



Customer satisfaction in the pet food subscription-based online services

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Abstract

Pet food subscription-based online services (SOS) fulfill the demand for pet food that fits pets' characteristics and health necessities. The present research explores the antecedents of pet food SOS customer satisfaction and its effect on continuance intention, positively moderated by price. 28,786 online reviews from 10 pet food SOS brands were collected from Trustpilot to generate a term-frequency matrix through text mining techniques and used as an input to construct a structural equation model. Results suggest that e-service quality (E-SQ), perceived healthfulness, ingredients and nutritional composition, and packaging positively influence customer satisfaction, subsequently predicting continuance intention. In turn, price was not confirmed as a positive moderating factor in the relationship between customer satisfaction and continuance intention.

Keywords Pet food · Subscription-based online services · E-service quality · Customer satisfaction · Continuance intention

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1 Introduction

Subscription-based online services (SOS), or subscription box retailing, are an e-commerce business model that provides a periodical delivery of customized boxes of products directly to consumers upon payment of a subscription fee, fostering a sense of personalization and continuity [1, 2]. In recent decades subscriptions started to include online processes, and motivated by their convenience and value-for-money characteristics (not necessarily cheaper), the subscription economy is experiencing massive growth [3, 4]. Valued at USD 196.35 billion in 2023, the growth rate of the global subscription e-commerce market is 65.80%, with an estimated value of USD 1,482.11 billion by 2027 [5]. Moreover, the decreasing interest in in-store shopping and the rise of online retailing has led to the increase of SOS in a wide range of products, such as pet food [1, 6].

This niche emerges from pet owners' attachment to their pet friends and increased concerns about pet health and nutrition [7]. Additionally, the frequency of delivery convenience increases the appeal of this subscription model [3]. Acknowledging the impact of regular pet food deliveries on customer satisfaction is crucial, especially given the substantial growth of unique challenges presented by high churn rates [8, 9]. Pet food SOS provides niche pet food (e.g., fresh, human grade), usually at premium prices compared to traditional kibble-type pet food [10, 11]. Thus, increasing expectations towards high-quality ingredients and pets' health benefits [10, 12]. In addition, pet food SOS offers a distinct context where customers' emotional attachment to their pets intersects with the healthiness concerns related to pet food, creating unique motivations and expectations [7]. This particularly requires understanding how it affects customer satisfaction with this subscription model. Customer satisfaction is pivotal in influencing SOS adoption and is a key competitive advantage in the ever-evolving e-commerce landscape [8]. Moreover, in satisfaction-related research, it is widely recognized as a driver of service continuance intention [13–15].

However, despite the growing importance of the pet food attributes [16] and the well-reported importance of e-service quality in the e-commerce [17], the literature lacks studies that specifically address customer behavior within the pet food SOS context. While customer behavior in SOS models is emerging as a research focus, most existing studies predominantly explore the fashion and beauty industry, primarily driven by hedonic motivations [1, 3, 18]. These findings are unlikely to apply to replenishment, given its utilitarian value. Furthermore, the subscription motivations were found to be category-dependent [3, 19, 20], so it is highly relevant to understand if they differ in the specific case of pet food SOS. Despite the number of research on customer satisfaction, no studies have yet measured customer satisfaction in the SOS context. Currently, most studies entailing customer satisfaction were applied in traditional stores (e.g., [17]), supermarkets (e.g., [21]), and delivery services (e.g., [22]).

To bridge this gap and enrich our knowledge of pet food SOS, this study aims to investigate customer satisfaction and its impact on continuance intention, which relationship was posited as being positively moderated by the latent variable price. By examining dimensions such as e-service quality, food's healthfulness, ingredients and nutritional composition, and package, we aim to provide insights that meet pet food subscribers' unique requirements and expectations. Additionally, we aim to

acknowledge the positive moderation effect of price among the relationship between customer satisfaction and continuance intention. To achieve this aim, 28,786 online customer reviews were collected from the ten most reviewed pet food SOS brands on Trustpilot.

Online reviews have been widely established as spontaneous and truthful clients' perceptions [23, 24], overcoming two survey-based research limitations such as smaller and often biased samples [25]. Hence, online reviews are critical secondary data sources for business management to understand customers' expectations and support decision-making [26, 27]. Moreover, analyzing consumers' online review writing behavior is also essential to understanding subscription services consumers [28]. Following the [24] approach, a term-frequency matrix was created through text mining techniques by pairing each retrieved online review with a validated dictionary. The term-frequency matrix was then used as an input to evaluate the model relationships using partial least square structural equation modeling (PLS-SEM). With the present research, we aim to enrich knowledge on pet food SOS' customer satisfaction and the subsequent impact on continuance intention. We also provide pet food SOS managers with practical measures to achieve customer satisfaction and strengthen their business.

2 Literature review and research hypotheses

2.1 E-service quality and pet food SOS customer satisfaction

Electronic service quality (E-SQ) has emerged as an adaptation of service quality to the digital environment within the pet food SOS [17, 29]. E-SQ comprehends the whole transaction from the beginning to the end, including the post-interaction services vital to the pet food SOS context [30]. It is how much a website allows the shopping, purchasing, and delivery experience to be efficient and effective in the pet food SOS [29, 31]. E-SQ's positive relationship with customer satisfaction has been established in pet food SOS-related e-commerce context, such as online shopping and delivery services tailored to pet owners' needs and preferences [12, 22]. Scales comprehending different dimensions have been developed to measure E-SQ within this context [32, 33]. Given the delivery nature of pet food SOS, two E-SQ dimensions expected to affect customer satisfaction within this context are customer service and fulfillment, which encompasses stages such as pet food production, subscription payment, and delivery that are paramount in the pet food SOS experience [34].

Customer service in the pet food SOS context refers to the online store's overall service level and return/handling policies during and after the sale, encompassing specific aspects related to pet food production, subscription management, and delivery [35, 36]. Without face-to-face contact, online stores within pet food SOS can provide communication channels like phone numbers or emails for customer service contact [17]. Meeting or exceeding customer service expectations is crucial for online customer satisfaction within the pet food SOS context [35, 37].

In our study, we explore E-SQ within the unique context of pet food SOS, where customers' emotional bonds with their pets merge with health concerns related to

pet food. This convergence creates distinct motivation and expectations among customers. Understanding how these factors influence customer satisfaction within this subscription model is crucial. Recognizing these nuances is essential for enhancing E-SQ in this specialized and competitive market.

Fulfillment concerns activities that ensure customers within the pet food SOS receive the product within the estimated time frame for delivery, at the expected price, and in mint condition [30, 31, 35]. In the SOS context, fulfillment encompasses the order and delivery processes of the subscription box [28]. Regarding the pet food delivery business, fulfillment activities such as preparation and delivery details are key factors that positively affect satisfaction [34]. Providing accurate and positive product information on websites and timely deliveries is crucial to prevent adverse outcomes such as post-payment dissonance or order cancelation [38, 39]. Therefore, the following hypothesis is proposed:

H1 *E-service quality positively influences pet food SOS customer satisfaction.*

2.2 Perceived healthfulness and pet food SOS customer satisfaction

One of the most critical attributes for pet food buyers is health [40, 41]. Due to the humanization of pets [42], customers' concern over pets' health has grown along with the concern for human health [11]. Thus, healthfulness becomes highly relevant in pet food SOS as pet owners are now looking for pet food that addresses pet health problems, such as being overweight, skin allergies, or digestive health [16, 43].

In this study context, healthfulness relates to customers' perceived fulfillment of pets' specific needs and well-being. Many authors have found healthiness an essential attribute customers prioritize when buying pet food [40, 44]. Literature states that as pets become part of families [45], owners are more aware of the well-being of their pets [46], and the perception of pet food healthfulness has become crucial for pet owners. In addition, pet owners with higher attachment to their pets are more concerned with the healthfulness provided by pet food [7]. Accordingly, in the context of pet food SOS, the possibilities of pet food curated to pets' special needs raise expectations toward pets' healthfulness and well-being [12].

Thus, in this study, we explore the pet food SOS context, in which the tailored nature of the service leads to higher expectations from pet owners [12]. Therefore, the following hypothesis is proposed:

H2 *The perception of pet food's healthfulness positively influences customer satisfaction.*

2.3 Ingredients and nutritional composition and pet food SOS customer satisfaction

Pet food ingredients and nutritional composition are important factors concerning pet food selection [46]. In this regard, the pet food SOS context presents a complex sce-

nario where ingredients and nutritional composition are chosen under a pet's specific profile [12]. Pet food can contain many ingredients, such as meat (e.g., chicken or pork), fish (e.g., salmon and tuna), grains, or vegetables.

Due to the wide range of information (e.g., the Internet, veterinarians, books, and other pet owners), owners are now more aware of the importance of pet food ingredients and nutrition [46]. Motivated by objective and subjective pet food knowledge, some ingredient attributes, such as "natural" or "organic," are perceived by pet owners as beneficial for pets [46, 47]. In contrast, other ingredients, such as grains, are perceived as harmful and unsafe [47, 48]. In addition, some pet owners prioritize targeted nutrition options, such as size, breed, or age-specific nutrition [16, 48]. Thus, pet owners are more likely to seek nutritionally balanced pet food while avoiding questionable ingredients [43, 47]. In this regard, the curation features, as well as the niche pet food [11], present by pet food SOS result in higher expectations that customers want to fulfill [12].

Although ingredients have been extensively regarded as a fundamental factor in the pet food buying decision [41, 48], there is a gap in addressing the context of pet food SOS-tailored ingredient selection. This context leads to higher expectations from pet owners, motivated by their attachment to their pets [7, 12]. Therefore, the following hypothesis is proposed:

H3 *Pet food's ingredients and nutritional composition positively influence customer satisfaction.*

2.4 Package and pet food SOS customer satisfaction

Studying the influence of packaging in the pet food SOS on customer satisfaction is critical for understanding customer behavior. The package increases a product's attractiveness without changing the physical properties of the product [49, 50]. In the context of pet food, packaging plays a crucial role in ensuring that the product arrives at its destination in the best conditions, and its prominence relies on containment, communication, convenience, and protection from the external environment [51]. Given the perishable nature of food products, effective packaging is vital as it cannot be easily restored or replaced [34]. While previous research on in-store pet food purchases suggested that packaging was less critical for customers' decision-making than other attributes [46], package design is critical for those who use online channels [44]. Understanding how pet food SOS packaging characteristics positively impact customer satisfaction is vital.

Within pet food SOS, the context of packaging refers to the design and package functionality used for delivering pet food products [44]. Effective packaging ensures that the pet food products arrive in optimal condition, meeting customer expectations.

Previous studies have highlighted the importance of packaging in the food industry, emphasizing its role in preserving product quality and enhancing the overall customer experience [52]. While traditional in-store pet food purchases and packaging may have had a relatively lower influence on customer decisions than other attributes [46], online pet food buyers have shown a greater reliance on package design [44].

This shift underscores the evolving significance of packaging in the pet food SOS, where customers make purchasing decisions based on extrinsic attributes [53].

The current study addresses this gap in the existing literature by specifically investigating the influence of pet food SOS packaging on customer satisfaction. While packaging has been recognized as a critical factor, its distinct impact in the context of pet food SOS remains relatively unexplored. Understanding how packaging characteristics contribute to customer satisfaction in this unique setting is vital, given the increasing popularity of pet food SOS models [1, 8]. Accordingly, this study aims to provide valuable insights for pet food businesses operating in the online subscription-based market.

Based on the importance of packaging in influencing customer satisfaction within pet food SOS, we propose the following hypothesis:

H4 *Pet Food SOS Package positively influences customer satisfaction.*

2.5 Customer satisfaction and continuance intention

Customer satisfaction is widely studied in marketing, often associated with the expectation-confirmation theory (ECT) [54, 55], also in the modern e-commerce context [17, 52, 56], and posited as a significant predictor of continuance intention [14]. Customer satisfaction is the judgment of the consumption-related fulfillment provided by a product, service, or its features [57, 58]. It is an attitude or behavior that corresponds to the customers' comparison between the outcomes of the purchase and the anticipated expectations [55, 59, 60].

In this study, customer satisfaction is a comprehensive measure of how well the pet food SOS aligns with customers' unique expectations, considering factors such as E-SQ, perceived healthfulness, ingredients and nutritional composition, and packaging. Pet owners within the SOS model have distinct motivations and expectations rooted in their deep commitment to their pets' well-being [7].

Previous research and foundational theories, including ECT and the disconfirmation-of-expectation model (DEM) [54, 61–63], have affirmed the pivotal role of satisfaction in shaping behavioral intentions, particularly continuance intention [18, 64]. Continuance intention pertains to a consumer's intention to use a pet food SOS during the post-adoption period, a consideration of significant relevance in the SOS businesses due to the high churn rates [8, 9]. While monthly fees are associated with subscription models and can lead to service cancellations, our study draws on existing literature to highlight the unique dynamics of the pet food SOS, emphasizing that satisfied customers are more likely to remain loyal to the service [13, 22, 65].

While the link between customer satisfaction and continuance intention is well-established, our research seeks to delve deeper into the intricacies of this relationship within the unique pet food SOS, where customers reveal distinct motivations and expectations [7]. By examining this relationship, we aim to provide valuable insights currently lacking in the extant literature.

Thus, the following hypothesis can be formulated:

H5 *Customers' satisfaction positively affects their continuance intention in the pet food SOS context.*

2.6 Moderating effect of price

Price holds significant relevance for the present research since pet food SOS often carries a higher price tag than traditional pet food, influencing decision-making and subscription abandonment [3, 12]. In the pet food SOS context, subscription cancellations due to dissatisfaction with the periodic subscription fee are common [8]. In addition, Pet food SOS provides customers with niche and premium pet food (e.g., fresh, human-grade), more expensive than traditional kibble-type food [11, 12]. Thus, understanding the moderating role of price in the satisfaction and continuance intention relationship is highly relevant in the pet food SOS context, as those are fundamental aspects of keeping and growing a customer base [66].

In e-commerce, price refers to the monetary value a customer pays for a product or service through online platforms, such as pet food SOS [67]. Existing literature has established a positive relationship between price and customer satisfaction in the online food context [68]. Additionally, price has been recognized as a moderating factor in the connection between customer satisfaction and behavioral intentions in the retail industry [69]. In the subscription service landscape, value for money has emerged as a key motivator and potential barrier [3]. Furthermore, although pet food subscription customers have been revealing a preference for lower price levels within various pricing options [12], higher levels of commitment to pets' well-being for pet food customers lead to less importance placed on price [7]. Additionally, higher prices, inherent to the niche and premium nature of pet food SOS, contribute to a sense of superior product quality and pets' well-being [10, 11]. In this regard, fulfilled or exceeded expectations results in a willingness to pay premium (higher) prices in the future [70]. Perceived premium services have a positive impact on the service's continuous use [71]. Thus suggesting that price could operate as a positive moderator between customer satisfaction and continuance intention within the subscription context.

Despite the existing body of literature on the interplay between price, customer satisfaction, and behavioral intention, a research gap exists in understanding these dynamics within the pet food SOS context. This unique context of subscription services designed for pets' needs presents distinctive challenges and opportunities, including the price sensitivity of pet owners' commitment to pets' well-being, the price-related abandonment rates [7, 8] and the usually higher prices than traditional pet food [12]. Therefore, the following hypothesis is proposed:

H6 *Price positively moderates the effect of customer satisfaction on continuance intention.*

Grounded in the previous hypotheses, the following conceptual model was developed (Fig. 1):

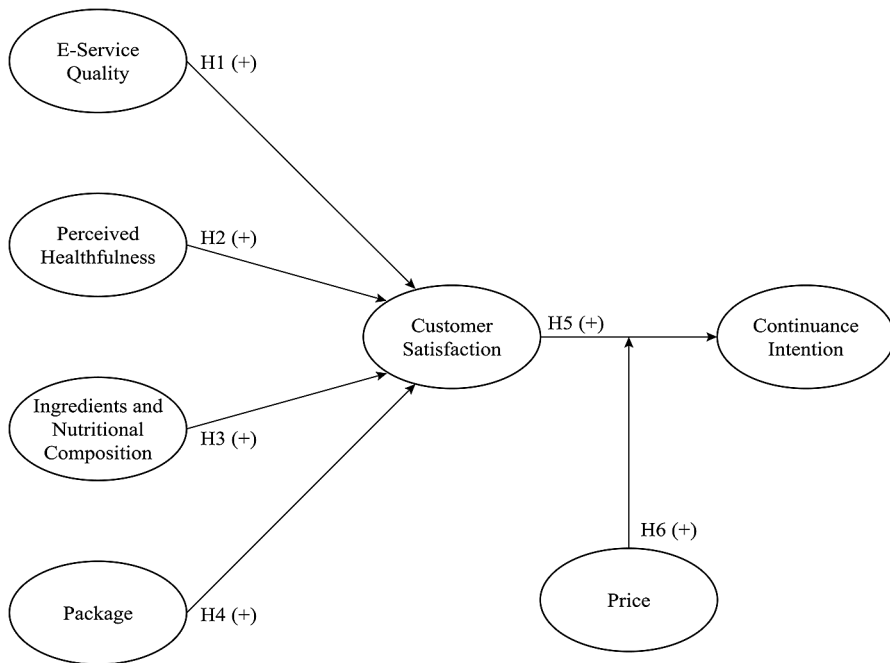


Fig. 1 Conceptual model

3 Methodology

Through online reviews, consumers can express and share their opinions online, reporting their experiences, purchased products, and services quality/performance while providing large quantities of data to marketing managers [27, 72]. This secondary data source enables the evaluation, measurement, understanding, and interpretation of consumers' behaviors [73]. Online customer reviews were collected from the Trustpilot website to study pet food SOS customer satisfaction and continuance intention. Following [24], this study combined two techniques for data analysis comprising text mining and PLS-SEM. Text mining was used to analyze individual reviews, a frequently used technique in customer satisfaction based on their own online reviews [74, 75]. For causality assessment in the conceptual model, the variance-based technique PLS-SEM was undertaken [76].

3.1 Data collection and pre-processing

This study analyzed customers' online reviews published on the Trustpilot website from January 2020 to June 2022 regarding their experiences with the product, brand, or service acquired. Trustpilot is a rapidly growing consumer review website widely used to share opinions on businesses [77], including the pet food SOS. This platform delivers rich and valuable insights to understand customers' opinions [78]. The brands used for this analysis were selected based on two criteria: (1) only brands that work exclusively with pet food SOS were selected to guarantee that the analyzed

reviews concern only pet food SOS; (2) only the ten most reviewed brands were chosen. For the data collection process, we used Octoparse, a web scraping software [79]. This type of software allows the extraction of large quantities of data from web pages into a structured spreadsheet, allowing easy management in a posterior analysis [80]. The selected brands and inherent number of reviews extracted are displayed in Table 1. 29,723 reviews were retrieved from the platform and analyzed individually content-wise for the data analysis process.

Online reviews are data in a non-structured text format [81]. Once the data collection was completed, the data was pre-processed to meet each model's construct. We used the open-source R software, an integrated suite of packages that enables different statistical and graphical techniques [82]. This coding-based tool offers more flexibility and tailored solutions for the data analysis [83].

As the reviews were in different languages, we translated them into English using the R package 'translateR' with the Google Translate API, already used by other authors for the same purpose [84, 85]. Then, the data was structured through the following steps: (1) tokenization, which consists of breaking the text into units (e.g., words and sentences); (2) cleaning non-text data, like images or HTML links; (3) removing stop words, articles, and adverbs with no significant meaning; (4) converting all words to lowercase; (5) and stemming, which consists of reducing inflected and derived terms into their radical or root form (e.g., "dog" and "dogs" will both be read as "dog") [86]. This process was completed using the 'tm' package, a widely used package for text mining applications in R [87, 88].

Upon the literature review on each construct, the inherent theoretical concepts were retained to create a structured dictionary with the model's constructs and related items for each construct. To guarantee the most accurate term-assignment process, 5% of the sample was randomly selected and assessed for consistency regarding each term classification [89, 90]. Since the definition of a dictionary and its terms are subjective [24, 83], the structured dictionary was validated by a panel of three independent multidisciplinary experts (a food engineer, a marketing professional, and a marketing academic) to reduce subjectiveness. An excerpt of the generated dictionary is presented in Table 2.

After validation, the online reviews were paired against the dictionary to create a term-frequency matrix [24]. Each term retrieved from the online reviews was

Table 1 List of the 10 pet food SOS brands and the number of extracted reviews

Pet Food SOS Brands	Number of Extracted Reviews
Tails	12,214
Butternut Box	5,888
Bella Duke	5,143
Pure Pet Food	1,901
Republic of Cats	1,078
The Farmers Dog	990
Ollie	737
Different Dog	690
Smalls	653
Nom Nom	429
Total	29,723

Table 2 Excerpt of the dictionary with sampled terms by construct

Construct	Items	Sample of terms
E-Service Quality	Service Level	service, email, contact
	Return / Handling Policies	change, switch, replace
	Timeliness of Delivery	arrive, delay, schedule
	Order Accuracy	delivery, order, shipment
Perceived Healthfulness	Health	health, healthier, ill
	Digestive Health	stomach, digestion, intestine
	Weight Control	weight, overweight, fat
	Skin Allergies	skin, allergies, allergy
Ingredients and Nutritional Composition	Meat	chicken, meat, beef
	Fish	fish, salmon, tuna
	Vegetables	vegetal, potato, carrot
	Cereals	grain, rice, cereal
	Nutrition	nutrition, protein, vitamin
	Package	package, bag, pack
Package	Package	package, bag, pack
Customer Satisfaction	Customer Satisfaction	good, like, happy
Price	Price	price, money, expensive
Continuance Intention	Continuance Intention	return, continue, future

assigned to each item/construct in the dictionary above. Each line of the term-frequency matrix corresponds to one of the extracted reviews, and each column to an item of the model's construct. Therefore, each cell in the term-frequency matrix corresponds to an item's number of times or frequency in a specific review. Whenever an item was mentioned frequently, it was considered relevant to the individual. The term-frequency matrix was then used as the input for the model's path estimation through the PLS-SEM technique, mimicking individual responses to a survey built upon different and factor-tested measurement scales for each construct. All reviews with no terms classified into at least one of the theory-related concepts in the dictionary were excluded from the analysis. 937 reviews were removed from our dataset for having no hits. Our final dataset was composed of 28,786 reviews.

3.2 Data analysis

The term-frequency matrix was used as an input for PLS-SEM analysis to measure the relations between the data collected and the model's constructs. The PLS-SEM method provides the interchange between theory and data [91]. This method allows users to estimate complex models comprising many constructs, indicators, and structural paths without any assumptions on the data distribution [92, 93]. PLS-SEM enables unrestricted use of single-item and formative measurement models while considered superior to secondary data [93, 94]. The conceptual model was assessed using SmartPLS 4, a software for data analysis using the PLS-SEM method [95].

For the PLS-SEM analysis, a formative measurement model was considered, as the model's constructs were derived from the cumulative term frequencies of each unique indicator in the created dictionary. Formative models allow unique indicators not to be conceptually interchangeable nor correlated, as they correspond to "linear combinations of a set of indicators that form the construct" [91(p. 105)]. Similar to

other studies, latent variables like E-SQ [35, 96], and several healthcare indicators [97] have a formative measurement, as well as Ingredients and Nutritional Composition. Package, customer satisfaction, price, and continuance intention were assessed using single-item measures. The confirmatory tetrad analysis (CTA-PLS) was undertaken to test if a construct's item has a formative or reflective measurement model [98, 99], considering only constructs with at least 4 items. A tetrad consists of a pair of covariances and is expected to be zero in reflective measurement models, but when significantly different from zero, the reflective measurement model specification has to be rejected [98]. As most p -values are below 0.05, the reflective model determination is rejected. Moreover, the Standardized Root Mean Square Residual (SRMR) as a goodness of fit measure for the PLS-SEM [100] presents a value of 0.040 for the formative measurement model against 0.081 for the reflective measurement model, which surpasses the recommended threshold of 0.08 [101]. In the case of formative models, the latent constructs are dependent as a result of a combination of their non-interchangeable items [102].

The model was evaluated following the recommendations from [91, 93], which differ from reflective models' assessment. While item-response theory implies reflective indicators (effects), formative or causal indicators cannot be evaluated as reflective to avoid any model's coefficient bias [103]. Both composite reliability and average variance extracted cannot be used to assess formative indicators [104, 105]. A Bootstrap procedure of 10,000 subsamples was applied to test path model coefficients and significance. A significance level of 5% was defined to investigate critical path coefficient t -values (t -value > 1.96 for two-tailed tests). The model's internal multicollinearity and direct effects were evaluated through a regression analysis, examining the size and significance of the path coefficients between the variables. The R^2 statistic was computed to determine which percentage of the endogenous latent variable variation is explained by its exogenous latent variables. For predictive performance assessment, Q^2 values were obtained through the PLSpredict algorithm, considering a *ten*-fold cross-validation [91, 106]. A summary of our methodological approach is depicted in Fig. 2.

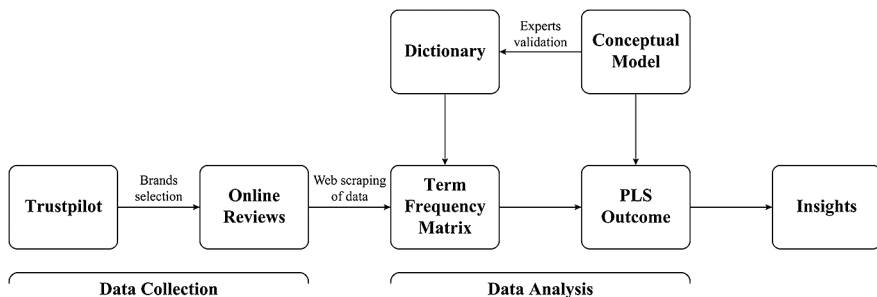


Fig. 2 Research process

4 Results

4.1 Formative measurement model evaluation

Descriptive statistics for each indicator, such as the range of frequency variation for each review, its mean, and standard deviation, are displayed in Table 3.

For formative measurement model validity, the model's indicators collinearity was analyzed by computing the variance inflation factor (VIF) through the PLS algorithm. A value below the critical threshold of 5 is recommended, with an ideal value below 3 [76, 93, 105]. As $1.000 \leq \text{VIF} \leq 1.199$, multicollinearity proved not to be an issue for estimating the path model. To proceed with the model's validity assessment, each formative indicator's relevance and significance were tested using the bootstrap estimation of 10,000 samples (Table 4).

All formative items' outer weights were statistically significant at a significance level of 5% as $p\text{-value} < 0.001$ for each (Table 4). Even though some indicators' outer loadings are less than 0.50 (timeliness of delivery, digestive health, weight control, skin allergies, fish, vegetables, and cereals), the outer weights are all significant. Therefore, all indicators were retained due to the theoretical support for each construct's specification. The removal of an item must be wisely weighed since its elimination may omit unique parts of the composite variable and reduce its theoretical

Table 3 Model's indicators descriptive statistics; Note: Min=Minimum; Max=Maximum; SD=Standard Deviation

Formative Variable / Indicators	Min – Max	Mean (SD)
E-Service Quality		
Service Level	0–42	1.226 (1.847)
Return/Handling Policies	0–12	0.479 (0.857)
Timeliness of Delivery	0–8	0.140 (0.437)
Order Accuracy	0–27	0.639 (1.092)
Perceived Healthfulness		
Health	0–11	0.325 (0.736)
Digestive Health	0–5	0.074 (0.307)
Weight Control	0–24	0.189 (0.729)
Skin Allergies	0–9	0.079 (0.440)
Ingredients and Nutritional Composition		
Meat	0–17	0.100 (0.485)
Fish	0–5	0.021 (0.178)
Vegetables	0–7	0.020 (0.208)
Cereals	0–8	0.039 (0.232)
Nutrition	0–10	0.134 (0.505)
Package		
Package	0–19	0.250 (0.814)
Customer Satisfaction		
Customer Satisfaction	0–16	1.711 (1.457)
Price		
Price	0–20	0.304 (0.852)
Continuance Intention		
Continuance Intention	0–9	0.113 (0.375)

Table 4 Summary of percentile bootstrapping estimation

Formative Variable / Indicators	Outer Weights (Outer Loadings)	t-values (p-values)	95% Percentile Confidence Interval
E-Service Quality			
Service Level	0.558 (0.769)	14.148 (0.000)	[0.477; 0.632]
Return/Handling Policies	0.503 (0.735)	12.773 (0.000)	[0.425; 0.579]
Timeliness of Delivery	0.190 (0.436)	4.417 (0.000)	[0.105; 0.274]
Order Accuracy	0.218 (0.544)	4.743 (0.000)	[0.127; 0.309]
Perceived Healthfulness			
Health	0.777 (0.852)	35.067 (0.000)	[0.731; 0.818]
Digestive Health	0.361 (0.433)	10.982 (0.000)	[0.294; 0.425]
Weight Control	0.325 (0.437)	10.860 (0.000)	[0.266; 0.385]
Skin Allergies	0.162 (0.246)	5.187 (0.000)	[0.101; 0.224]
Ingredients and Nutritional Composition			
Meat	0.414 (0.636)	8.558 (0.000)	[0.319; 0.508]
Fish	0.292 (0.473)	6.432 (0.000)	[0.198; 0.377]
Vegetables	0.168 (0.363)	3.451 (0.001)	[0.074; 0.267]
Cereals	0.278 (0.408)	6.131 (0.000)	[0.186; 0.364]
Nutrition	0.601 (0.707)	15.709 (0.000)	[0.522; 0.672]
Package			
Package	N/A	N/A	N/A
Customer Satisfaction			
Customer Satisfaction	N/A	N/A	N/A
Price			
Price	N/A	N/A	N/A
Continuance Intention			
Continuance Intention	N/A	N/A	N/A

Note: N/A=Not Applicable

validity [24, 102, 107, 108]. Service level and return/handling policies are the most relevant indicators for e-service quality construct formation, with outer weights of 0.558 and 0.503, respectively. Health is the most relevant indicator for the formative construct of perceived healthfulness (outer weight=0.777). For ingredients and nutritional composition formative construct, the broader indicator nutrition shows higher relative significance (outer weight=0.601).

For the model's stability evaluation, the confidence intervals were calculated through the percentile bootstrapping procedure, as this method outperforms both in terms of coverage and balance [109]. Also, as the outer weights' estimated values do not assume values beyond -2.0 and $+2.0$, there is no need to use the bias-corrected and accelerated bootstrap method [105]. The model's stability was established as all outer weights fell into the corresponding confidence intervals.

4.2 Common method variance

The variance in the model can be attributed to the measurement method instead of the constructs themselves, whenever a single-method approach for data collection is used [110, 111], a phenomenon widely known as Common Method Variance (CMV), which can bias the results for constructs' reliability and validity [112].

Harman's single factor test is a common technique to test the CMV [113] by computing all model's items at once in an Exploratory Factor Analysis. The single unrotated factor extracted from the analysis accounts for 14.774% of the model's variance and is below the 50% threshold [111]. Hence, no evidence of CMV was detected.

Another statistical approach that enables CMV detection is based on a full collinearity test [114] and consists of computing all VIF values for all constructs in the model. All values in Table 5 are below the cut-off value of 3.3 indicating no evidence of multicollinearity issues or evidence of CMV [115].

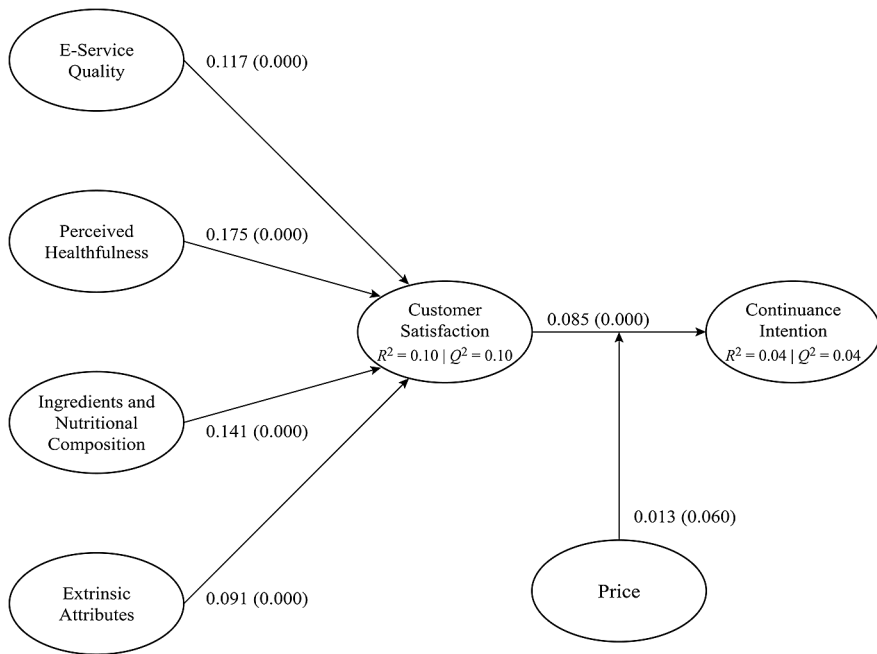
4.3 Structural model evaluation

The results regarding the structural model estimation are displayed in Fig. 3; Table 6. All path coefficients returned as statistically significant. Consequently, all formulated hypotheses were supported. E-SQ ($\beta=0.117$, $p<.001$), perceived healthfulness ($\beta=0.175$, $p<.001$), ingredients and nutritional composition ($\beta=0.141$, $p<.001$), and

Table 5 VIF results for the inner model

Variables	CI	E-SQ	INC	PH	PK	PR	CS
CI	–	1.067	1.081	1.065	1.079	1.079	1.084
E-SQ	1.134	–	1.137	1.107	1.106	1.118	1.122
INC	1.121	1.115	–	1.089	1.077	1.032	1.087
PH	1.125	1.123	1.114	–	1.110	1.117	1.112
PK	1.062	1.043	1.056	1.059	–	1.056	1.048
PR	1.167	1.142	1.116	1.130	1.139	–	1.144
CS	1.108	1.101	1.092	1.080	1.088	1.092	–

Note: CI=Continuance Intention; E-SQ=E-Service Quality; INC=Ingredients and Nutritional Composition; PH=Perceived Healthfulness; PK=Package; PR=Price; CS=Customer Satisfaction

**Fig. 3** Structural measurement model results

Note: Values correspond to path coefficients (β) and p -values in parentheses

Table 6 Structural model results and hypotheses decision; Note: β =Path Coefficient

Hypothesis	Path	β	t-value	p -value	Decision
H1	E-Service Quality \rightarrow Customer Satisfaction	0.117	14.074	0.000	Supported
H2	Perceived Healthfulness \rightarrow Customer Satisfaction	0.175	22.704	0.000	Supported
H3	Ingredients and Nutritional Composition \rightarrow Customer Satisfaction	0.141	14.379	0.000	Supported
H4	Package \rightarrow Customer Satisfaction	0.091	12.168	0.000	Supported
H5	Customer Satisfaction \rightarrow Continuance Intention	0.085	11.007	0.000	Supported
H6	Price \times (Customer Satisfaction \rightarrow Continuance Intention)	0.013	1.883	0.060	Not Supported

package ($\beta=0.091$, $p<.001$), are revealed themselves as positive predictors of customer satisfaction. Thus, H1, H2, H3, and H4 were supported. Customer satisfaction was positively related to continuance intention ($\beta=0.085$, $p<.001$), supporting H5, while price is deemed not a significant moderator of the path between customer satisfaction and continuance intention ($\beta=0.013$, $p=.060$) at a significance level of 5%, but at a 10% level it is.

The structural model explained around 10.2% ($R^2=0.102$) of the customer satisfaction variance and 3.70% ($R^2=0.037$) of continuance intention. R^2 values should be interpreted based on the context [93]. Since the present research concerns consumer

behavior, values of 0.20 are considered high. Therefore, these values reflect the model's moderate explanatory power on customer satisfaction and a weaker explanatory power over the continuance intention. The Q^2 values concerning the same variables were above 0, evidencing the model's predictive capacity (Fig. 3).

5 Discussion and implications

This study was conducted solely upon secondary data analysis and followed a two-fold statistical approach to analyze customer satisfaction and its effects on continuance intention in the pet food SOS context: (1) A text mining approach applied over 28,786 valid online reviews extracted from Trustpilot; (2) Structural Equation Model, based on a variance-based technique (PLS-SEM) so that conceptual's model relationships could be tested and validated.

All postulated relationships between the formative constructs were deemed significant. Customer satisfaction was identified as vital for consumer retention and continuance intention in the pet food SOS and proven to have a positive dependency on different factors, such as E-SQ, perceived healthfulness, ingredients and nutritional composition, and package.

5.1 Theoretical contributions and implications

This study contributes to the theory by proposing a new perspective on how SOS can assist the customers' needs. By focusing on the pet food SOS market, this study reinforces the centrality of customer satisfaction as a central driver of continuance intention, client retention, and loyalty [14]. Our study underscores the importance of meeting and exceeding customer expectations to enhance or maintain high levels of customer satisfaction, extending the application of ECT in the subscription services [116, 117], and shedding light on how it operates within the pet food SOS market. Our research empirically validates that customer experience significantly influences overall customer satisfaction [118]. This understanding underscores the profound customer experience impact on fostering long-term relationships between customers and brands, contributing to consumer behavior theory. These contributions enhance our understanding of customer behavior and loyalty within the context of pet food SOS, filling a critical gap in the existing literature. It also contributes to satisfaction-related theories by reinforcing the relevance of customer satisfaction as an essential driver of continuance intention, client retention, and loyalty, as posited by [14], also in the pet food SOS market.

Regarding the ECT, our study's findings posit the importance of meeting or exceeding expectations to retain higher customer satisfaction [116, 117]. Customer experience is verified to be entirely reflected in customer satisfaction by [118], leading to a long-term relationship between customers and the brand. The findings from this research also contribute to the consumer behavior theory, reinforcing customer satisfaction as an essential factor influencing buying behavior.

5.2 Managerial contributions and implications

As for practical contributions to the marketing field, based on this study's results, pet food SOS can increase their assessed e-service quality by improving user experience on their websites and mobile apps [119]. Customizable options are precious [120], such as ingredients and delivery options to meet customers' specific needs and to increase their satisfaction and loyalty.

The structural model results indicate that E-SQ positively influences customer satisfaction, consistent with previous findings on SOS-related contexts, such as the online shopping [9, 17] and delivery services [1] while advancing the knowledge on pet food services. The importance of the different E-SQ dimensions included in the study, like order fulfillment and customer service, was also established. Order fulfillment is essential in a subscription business model, including timely deliveries and orders' delivery in good condition, which is the leading enabler of service quality perception and customer satisfaction [9, 35]. Results also show evidence of service level and returning policies related to customer service strongly influencing E-SQ. Therefore, pet food SOS must seek timely and effective customer service management of customers' concerns [17]. To provide more efficient and timely customer service, further investment in staff training and new technologies adoption (e.g., chatbots and online help desks) should be made, promoting customer satisfaction levels [121].

These pet food SOS provide diverse food choices according to pets' characteristics and health conditions. Thus, healthfulness was expected to influence customers' expectations greatly, which was validated. Hence, a positive relationship between perceived healthfulness and customer satisfaction was also recognized, supporting the idea that pet owners expect pet food to contribute to the well-being of their pets [16, 46]. Veterinarian know-how is crucial to achieving the desired health benefits from the pet food [122]. Thus, pet food SOS marketing and communication strategies should emphasize the experts' participation in pet food production.

As customer pet food knowledge increases, pet owners are more conscious about pet food ingredients and nutrition [46]. The study identified ingredients and nutritional composition as positively affecting customer satisfaction, corroborating previous research [16], reflecting the rising interest in pet nutrition, as the item nutrition returned the highest impact.

Investment in packaging may be a suitable way to increase customer satisfaction [123]. Packaging indicator was deemed highly relevant and a positive relationship with customer satisfaction was established. Using high-quality and sustainable materials [124] and personalized packaging [125] can contribute to more appealing and effective packaging. Nevertheless, these results challenge previous research on pet food packaging, which is suggested to have little impact on customers' decisions [16] but in the offline shopping context. With no access to sensory perceptions, online customers' decisions tend to be based on packaging attributes [53], which should be a relevant matter within the marketing strategy for the company.

Satisfaction is a central link between the customers' service evaluation, including E-SQ, perceived healthfulness, ingredients and nutritional composition, and packaging, and their decision to continue using the service. This result aligns with the ECT, where customer satisfaction is often a predictor of their intention to continue using a

service [54, 55]. It is imperative for companies to focus on balancing product, communication, and E-SQ on enhancing the overall customer experience. By ensuring high customer levels, loyalty is fostered, which is crucial for long-term success in a competitive market. Investments in improving customer satisfaction are likely to pay off in terms of increased customer loyalty and sustained revenue streams [8, 9].

While customer satisfaction is crucial for continuance intention, results suggest that the customers' decision to continue their subscriptions is predominantly influenced by their satisfaction levels, regardless of price. This result reveals a strong loyalty and perceived value that customers associate with the service [14], which outweigh cost considerations. For companies, this finding emphasizes the importance of maintaining high standards of product quality and E-SQ.

5.3 Limitations and recommendations for future research

All pet food SOS customer reviews were collected from the top ten brands on Trustpilot, within the pet food SOS industry, with more reviews, limiting the dataset built for the study and the inherent conclusions. Secondly, even though an independent panel of experts validated the dictionary, this process is always subjective [24]. It would be interesting to deploy a survey and compare survey-based results with review-based to guarantee method triangulation and the results' robustness. Thirdly, the analyzed period comprehends the Covid-19 pandemic lockdowns, which heavily impacted pet food customer behavior [126] and the online subscription market [8]. Fourth, the model considered customer satisfaction a unidimensional construct, as no reference in the dataset enabled the analysis of this construction for both cognitive and affective dimensions separately. Fifth, other antecedents of customer satisfaction could be explored for pet food SOS to potentiate the model's explanatory power, such as convenience and ease of use [3], as well as perceived usefulness and trust for continuance intention [66]. Sixth, no differentiation was done between first-time customers and long-time subscribers. Future researchers could study how customer longevity impacts pet food SOS continuance intention. Future studies could also distinguish between the type of pet food (e.g., kibble, raw, fresh) and pet category (e.g., dog food, cat food) and use these variables for manipulation in another experimental research. Finally, future studies could explore the impact of confounding factors such as text length, product information, and reviewer demographics on customer satisfaction in online services.

6 Conclusions

Pet food SOS fulfills the demand for pet food that fits pets' characteristics and health necessities [11, 16]. The peculiarity of this business model raises expectations that demand an understanding of customer satisfaction. The high churn rates associated with subscription models [8] justified the analysis of pet food SOS continuance intention. The present research aimed to study the antecedents of pet food SOS satisfaction and its effect on continuance intention. A text mining technique with the PLS-SEM method was used to infer the relationships among E-SQ, perceived healthfulness,

ingredients and nutritional composition, package, pet food SOS customer satisfaction, price, and continuance intention.

Overall, our findings support that health, ingredients and nutrition are fundamental aspects of pet food consumer decisions [16, 46] and corroborate previous findings on the relationship between satisfaction and E-SQ [18], packaging attributes [52], and service continuance intention [13]. However, we found no evidence of the positive moderating effect of price on the relationship between satisfaction and continuance intention, contrary to previous studies [69].

From a theoretical point of view, this research supports spreading the knowledge on pet food SOS' customer satisfaction and its subsequent impact on continuance intention. At a practical level, pet food SOS managers can use this knowledge to strengthen their business and understand the measures that can be implemented to achieve customer satisfaction. Moreover, regardless of the product, subscription-based business managers could implement the methodology used in this study to gain significant insights into customers' behavior. In sum, these guidelines are expected to help keep customers satisfied, and satisfied customers will continue to use pet food SOS.

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