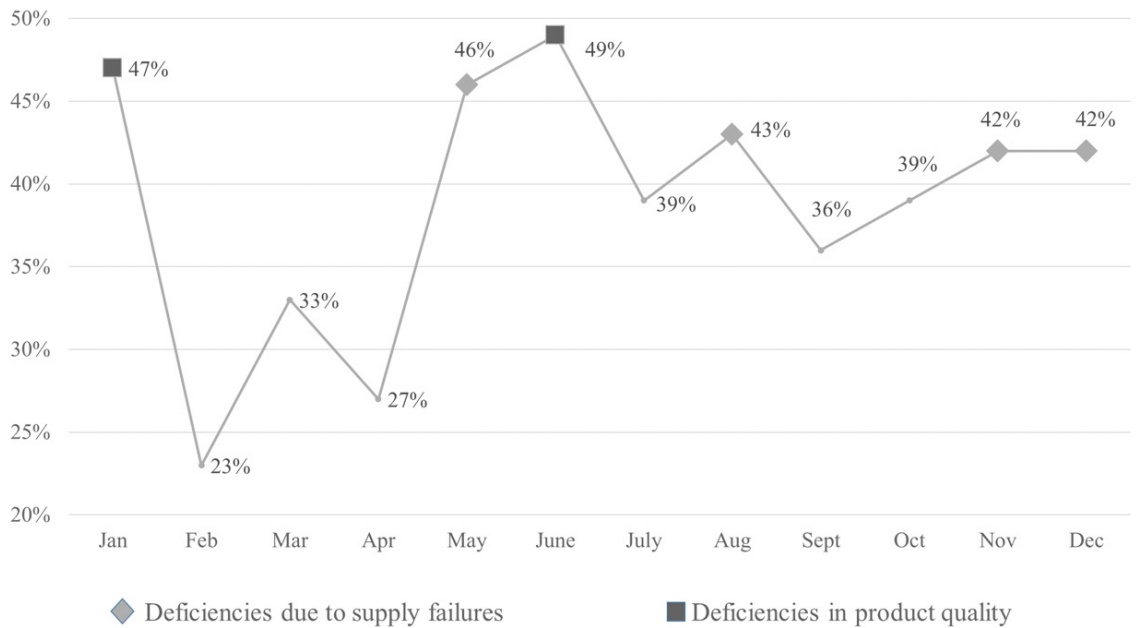
In this case, the replenishment subscription box product is pet food, which would otherwise be bought and consumed repeatedly. In the words of the CEO, “in any replenishment subscription box model, the main motivation for consumers

is the search for convenience. Our replenishments subscriptions must be able to absorb the replacement task and, what’s more, allow the user to stop worrying about managing the product and when it will run out.”

This opens up a range of specific conditioning factors for the value proposition in replenishment box firms. All the interview respondents underscored how important it was for these models to offer the customer the right amount of the product they want at the time they need it. Unlike traditional e-commerce, the promise to replenish must be met because any stock-out would involve a much greater loss of customer trust than for one-off purchases. In the last year of the study, this was very relevant for the firm as several problems in production (affecting product quality) and supplying the box to subscribers had a major impact on subscriber losses, that is, the churn rate. In particular, the CMO highlighted the case of customers who had been subscribed for a short time, “gaining the loyalty of a subscriber is very complicated, which is why the first deliveries are critical in order to successfully acquire customers. However, providing the best service while maintaining high-paced growth has become a huge challenge for the organization”.

The specific example in Figure 2 shows the month-on-month churn rate for the last year for the consumers who started in the same month. It clearly depicts how that figure rises sharply when there are deficiencies in product quality and/or supply failures.

Figure 2 Monthly evolution of the churn rate for subscribers that started in that same month



Those events led the firm to take the decision to clearly establish limits for the number of new subscribers that could be taken on in a specific period in each of its markets. At the same time, the firm set up alternatives to manage the excess of new subscriptions and mitigate the loss of potential subscribers. The respondents highlighted the use of waiting lists and “out-of-stock”, which are typical in traditional e-commerce and can also serve as tools for acquiring customers because of the hype they generate.

Regarding the quantity received by the customer, part of the value proposition for replenishment subscription boxes is to know and understand the customer’s consumption pattern well. Our study revealed that some products may not maintain the linear consumption rate that is expected in these models, which means that the subscription models must be flexible so that customers do not run out of product or have to store too much of it. In the words of the CMO, “this is critical for perishable products like the ones we handle, which can’t be accumulated, but it could also be the case for other firms handling large products, for example, which are inconvenient for customers to store in large quantities.”

In short, the value proposition for replenishment subscription boxes must go beyond sending the same amount of a specific product on the same day every month. The CEO of the firm summed up this idea by comparing it to the subscription models for online video streaming platforms, “replenishment subscription boxes must offer plans that are more adapted to the user, like subscription platforms such as Netflix, HBO or Amazon Prime, which are highly successful examples of subscription models that have an enormous degree of personalization of the content offered to each user.”

4.2. Customer segments

“Subscribing to a product is very different than buying it once.” These were the most repeated words among the respondents when asked about the subscriber profile. Customers opted for the replenishment subscription box model because of a lack of time or the distance from their usual point of purchase, and because they do not want to worry about managing the stock of a product they buy regularly. In addition, in this particular case, the most common subscriber profile was middle-aged, reasonably technology literate, with mid-to-high disposable income, and living in an urban setting, which, according to the CEO, is a profile that is common to a large proportion of subscription box models. As these online services have based customer acquisition on free-trials due to the very low costs related to this trial, our research stresses the need for subscription boxes to act similarly and opt for large discounts in the first deliveries.

The downside to such aggressive marketing strategies is the variable cost that is inherent to the physical sale of a product; a cost that does not exist for online services subscriptions. This cost not only includes the product itself but also the physical movement of it, and can generate considerable increases in the customer acquisition cost (CAC). The COO of the firm illustrated this problem in the following way, “in our firm, this variable cost means that CAC recovery does not happen in the first month of the subscription’s life-time but takes various months of that lifetime” (Figure 3). Consequently, loyalty becomes the cornerstone of the business and the relationship with the customer is a vital weapon in controlling the churn rate and compensating the high CAC values in the sector.

Figure 3 Evolution of the relationship between LTV and CAC in the first 12 months. CAC recovery estimated to happen in month 5.

Month	1	2	3	4	5	6	7	8	9	10	11	12	24
LTV/CAC	0,28	0,50	0,69	0,87	1,03	1,18	1,34	1,47	1,60	1,72	1,84	1,95	3,20

Furthermore, the online nature of the subscriptions gives access to a much wider market than a simple brick-and-mortar shop. However, as the interviewees pointed out, replenishment subscriptions, which combine the physical movement of products with a recurrence and high level of precision in deliveries, require high-level monitoring of operations, which can be a conditioning factor for rapid expansion to international markets. This greatly differentiates replenishment subscription boxes from simple e-commerce, but also from other subscription box models in which time until delivery and precision are not so critical.

Finally, the CMO stressed the mid-to-long term orientation that they looked for in replenishment subscription box subscribers. That means marketing strategies must take into account that the target customer will not be a compulsive buyer. One of the consequences of this is management of the “big days” in e-commerce such as Black Friday. In the CMO’s words, “even though they are interesting options for customer acquisition, experience has shown us that the proportion of customers acquired on big days who then continue to subscribe is much smaller than our average. That, added to the high levels of CAC in the sector, make that type of acquisition rather unattractive.”

Finally, the CMO at the firm recognized the value, on several occasions, of the importance of the subscriber base. As the company focuses more on highly loyal customers, these can must become an important tool for securing the firm’s growth. One example of this are the new product trials the company carry out with them, and which are useful not only to test the products but also as a way of keeping customers loyal. Furthermore, the relationship established with some subscribers was so strong that they became important reviewers of the firm’s products on social media. Over time, the firm took advantage of this situation and established promotions through its subscribers as an important marketing strategy to reduce the CAC.

4.3. Channels

In general, the web is the main tool the firm possesses to acquire its customers and keep them loyal. However, our study revealed that creating a mobile app can be very useful for managing subscriptions and deliveries, as well as complementary future sales that can be added to the basic subscription. Driven by the CTO, the firm launched a beta development throughout the project, and initial reactions

were highly positive. In addition, on several occasions the firm looked into using marketplaces, which are especially designed for subscription businesses and group multiple subscriptions so that payments and deliveries can be managed together. However, the firm’s products are perishable and require careful storage and special delivery, which hindered taking that particular step. Despite everything, in the CTO’s words, “the marketplaces could be an interesting option for new replenishment subscription boxes to enter the market as the market grows.”

The online character of subscription box models does not have to limit sales to that particular channel. Our study also determined that, linked to customer demands in service terms, pick-up from a specific physical place is also a benefit that these models can offer. Individual sales by the firm at the pick-up points, when these were shop premises, or even the option to subscribe at the shop, made a lot of sense because it was not only a way of reaching new market segments but also meant operational synergies could be obtained.

4.4. Customer relationships

For the respondents, the B2C relationship entered into in a subscription model is closer to that between a supplier and a customer than that between a consumer and an e-commerce outlet in a one-off purchase.

Despite this, the CMO pointed out the differences between those customers who need to know about the product in detail before subscribing and those who were just making a traditional purchase. Our study revealed there are subscribers who prefer not to interact with the subscription and others who require continual attention and personalize every delivery. This reinforced the importance of allowing subscribers to take decisions about their subscription in an agile way via the firm’s platform. Some of the features subscribers could configure to their own taste were: the products in the subscription for each delivery, the quantities, the delivery (mode, frequency, delivery point, date and time), or possible returns (for both product and packaging).

At the same time, the firm also had to meet the needs of customer segment that preferred not to interact with the platform. “For this subscriber group we have to make another extra effort, in this case by knowing their consumption habits and ensuring they never run out of product,” stated the CMO. Depending on the type of products in the

subscription, technology can help thanks to the number of connected devices in the homes of consumers. The company under study used Artificial Intelligence (AI) to predict the average consumption of the pets according to variables such as their real physical activity, current weight and age, and previous consumption, among others. This alternative was key for the less proactive segment of subscribers, although simpler alternatives worked for other groups. As an example, many customers chose to receive reminders to confirm deliveries in the days leading up to them so that they could simply accept or delay dispatch if they did not have product available or still had some left, respectively. Regardless of the customer's profile, all the consumer information allowed the replenishment subscription to convert their experience into something more personal, which is key to the model's success.

4.5. Revenue streams

The main advantage of subscription-based models is, precisely, recurrent revenue generated through the customer relationship, which represent the main revenue stream for the firm. The respondents defended the importance of lifetime value (LTV - the total revenue that, on average, each subscriber provides during their time as a customer),

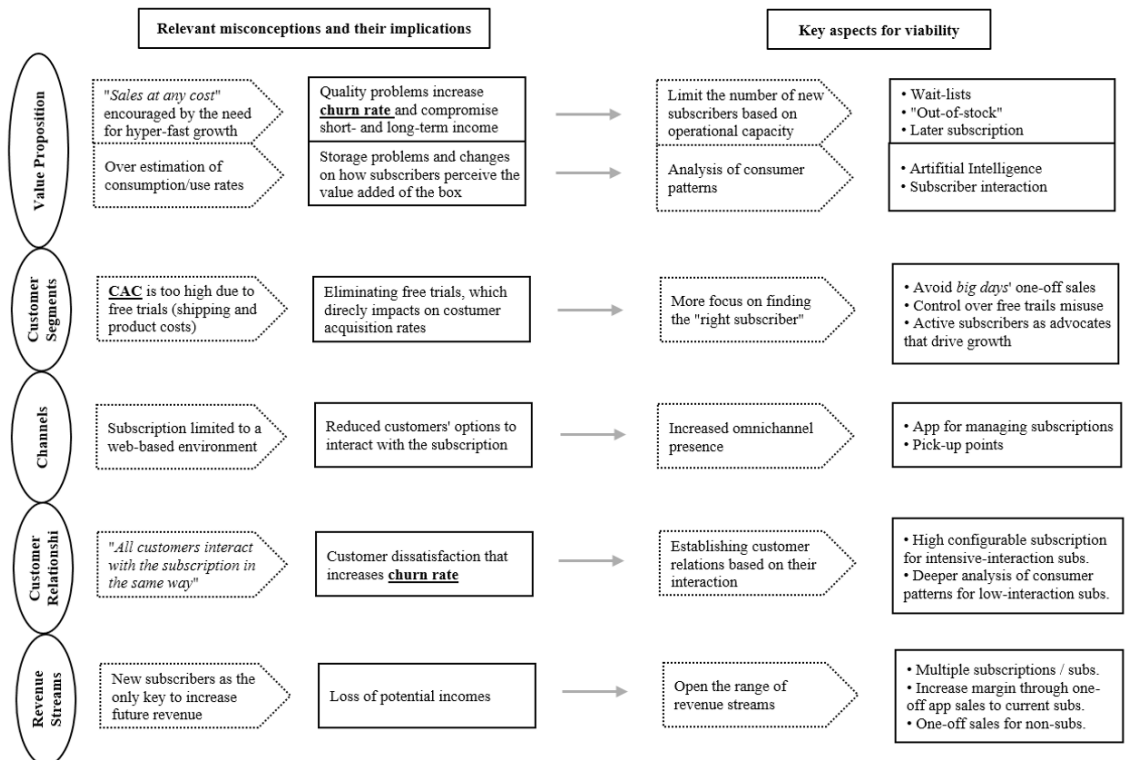
together with the CAC and the churn rate when it came to determining how healthy the business was; they are all recognized indicators (Warrillow, 2015).

Furthermore, following the example of the case study firm, replenishment subscription boxes can opt to multiply revenue streams through a traditional online store that complements the subscription and encourages customers to add other products to their recurrent deliveries. This can improve gross margins, thanks to logistics synergies, but requires the customer to take an active role regarding their subscription.

Additionally, as mentioned previously, by making the most of synergies with brick-and-mortar establishments used as delivery pick-up points, firms offering replenishment subscriptions can also make sales through the traditional channel as a gateway to new market segments, which can either be one-off product sales or as a way of enabling people to join the subscription model from the real store.

Finally, Figure 4 summarizes the key aspects for the viability of the subscription box business model for the first five elements of the BMC (those directly related to customers: Value Proposition, Customer Segments, Channels, Customer Relationships, and Revenue Streams).

Figure 4 Key aspects for the viability of the replenishment subscription box business model for the first five elements of the BMC.



4.6. Key resources

In line with the replenishment subscription box value proposition, the interviewees defended the importance of a subscription management tool – a key part of the success of the business. In the words of the CTO, “from the customer’s point of view, this tool must be integrated from the outset in the web environment, the main subscriber acquisition channel, and the app environment, which makes managing the subscription easier. From an internal point of view, the key lies in how the tool helps the firm to manage operations by the way it directly connects data from the website and the app.”

Information on active subscriptions, including the products they include, and the dates and places for each scheduled delivery, was one of the aspects highlighted as critical. That information has to be available in the tool as it helps to manage the stock needed of each product at any moment, the deliveries to customers, and so on. Moreover, because the subscribers interact with the subscription to reconfigure the deliveries, the tool must update this information continually to ensure proper service.

At the same time, prediction tools become particularly relevant in such models because of the high percentage of recurring customers. The COO mentioned the specific case of the cohorts matrix as a tool. It was developed with the intention of modelling subscriptions and provides historic data about churn rate, but it also helps to predict the number of customers who will continue with the replenishment subscription box in the next cycles depending on the time they have been subscribed (McCarthy et al., 2017).

4.7. Key partners

“The firm, in its role as a start-up, has always lacked a strong negotiating position against the suppliers of the products offered in the subscriptions, which is endemic in our sector.” These were the COO’s first words when talking about the firm’s key partners. Moreover, the replenishment subscription model is generally limited and very specific in what it offers, which in turn means that the number of key suppliers is small. This suggests that establishing a long-term relationship of trust with suppliers is critical in order to ensure supply and to negotiate margins that make economic viability a possibility as well as allow expansion and growth of the model in both volume and geographic coverage.

The analysis also indicates that logistics providers are the other cornerstone in the trading relationships because, in general, they are the ones responsible for the last mile. There are two reasons for this: first, the need to ensure delivery on the right day at the right time, given that this is a programmed delivery of a replenishment product; second, because of the need to communicate with the third-party logistics (3PL)

firm so that the user can make rapid changes to the time and place of the delivery.

Regarding the rapid growth experienced by the firm, the COO stated the importance of having international suppliers with extensive networks, which allow the services to be maintained wherever the replenishment subscription box reached. “With the logistics providers, we have flexibility when looking for firms that can be global or smaller 3PLs, but with the experience from each of the markets we operate in, we can’t do the same with the product suppliers for the boxes because that would slow down expansion. That is why it is key to partner with strong suppliers that allow you to ensure supply in any potentially strategic market.”

Finally, the interviewees also highlighted the importance of support from the traditional channel: to provide the option of in-store pick-up, to increase sales to physical stores, or simply to provide support to the internal distribution network. As the firm grew in sales and structure, this alternative showed itself to be interesting in order to make the model more flexible both commercially and logistically through its potential in improving the last mile.

4.8. Key activities

Our study showed that, for replenishment subscription box models specifically, interaction with customers and the set of replenishment operations are key for success. Both elements will be critical for ensuring customer service, the cornerstone of any subscription model, which has the aim of minimizing the churn rate. Referring to operations, the respondents agreed it is typical in the sector that all, or almost all, operations are out-sourced. So, monitoring of all the operations jointly (materials supply, warehousing, stock control, picking, packing, deliveries, and inverse logistics) is vital in order to ensure the desired service level.

Furthermore, as replenishment subscription box models grow and expand, particularly when they enter international markets, these operations become even more critical. According to the COO, “there is an enormous difference between a one-off sale to one point on the globe and ensuring a recurring and customizable delivery service of an exclusive range to the same place.” Thus, throughout the study it was shown that there were more critical decisions to make for replenishment subscription boxes than for traditional e-commerce, such as choosing where to warehouse stock, the optimum levels for ensuring reasonable delivery (and response) times, or whether to open the door to new suppliers (both for products and logistics services).

Another important element revealed by the study is that the presumed demand stability to which replenishment models aspire is very far from reality. The power to personalize that customers increasingly demand, such as,

for example, the time margin during which they can modify their order, obliges replenishment subscription businesses to work with considerable margins if they want to ensure supply. In the words of the COO, “if we add uncertainty about customer acquisition and churn rate to that, and also about the types of box and the various geographical areas we serve, then operations planning becomes highly complex and daily decisions can easily move you away from your main goals as an organization.” The main issue we found throughout the study was that start-ups do not have the time nor the resources to solve such complex problems or to work with the margins required. Thus, agility becomes a critical factor in order to test operational features, internally and with subscribers and logistics suppliers, and to rapidly pivot towards the right fulfillment strategies that ensure the correct supply of replenishment subscription boxes.

4.9. Cost structure

Our research reflects that growth in a business model like that for replenishment subscription boxes is marked by high CAC values, mainly due to expenditure on the free trials needed in order to be competitive in the sector. Replenishment costs are the other constant, which obliges the firm to be focused on progressively improving the efficiency of its operations. In the words of the CEO, “if non-organic growth has been established in traditional e-commerce firms, then in the world of subscription boxes, the need for cash is even greater because of the extra effort required for acquiring subscribers and the operational demands.”

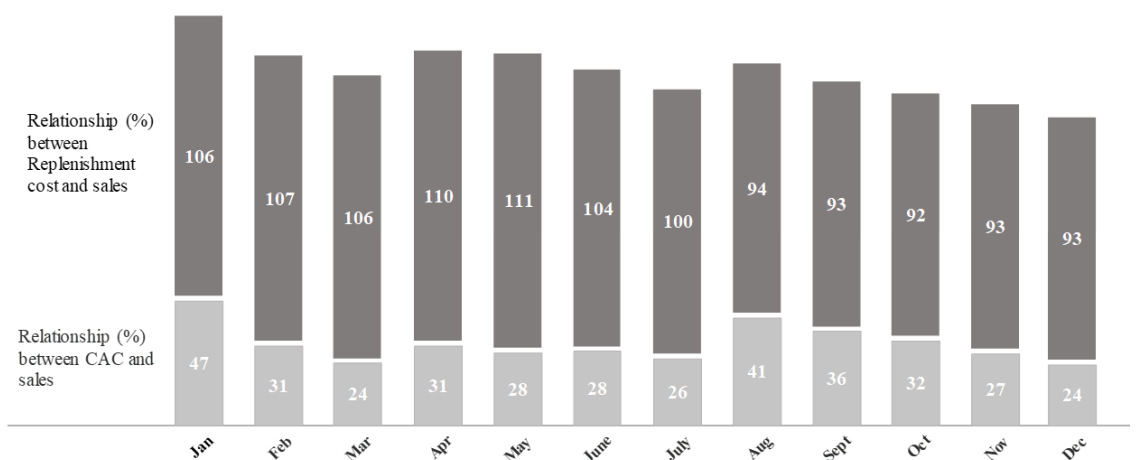
Regarding this matter, all the other respondents echoed the tremendous difficulty there was in covering all the

operational costs that are characteristic of the sector while the firm maintained such a rapid growth rate, highlighting standardization of processes such as picking and packing as major areas for improvement. “By working with relatively limited product and packaging ranges, we can see great potential,” said the COO. “Moreover, as we continue to grow, negotiations with last-mile logistics providers become much more important because of the potentials for savings in recurring deliveries and routes linked to the subscriptions.”

At the same time, the study also revealed the enormous potential for setting up win-win strategies with subscribers that permit cost reductions and, as a result, improved profitability for the model. According to the CMO, “for models like ours, it is critical to take full advantage of the very close relationship we have with our customers and look for mutual benefits.” An example of the firm putting this into practice was the suggestion of dates and delivery slots to subscribers, which allowed them to optimize transport and all the other processes on the supply chain. “In exchange, the firm offered discounts in future deliveries or added a complementary gift product depending on the subscriber’s preferences.”

Figure 5 illustrates this situation clearly. It shows the evolution of how much revenue is used proportionally for CAC and for the cost of replenishment for the last year of study. During that fourth year, the company had heavily focused on cost control, which can be seen in the graph through the monthly decrease of the sum of both costs compared to the total sales. Nonetheless, the sum of both costs has always exceeded overall sales, which gives an idea of the need for investment at the firm during growth stages such as the one it was going through.

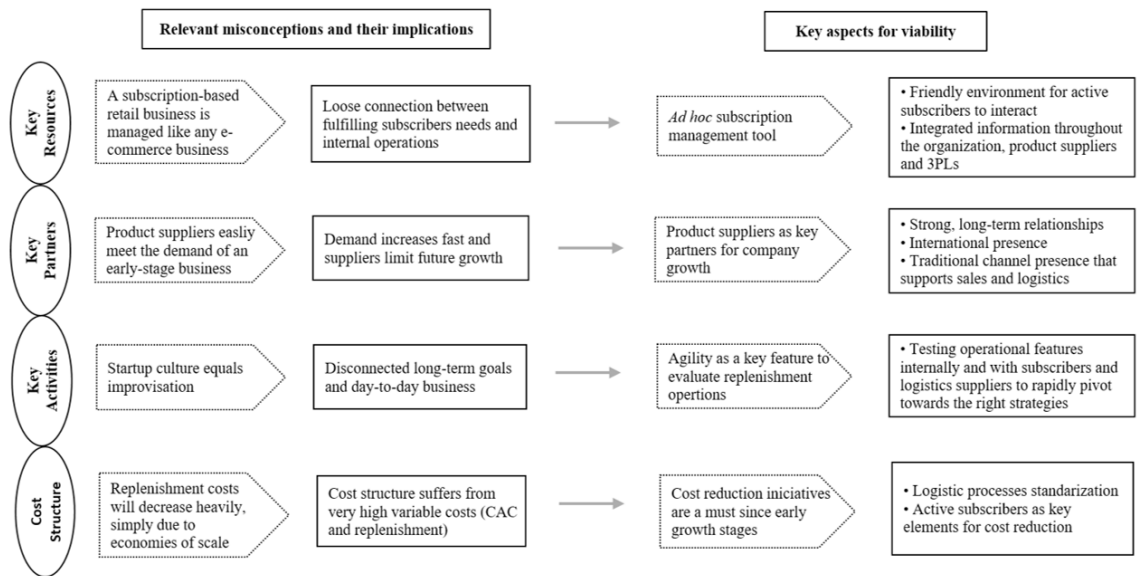
Figure 5 Annual evolution of the proportion of sales that covers the CAC and the cost of replenishment (year 4 of the study).



Finally, Figure 6 summarizes the key aspects for the viability of the subscription box business model for the

remaining elements of the BMC (Key Resources, Key Partners, Key Activities, and Cost Structure).

Figure 6 Key aspects for the viability of the replenishment subscription box business model for the last four elements of the BMC.



5. Discussion

The complete development of the replenishment subscription box business model, together with the case study’s longitudinal approach, has allowed us to understand the aspects that are key to ensuring the viability of firms using the model.

Our study reveals that developing the business model for replenishment subscription boxes correctly presents major challenges, even though it is considered to be a model that promises a solid customer base and some stability in demand and revenue (Rudolph et al., 2017). Demand forecasting was more complex than expected, despite the subscription model (McCarthy et al., 2017). This is because of the rapid growth that this type of e-commerce company aspires to – particularly during the initial stage: extending to new markets, and increasing the box range on offer, which is necessary to cover the growing demands of customers (Bischof et al., 2020) – generate great uncertainty in the acquisition values and churn rate that are a major hindrance to management.

At the same time, the profile of a replenishment box subscriber revealed that the characteristic search for convenience (Tao and Xu, 2018) can take different guises. On the one hand, some subscribers demanded a high degree of personalization in the service; for them, the extra tools such as the subscription app were of great importance, allowing them to configure aspects to their own taste such as the products in the subscription (for each delivery), the quantities, and the mode, frequency, place, date and time of the delivery, as well as any returns. Such a great need for personalization is in line with previous research by Bischof et al. (2020), as they considered such aspects as the intervals

between deliveries and the ease of product returns as being key in these models.

On the other hand, some consumers see the box as a way of not having to worry at all about receiving a guaranteed delivery, which requires a very deep level of understanding of the consumer – critical in order to maintain a stable churn rate and ensure the model’s viability (McCarthy and Fader, 2017). Thus, in line with Warrillow (2015), part of the success of replenishment subscription box models involves being able to manage a large amount of data about subscribers, in the form of their consumption, preferences and other information, which has to be shared with product suppliers and also 3PLs in order to align the supply chain. Moreover, this integration becomes increasingly critical as the company expands, as it will boost agility in decision-making processes regarding the replenishment system, which is key to ensure the viability of the subscription business.

In turn, correct information management allows replenishment subscription box firms to tackle another of their weak points: replenishment costs, most of which are for logistics (Warrillow, 2015; Rudolph et al., 2017; Bischof et al., 2020). Our experience demonstrated that a communications channel with subscribers, like the app, can be used to set up win-win strategies such as reconciling deliveries to optimize and reduce the price of transport in exchange for a reward for the subscriber. The use of the traditional sales channel, in addition to being a potential revenue stream (Rudolph et al., 2017), was also another alternative way of taking advantage of already established networks and being closer to customers, as well as reducing last-mile costs. Finally, optimization of logistics processes from the earliest stages, which is not very widespread among

e-commerce start-ups because of the inherent chaos in their growth (Acquila-Natale et al., 2019), turned out to be another key to the firm's success.

Regarding the difficulties controlling costs and making the models viable (McCarthy and Fader, 2017), client acquisition costs are another great dilemma for replenishment subscription box models. Bray et al. (2021) had already remarked on the importance of trials as a key element in acquiring subscribers. Our study reinforces this theory and highlights maximum optimization of the acquisition effort by playing down the importance of dates that are traditionally important in e-commerce, such as Black Friday, and focusing on subscribers that are more reserved shoppers but who have a mid-to-long term view, which means the free trial is targeted at a profile that is of interest to the firm (Baxter, 2016).

Our study shows the success of firms with replenishment subscriptions lies in their capacity to move the focus of the recurring revenue that these models generate away from the different profiles of the customers they supply and more towards nuances in the needs that they meet in each of those customer segments. The complexity of this change of focus lies in the fact that acquiring loyalty in the subscribers of the replenishment subscription box requires additional effort, which, if not correctly focused, can easily lead such companies to bankruptcy (McCarthy and Fader, 2017). On the one hand, obtaining sustainable growth for the firm while simultaneously keeping CAC under control requires great precision when acquiring customers from the target segments in order to minimize the "loss" of the free trials in a high churn rate during the initial stages. On the other hand, firms must focus on optimizing replenishment costs from the outset because the rapid expansion of these models, together with the need to ensure excellent service to subscribers, can put the viability of the model in jeopardy.

6. Conclusions

This work is a major contribution to the literature on subscription boxes as it is the first to analyze in detail these highly innovational business models by using longitudinal data. Specifically, our study has centered on replenishment subscription boxes and has responded to the following research question: What are the key aspects for the viability of the business model of the replenishment subscription box? Our answer has been supported by the consolidated theoretical framework of the Business Model Canvas, which the literature on such subscription boxes required in order to encompass all the keys to this business model. Furthermore, the four-year longitudinal case study allowed us to complement the current knowledge in the literature, which is wide-ranging in terms of subscriber acquisition, with a mid-to-long term view that gives some idea of many of the keys to creating loyalty in this sector.

Firms that opt to have a replenishment box subscription box model, or redefine their already established, stable business model, will find our work to be a guide containing the key aspects for their development based on a case study of a success in the sector. Because this is a single case study, our research may not be extendable to all the firms in the sector; however, the purpose of this research is not so much to generalize conclusions but rather to expand the analytical generalizability of all the key aspects to consider in order to ensure the viability of the business model in firms with replenishment subscription boxes. The knowledge generated by this analysis and the later discussion can also offer important insights for academics and managers.

Furthermore, the application of a structured framework such as the BMC can act as a guiding tool in the comparison of business models both between competitors within the replenishment subscription box sector and between the current model and the evolution of a single firm. Thus, any firm can determine the strengths and weaknesses of many business models.

Future research could focus on analyzing a wider sample that would make it possible to find differentiating elements that can be generated by alternative replenishment subscription box business models. Moreover, our study was definitively marked by the stage of constant growth that the firm in question was undergoing. As the market matures and some firms establish themselves as long-term players, research should reanalyze the business models and evaluate the keys that led them to triumph in the long term. Finally, the omnichannel model is increasingly being seen as the path to take both by traditional brick-and-mortar retailers and pure players. Thus, future research could look more in depth at the benefits that online subscription boxes could provide and the synergies they have with the traditional sales channel. As these models continue to grow in the market, we consider that it is important to know how to correctly structure the business model and what the key aspects are for ensuring that that model continues to be viable in the long term.

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