ANÁLISIS DE LA EVOLUCIÓN DEL DISCURSO ACADÉMICO SOBRE EL COMPORTAMIENTO DEL CONSUMIDOR Y LA COVID-19 MEDIANTE EL MODELADO DE TEMAS

RESUMEN: el COVID-19 trajo cambios en los hábitos de los consumidores producto del confinamiento estricto durante el primer año de la pandemia y un segundo año caracterizado por retomar actividades bajo el modelo de la "nueva normalidad". Recientemente, han surgido revisiones de literatura que sintetizan los estudios disponibles sobre el comportamiento de los consumidores y la pandemia. Muchas de estas revisiones tienen un enfoque regional o específico a cada país, y otras destacan ciertos factores que fueron analizados al inicio de la pandemia. Por su parte, el presente estudio separa los temas más destacados identificados en la literatura publicada en 2020 con respecto a aquellos que hacen parte del acervo de 2021. Para ello, se acudió a una base de datos global de Scopus que muestra la evolución del discurso académico en torno al comportamiento del consumidor a medida que avanzaba la pandemia. Interesantemente, algunas diferencias muestran la evolución de los consumidores a lo largo de la pandemia, vista a través de los ojos de los investigadores. El modelado de temas destaca los principales temas estudiados en ambos años. Los resultados muestran la relevancia de cuatro temas principales que difieren de un año a otro. Sin embargo, temas como la investigación sobre el consumo electrónico siguen siendo igualmente importantes en ambos años. Así, los autores de este trabajo proponemos un modelo teórico de investigación del comportamiento de los consumidores que tiene como objetivo ayudar a los consumidores a entenderse a sí mismos, apoyar a los gerentes en el abordaje de estrategias pertinentes y propiciar que los responsables de la generación de políticas busquen regular los principales problemas ocasionados por la pandemia.

PALABRAS CLAVE: revisión de literatura, tendencias en marketing, consumidor en línea, pandemia, modelado de temas.

ANÁLISE DA EVOLUÇÃO DO DISCURSO ACADÊMICO SOBRE O COMPORTAMENTO DO CONSUMIDOR E A COVID-19 A PARTIR DA MODELAGEM DE TÓPICOS

RESUMO: a pandemia da covid-19 trouxe mudanças nos hábitos dos consumidores derivadas do confinamento inicial no primeiro ano e um segundo ano caracterizado pela tentativa de retorno às atividades sob o rótulo de "novo normal". Várias revisões de literatura que resumem pesquisas existentes sobre o comportamento do consumidor e a pandemia surgiram recentemente. Muitas delas apresentam um foco regional ou específico do país. Outros enfatizam certos fatores em estudo no início da pandemia. O presente estudo, em contrapartida, separa os temas mais marcantes encontrados na literatura em 2020 daqueles encontrados em 2021 a partir de uma base de dados global do Scopus, mostrando a evolução do discurso acadêmico sobre o comportamento do consumidor à medida que a pandemia se desenvolveu. Curiosamente, algumas diferenças mostram a evolução dos consumidores ao longo da pandemia, vista pelos olhos dos pesquisadores. A modelagem de tópicos destaca os principais temas em estudo em ambos os anos. Os resultados apontam a relevância de quatro grandes temas que diferem de um ano para outro. A pesquisa sobre consumo on-line, no entanto, mantém-se igualmente importante em ambos os anos. Propomos um modelo teórico de pesquisa de comportamento do consumidor que visa ajudar os consumidores a se entenderem, os gestores a abordarem estratégias em conformidade e os formuladores de políticas a regularem as principais questões trazidas pela pandemia.

PALAVRAS-CHAVE: revisão de literatura, tendências de marketing, consumidor on-line, pandemia, modelagem de tópicos.

UNE ANALYSE DE L'ÉVOLUTION DU DISCOURS ACADÉMIQUE SUR LE COMPORTEMENT DU CONSOMMATEUR ET COVID-19 À L'AIDE DE LA MODÉLISATION THÉMATIQUE

RÉSUMÉ : La pandémie de COVID-19 a entraîné des changements dans les habitudes des consommateurs découlant d'un confinement initial au cours de la première année et d'une deuxième année caractérisée par une tentative de retour aux activités sous l'étiquette de la « nouvelle normalité ». Plusieurs analyses documentaires résumant les recherches existantes sur le comportement des consommateurs et la pandémie ont récemment vu le jour. Beaucoup d'entre elles sont axées sur une région ou un pays en particulier. D'autres mettent l'accent sur certains facteurs étudiés au début de la pandémie. Cette étude, en revanche, sépare les sujets les plus saillants trouvés dans la littérature en 2020 de ceux trouvés en 2021 en utilisant une base de données Scopus mondiale montrant l'évolution du discours académique sur le comportement des consommateurs à mesure que la pandémie se développait. Il est intéressant de noter que certaines différences montrent l'évolution des consommateurs tout au long de la pandémie, vue à travers les yeux des chercheurs. La modélisation thématique met en évidence les principaux sujets d'étude au cours des deux années. Les résultats montrent la pertinence de quatre sujets majeurs qui diffèrent d'une année à l'autre. La recherche sur la consommation en ligne reste toutefois aussi importante les deux années. Nous proposons un modèle théorique de recherche sur le comportement des consommateurs qui vise à aider les consommateurs à se comprendre eux-mêmes, les gestionnaires à élaborer des stratégies en conséquence et les décideurs à réguler les principaux problèmes posés par la pandémie.

MOTS-CLÉ : Revue de la littérature, tendances marketing, consommateur en ligne, pandémie, modélisation thématique.

Analyzing Academic Discourse Evolution on Consumer Behavior and COVID-19 Using Topic Modeling

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ABSTRACT: The COVID-19 pandemic brought changes in consumers' habits derived from initial confinement in the first year and a second year characterized by an attempt to return to activities under the "new normal" label. Several literature reviews that summarize existing research on consumer behavior and the pandemic have recently emerged. Many of them have a regional or country-specific focus. Others emphasize certain factors under study at the beginning of the pandemic. This study, in contrast, separates the most salient topics found in literature in 2020 from those found in 2021 using a global Scopus database showing the evolution of the academic discourse on consumer behavior as the pandemic developed. Interestingly, some differences show consumers' evolution throughout the pandemic, seen through the eyes of researchers. Topic modeling highlights the main topics under study in both years. Results show the relevance of four major topics that differ from one year to another. Research on online consumption, however, remains equally important in both years. We propose a theoretical model of consumer behavior research that aims to help consumers understand themselves, managers address strategies accordingly, and policymakers regulate the major issues brought by the pandemic.

KEYWORDS: Literature review, marketing trends, online consumer, pandemic, topic modeling.

Introduction

The COVID-19 breakout forced confinements globally that brought changes in people's lifestyles and priorities. As a result, consumers experienced changes in their preferences, and researchers started following this interesting and unprecedented shift. Topics commonly discussed in marketing journals in the past few years related to customer satisfaction, marketing innovation, branding strategy, and consumer behavior (Nicolas *et al.*, 2020). However, marketing trends were also altered following the changes in consumer habits.

Due to country-specific waves in terms of the pandemic development, a local study could seem reasonable. However, there are clear general trends

that show changes in consumer behavior that are worth studying. In this work, we show the evolution of general research topics highlighting the shift between the first and the second year of the pandemic. Although many activities stayed relatively similar (*i.e.*, restrictions in education in some contexts), some differences have been detected between 2020 and 2021. The former was filled with anxiety, fear of the unknown, and a search for a healthier lifestyle, while the latter showed consumers looking for comfort and experimenting with postponed activities again as they began to go out following safety measures. Therefore, the main novelty of this study is to separate the most salient topics found in academic literature in 2020 from those found in 2021, showing the evolution of the academic discourse on consumer behavior as the pandemic developed in a theoretical model. Scopus database was chosen to carry out this study because it covers more journals than Web of Science, thus providing access to a larger number of articles (Mongeon & Paul-Hus, 2016).

We used topic modeling to highlight the main topics under study in both years since it allows quantitative analysis of large amounts of textual data, which is why it has been applied to carry out literature reviews in various fields (Upreti *et al.*, 2016). This technique uses unsupervised machine learning to extract terms with a consistent meaning (called topics) from the document corpus, automatically grouping those with the most semantic links (Rossetti *et al.*, 2016). Being an unsupervised model, it is convenient because it does not require previous annotations or labeling of documents. That is, the themes will arise from the statistical structure of the data in the documents and words analyzed (Sun & Yin, 2017).

COVID-19 has affected the whole landscape around the world. This study contributes to analyzing this situation by exposing trends derived from the pandemic crisis. From a marketing-related perspective, this is relevant as companies should be aware of these issues. Consumers have shifted certain habits, including information consumption and psychological changes. As a result, consumption has changed, making researchers question specific business models' sustainability. In addition, supply chains have suffered. Hence, the peculiarity of this crisis, which marketers need to manage. This study helps consumers understand the changes our society has gone through during this critical period.

The study presents a summary of the salient literature focused on consumer behavior, first as an individual and second as a subject of study for marketing and business during the COVID-19 pandemic. This is followed by an explanation of the methodology used and topic modeling.

Our results highlighting the differences among studies in the first and second years of the pandemic are discussed in the following section. We end by presenting a theoretical framework and important managerial and policy implications.

Literature review

Consumer behavior and COVID-19 literature

There is a vast amount of articles that relate consumer behavior to COVID-19. Articles vary from consumer shopping behavior (Eger *et al.*, 2021) to psychological factors (Di Crosta *et al.,* 2021) and even paradigm shifts (Mehta *et al.*, 2020). The primary health concern is reflected in the number of studies that address dietary issues (Sidor & Rzymski, 2020) and health-related risks (Shin & Kang, 2020). As a result, we find a good amount of literature studying food consumption.

The carbon footprint has also been a subject of concern for the last two decades, and the effect of the pandemic on environmental issues is no exception. Studies that look into waste management (Vanapalli *et al.*, 2021) and the impact of food wastage (Jribi *et al.*, 2020) are common.

Previous literature reviews on the pandemic have implemented different approaches to address consumer behavior. An example is the systematic literature review of Cruz-Cárdenas *et al.* (2021), who relate COVID-19 and consumer behavior to technology and society. These authors do a descriptive, bibliometric, and co-occurrence analysis and find that the measures adopted by governments, technology, and social media stand out as external factors. According to the authors, technological and digital formats mark consumer behavior; hence, firms must incorporate digital transformations in their process. Some other reviews warn us about the general patterns that consumers have been producing since the COVID-19 pandemic began. These include attitudes and habits such as spending or purchasing patterns (Di Crosta *et al.*, 2021; Satish *et al.*, 2021).

To differentiate studies, some authors use the resource of generational cohorts (Eger *et al.*, 2021; Jílková & Králová, 2021) or significant historical milestones (Zwanka & Buff, 2021). These studies try to emphasize the relevance of looking at consumers from different points of view and not generalizing, as could happen when faced with a crisis. We also see a stream of literature focused on the consumer as an individual. However, there is an important relationship with the business impact of COVID-19. Many studies emphasize the need for niche businesses to respond to current changes in consumer behavior.
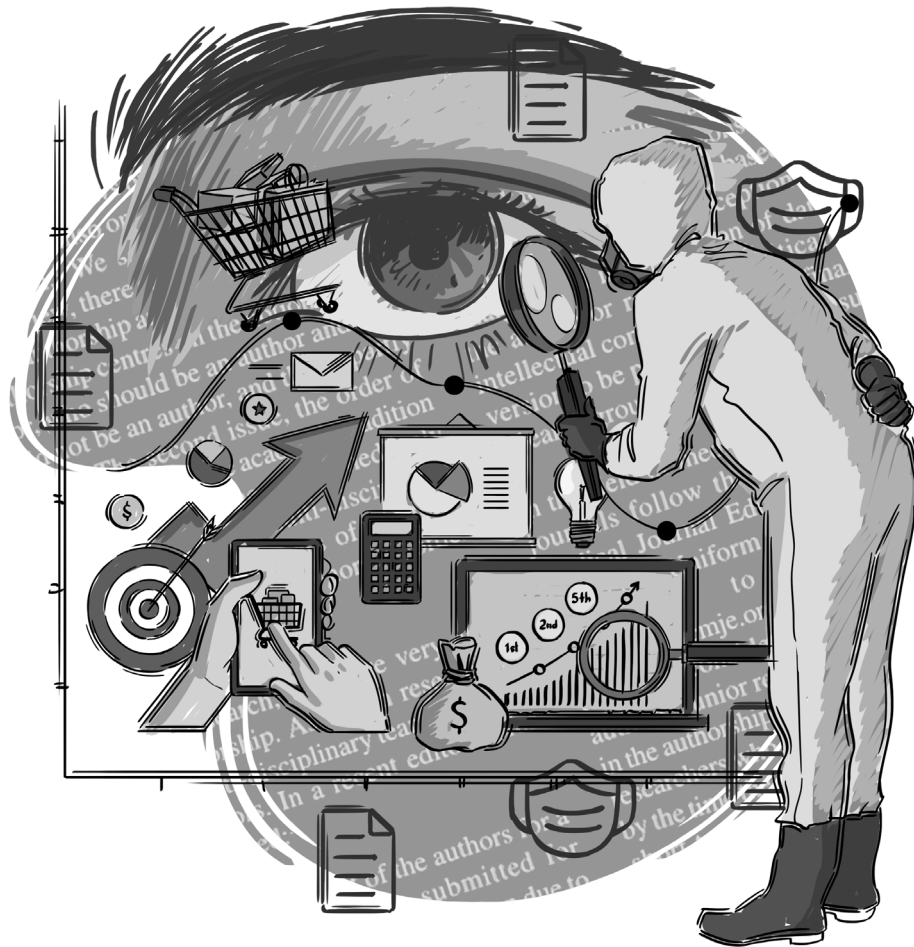
Marketing and business-related COVID-19 literature

Marketing trends have evolved as a natural consequence of consumer behavior changes during the pandemic. Some studies on marketing trends emphasize the effects of COVID-19, which may disrupt marketing strategies and policies (Hoekstra & Leeflang, 2020). Maulana (2020) does an integrative literature review focusing on research trends in marketing science before the COVID-19 outbreak. This author proposes a research agenda highlighting social media and social and cause-related marketing studies concerning the pandemic.

On the one hand, supply chain disruption in the pandemic era is a key issue explored by diverse authors (Sarkis, 2021). Different industries were and continue to be affected by this problem, particularly the food industry, as evidenced by the different studies on such matters (Hobbs, 2020). On the other hand, the increase in online activities and digitalization is an important research topic with relevant implications for individuals and industries. A large number of studies find that e-commerce has grown and will continue

to do so, thanks to the increase in global online activity and home office approaches. As a result, we find a large number of studies addressing the challenges of the online channel (Jílková & Králová, 2021).

Tourism is an industry that has been particularly impacted by the initial confinement and the continuous regulations and fears that prevent people from traveling —studies such as Shin and Kang (2020) stress technology's usefulness in facing such challenges. An important change related to technology is the study of how people search for information (Bento et al., 2020). This is an essential feature of consumer behavior relevant to governments and businesses. Paakkari and Okan (2020) emphasize how health literacy is an underestimated problem. For companies, business intelligence data that helps to understand search patterns and trends is vital in the current changing environment.

Moreover, we need to consider the amount of time people spend online derived from the COVID-19 pandemic. This is known as the "attention economy," a recent but well-researched topic in 2020. Whether consumers look for

information and make decisions following influencers or have other strategies is a topic that has also attracted researchers' attention.

Therefore, in a world of literature, this study aims to answer the following research question: *Which are the salient topics addressed in the consumer behavior literature during the pandemic, and how have they changed?*

The use of surveys among researchers is common (Di Crosta *et al.*, 2021; Eger *et al.*, 2021; Gu *et al.*, 2021; Jílková & Králová, 2021; Mehta *et al.*, 2020; Satish *et al.*, 2021). Others have used secondary data, such as the work of Hoekstra and Leeflang (2020) and Zwanka and Buff (2021). The number of citations can measure the impact of research. Table 1 summarizes the most cited articles related to consumer behavior and COVID-19. By looking at the information in this table, it is visible that secondary data and surveys are still the most common data collection methods, only one study conducts an experiment, and few works adopt online panel data.

Methodology

The topic modeling approach is appropriate for this study because it is more transparent, replicable, and with less ambiguity than manual or taxonomy-based categorizations (Walker *et al.*, 2019). In addition, it has been applied in management (Hannigan *et al.*, 2019), tourism (Hu *et al.*, 2019), marketing (Amado *et al.*, 2018), and journalism (Jacobi *et al.*, 2015), among other research fields. Specifically, we have used Latent Dirichlet Allocation (LDA) algorithm because it is the simplest of several options available for topic modeling (Blei, 2012) and the most frequent topic modeling technique (Silva *et al.*, 2021). The LDA algorithm is an unsupervised probabilistic modeling method that extracts topics from a collection of documents, considering that the most frequent words within a topic will represent the topic (Asmussen & Møller, 2019). In that sense, LDA assumes that all documents have been generated from a fixed set of topics. However, these topics have different proportions ranging from 0%, when the document does

Table 1.
Most cited consumer behavior, marketing and COVID-19 related literature.

Author and year	Title	Methodology	Focus and limitations
Hobbs (2020)	Food supply chains during the COVID-19 pandemic	Secondary data and commentary (special issue)	Potential supply-side disruptions to food supply chains are assessed, including labor shortages, disruptions to transportation networks, and "thickening" of the Canada-United States border concerning the movement of goods.
Donthu and Gustafsson (2020)	Effects of COVID-19 on business and research	Introduction to the special issue	A global effort to address some pandemic-related issues affecting society. 13 papers cover different industry sectors (e.g., tourism, retail, higher education), changes in consumer behavior and businesses, ethical issues, and aspects related to employees and leadership.
Sidor and Rzymski (2020)	Dietary choices and habits during the COVID-19 lockdown: Experience from Poland	Cross-sectional online survey	The study highlights that a lockdown imposed to contain an infectious agent may affect eating behaviors and dietary habits in Poland.
Sheth (2020)	Impact of COVID-19 on consumer behavior: Will the old habits return or die?	Secondary data	Consumers are learning to improvise and learn new habits.
Paakkari and Okan (2020)	COVID-19: Health literacy is an underestimated problem	Secondary data	Health literacy should be seen regarding social responsibility and solidarity. Concerned with ethics of sharing misleading and false information about SARS-COV-2.
Laato *et al.* (2020)	Unusual purchasing behavior during the early stages of the COVID-19 pandemic: The stimulus-organism-response approach	Structural equation modeling	Investigates behavior when fears of consumer market disruptions started circulating.
Allington *et al.* (2021)	Health-protective behavior, social media usage, and conspiracy belief during the COVID-19 public health emergency	Linear probability models using questionnaire surveys of social media use	Restricted to UK residents. Concerns regarding the spread of COVID-19 conspiracy theories on social media.
Pantano *et al.* (2020)	Competing during a pandemic? Retailers' ups and downs during the COVID-19 outbreak	Secondary data	Synthesize the challenges that retailers are facing during the COVID-19 emergency and provide suggestions.

(Continues)

Author and year	Title	Methodology	Focus and limitations
Kirk and Rifkin (2020)	I'll trade you diamonds for toilet paper: Consumer reacting, coping and adapting behaviors in the COVID-19 pandemic	Secondary data/theoretical approach	Under an environmentally imposed constraints point of view, the authors examine behaviors during each of three phases: reacting, coping, and longer-term adapting.
Jribi et al. (2020)	COVID-19 virus outbreak lockdown: What impacts on household food wastage?	Online survey	Applied in Tunisia. Determine the impact of COVID-19 lockdown on Tunisian consumer awareness, attitudes, and behaviors related to food wastage.
Vanapalli et al. (2021)	Challenges and strategies for effective plastic waste management during and post COVID-19 pandemic	Secondary data	Implications on the consumer perception for transitioning towards a circular economy. Complexities of plastic waste management enhanced by COVID-19.
Yuen et al. (2020).	The psychological causes of panic buying following a health crisis	A systematic review of the related literature	Review, identify, and synthesize the psychological causes of panic buying.
Shin and Kang (2020)	Reducing perceived health risk to attract hotel customers in the COVID-19 pandemic era: Focused on technology innovation for social distancing and cleanliness	Three experimental studies using online consumer samples	Examine the impact of expected interaction and expected cleanliness on perceived health risk and hotel booking intention.
Hall et al. (2021)	Beyond panic buying: consumption displacement and COVID-19	Based on consumer spending data	Evaluate consumption displacement, the shift in consumption that occurs when consumers experience a change in the availability of goods, services, and amenities to which they are accustomed as the result of an external event.
Laguna et al. (2020)	The impact of COVID-19 lockdown on food priorities. Results from a preliminary study using social media and an online survey of Spanish consumers	Online survey. Social media data	Spanish consumers. Impact of the COVID-19 health crisis on people's interests, opinions, and behavior towards food.
Bento et al. (2020)	Evidence from internet search data shows information-seeking responses to news of local COVID-19 cases	A daily panel of COVID-19–related search intensity data in 50 U.S. states and Washington, DC.	Examine information-seeking responses to the first COVID-19 case public announcement in a state of the U.S. Event study framework for all U.S. states.
Motta et al. (2020)	A Preliminary Evaluation of the Public Risk Perception Related to the COVID-19 Health Emergency in Italy	Survey	Investigate Italian public perceptions of health risk. For this purpose, a questionnaire.
Islam et al. (2021)	Panic buying in the COVID-19 pandemic: A multi-country examination	Online surveys	Multi-country setting including the U.S., China, India, and Pakistan. Study of consumers' panic buying behaviors using the stimuli-organism-response model and the competitive arousal model.
Sarkis (2021)	Supply chain sustainability: learning from the COVID-19 pandemic	Published literature, insights from virtual open forums, and practitioner interviews	Provide research guidance for investigating sustainability in supply chains in a post-COVID-19 environment
Ben Hassen et al. (2020)	Impact of COVID-19 on Food Behavior and Consumption in Qatar	Online survey	Restricted to Qatar, investigates the immediate impacts of COVID-19 on Qatari consumer awareness, attitudes, and behaviors related to food consumption.

Source: authors.

not talk about the topic, to 100%, when the document talks exclusively about the topic (Debortoli et al., 2016).

The first step has been to determine the keywords to use in the search, for which we have considered the terms "consumer" and ("behavior" or "behaviour") and "COVID-19", excluding articles published in 2022; obtaining a total of 928 scientific articles with these keywords from January 2020 to December 2021. All abstracts were extracted from Scopus, generating a BibTex file, and then uploaded into the R software for a pre-processing step. The pre-processing step is needed to clean the abstracts by removing words used in the search, as well as other words that do not contribute to the discussion, such as years, and

names of publishers, among others. In this step, we have also discovered the best number of topics (k) by using a simulation with different values, from 2 to 50, obtaining k = 4 as the best option. The following step has been to apply the LDA algorithm by year of publication, where topics were suggested by the data rather than predefined by the researchers (Schmiedel *et al.*, 2019) and the abstracts corresponding to the same year were grouped to find the most used words by year. The last step has been to label the topics based on the most important words to propose a theoretical model (figure 1).

Results

After applying the topic modeling technique with a value of k = 4, we can see in figure 2 the top terms that are most common within each topic using the per-topic-per-word probabilities called "beta." It is important to note that the scales on the *X* axis for the beta are not the same for the different topics. The beta values for topic 4 are higher than for the other topics, indicating that the words in topic 4 are more likely to appear in that topic than in other topics.

To analyze how much literature is associated each year with each topic, we used the "gamma" metric, which can be understood as the annual probability per topic. For example, 2020 and 2021 have a high presence of topic 4, between 70 and 75%, while in 2020, topic 1 has an occurrence of little more than 20%, and in 2021 topics 2 and 3 have an occurrence of about 10% (figure 3). It should be noted that it is not that topic 1 does not have a presence

in 2021, nor topics 2 and 3 in 2020, but that its presence is minimal, around 5% or less.

Figures 2 and 3 show an evolution of the topics studied over time, where we can see that topic 4 is the most important and recurrent during 2020 and 2021. However, the other themes show a change in the subject investigated in the period analyzed. To propose a theoretical model, we have assigned an appropriate label according to the most important words of each topic. Figure 4 shows the theoretical model, where we can mention four blocks: (i) pandemic moves consumption online, covering both years, indicating that COVID-19 impacts consumer behavior accelerating the migration to online channels; (ii) lockdown due to coronavirus impacts people interaction, in 2020 the health restrictions reduced traditional interactions among people; (iii) increase protection to maintain operations, in 2021 organizations transformed to keep working; (iv) sustainability of consumption and current business models, as in 2021 was critical to analyze the better way to consume what was needed as well as to be sustainable to ensure survival, especially for small businesses.

Discussion

It is important to note that although most cited articles refer to supply chain issues, health concerns, information consumption, and psychological effects during the pandemic, the topic modeling analyzed presented here highlighted slightly different salient research areas. For example, health concerns are related to topic 2 (increment
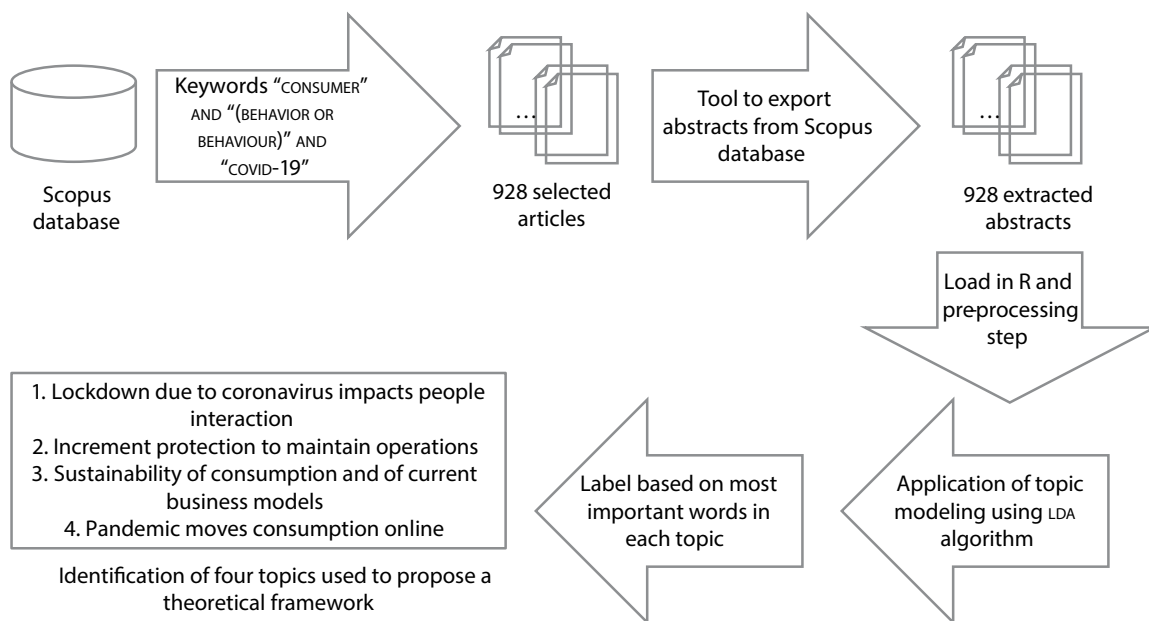

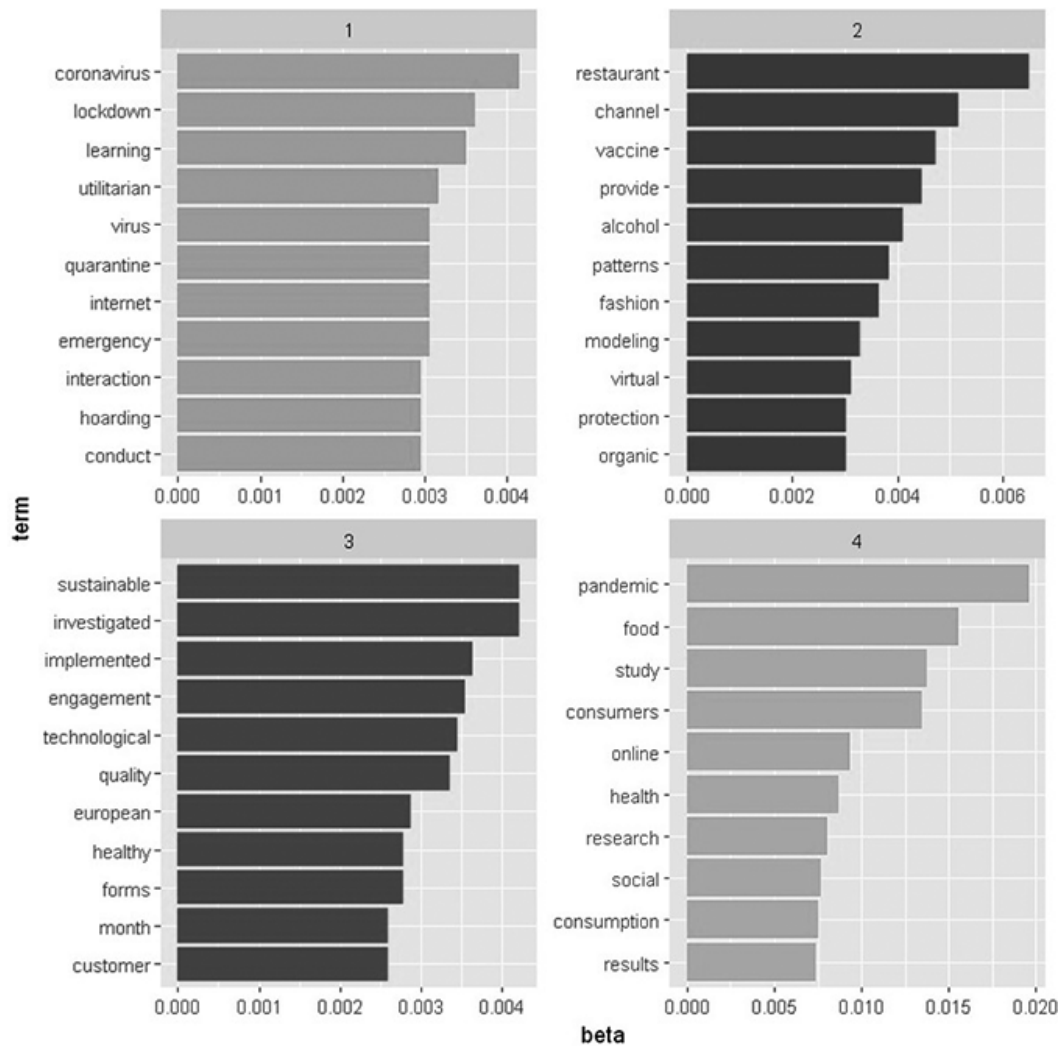**Figure 1.** Methodology explained step by step. Source: authors.

Figure 2. Most important words by topic. Source: authors.

protection to maintain operations); however, it is more concerned with the business side than the consumer concern. Psychological effects can relate to topic 1 (impact on people's interaction) and expand to different social changes derived, for example, from consumer behavior directed to consume more online. Hence, the ongoing relevance of topic 4 (online consumption). Topic 3 (sustainability of consumption and business models) is fascinating as this appears to be a topic that has attracted researchers' attention and is vital for businesses. However, those studies have not been cited that much and, therefore, have not had a visible impact yet.

Derived from our results, consumer value theory becomes relevant to studying the changes in product scope (niche marketing) and value propositions, together with business model theory. For example, consumers may be looking for more products that help them relax and socialize after stressing COVID-19 times. It will be interesting to see if

healthy eating is still a trend. Suppose we link this to the need to study user retention through social media and long-term purchasing behavior. In that case, both business model and consumer behavior theories become promising areas for future research. In particular, decision journey theory and the sales funnel can be helpful to explore.

The subsections below present a discussion on each of the four topics of our model.

Lockdown due to coronavirus impacts people's interaction (topic 1)

Lockdown due to COVID-19 has caused several changes in consumer behavior, which has created variations in spending patterns and fluctuations in prices of various products, which may continue to change since it is not known when the pandemic will end (Borsellino *et al.*, 2020). In times of crisis, it is necessary to consider those
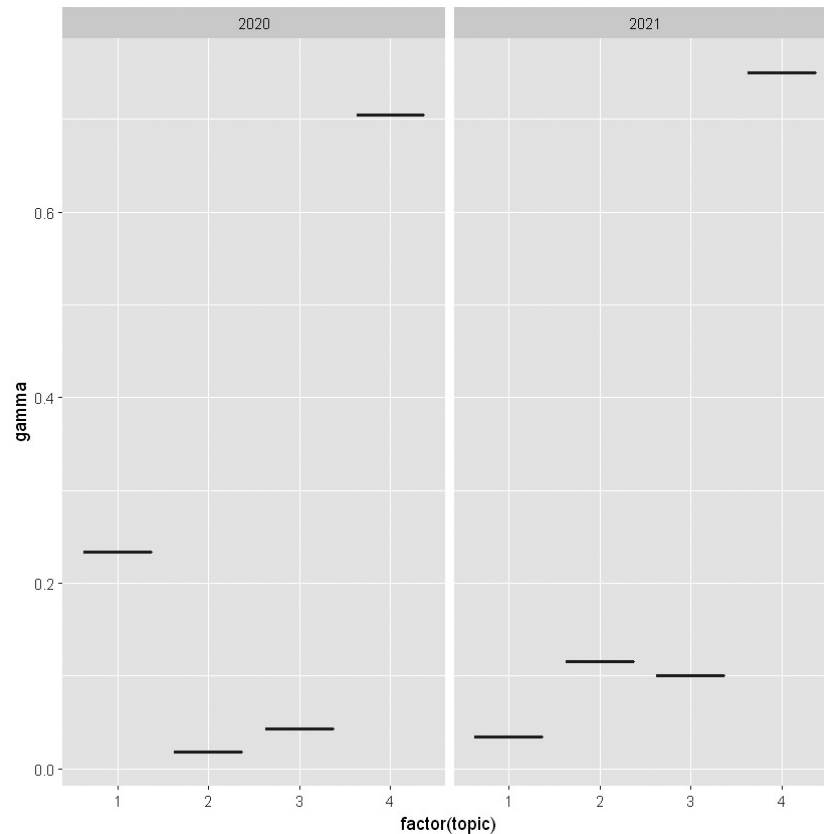
Figure 3. Association between topics and years. Source: authors.

factors that serve to model consumer behavior, such as the attitude towards risk, which reflects how the consumer reacts to risk, and the perception of risk, when consumers consider how much they are exposed (Mehta *et al.*, 2020). The lockdown, as well as social distancing recommendations that were implemented to fight COVID-19, generated significant changes in consumer behavior. For example, the limits between professional and personal life are practically non-existent since many people work, study, and relax at home (Sheth, 2020); hence, consumers look for simple products and services that are perceived as of great value by simplifying their lives (Mehta *et al.*, 2020).

COVID-19 has generated changes in consumers' priorities due to the mandatory isolation adopted as a preventive action, reducing the consumption of unnecessary items and increasing the consumption of groceries and home entertainment (Mehta *et al.*, 2020). In this context, many restaurants stopped working. Hence, consumers had to eat more at home, which increased the traffic of websites related to cooking recipes, implying a change in consumer preferences (Borsellino *et al.*, 2020). In addition, the purchase of prepared foods decreased since they are perceived as less healthy and because people have more time

to prepare their own food; on the contrary, more fresh vegetables are being bought, as they are considered healthier foods (Laguna *et al.*, 2020). However, even though consumers bought fruit instead of beer at the beginning of the pandemic, after a while, they went back to buying beer and snacks because they were forced to stay home to prevent infections (Anastasiadou *et al.*, 2020).

Panic buying behavior is a reaction to situations of fear and uncertainty, which generates an accumulation of basic (rational) goods or unnecessary (irrational) goods and, consequently, a shortage in the supply chain (Borsellino *et al.*, 2020). The fear of getting sick, as well as the difficulty in accessing several products, have been the main factors that cause hoarding behavior (Hao *et al.*, 2020). Other factors that influence the hoarding of products in times of crisis are education, income level, purchases in online stores, gender, and profession in fields related to medicine (Wang & Hao, 2020). On the one hand, hoarding is a common reaction when there is uncertainty about the future supply of products that cover basic needs. On the other hand, an informal market may arise where unauthorized intermediaries hoard essential products and generate price increases, or even counterfeit products may be sold
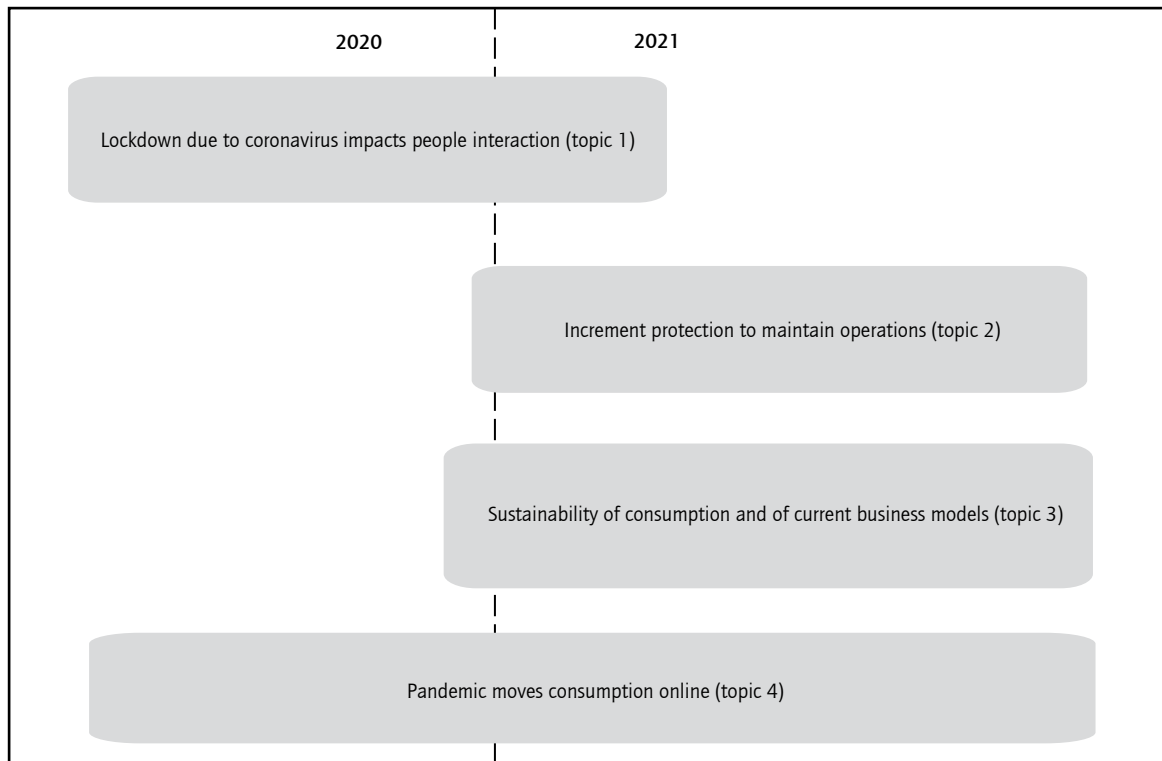
Figure 4. Theoretical model based on topics covered by research articles published in Scopus. Source: authors.

(Sheth, 2020). Anastasiadou *et al.* (2020) found that consumers are more likely to accumulate a certain product if its price or maintenance cost is low or if there is a risk of receiving the product due to a crisis.

At the beginning of the pandemic, when a consumer made a purchase, he or she tried to be as fast as possible, allocating significant importance to the disinfection and cleaning of bags and shopping carts, as well as preferring to buy locally produced products, perhaps to avoid contamination by reducing their manipulation (Anastasiadou *et al.*, 2020). In this sense, the general preference for shopping, especially in Latin America and other developing regions, has shifted from traditional points of sale to more modern channels, such as supermarkets or hypermarkets, due to a perception of cleanliness and safety (Borsellino *et al.*, 2020). This is confirmed by another study that argues that those who prefer modern commerce based their decision on attributes of safety, cleanliness, and vehicle parking (Bohorquez-Lopez *et al.*, 2022).

Increase protection to maintain operations (topic 2)

Previous research found that fear is one of the main determinants of consumer purchasing behavior in crises (Eger *et al.*, 2021; Hassan & Soliman, 2021; Rather, 2021). These studies also indicated that people tend to comply

with expectations and restrictions in risky circumstances. Roberts and David (2021) identified that fear of COVID-19 can cause increased self-efficacy as well as perceived behavioral control, with the emotional response influencing self-protective behavior (Liu *et al.*, 2021). During the COVID-19 pandemic, the perceived threat is positively correlated with the global adoption of preventive measures, resulting in elevated self-protection against the imminent threat (Itani & Hollebeek, 2021). In this context, these authors found that fear causes many people to comply with social distancing since the severity of the threat is relatively high, so social distancing is perceived as an effective coping mechanism by those who believe that they are more likely to contagion.

Czarniecka-Skubina *et al.* (2021) studied the catering industry, which has adopted new practices to minimize the risk of COVID-19 contagion, identifying the main protection measures such as hand disinfection, table disinfection, use of masks and visors by staff, the possibility of cashless payments, and maintenance of social distance. Within the protection measures that take into account a comprehensive approach to reduce the transmission of COVID-19 both inside and outside the facilities, that is, not only focusing on consumers but also on the staff working in organizations, we can highlight: vaccination of employees, ensuring that social distancing is practiced, ensuring that masks are

used appropriately, periodically evaluating employees for COVID-19, promoting frequent hand washing, cleaning surfaces exposed to different people, and ensure adequate ventilation (Trmčić *et al.*, 2021).

Liu *et al.* (2021) suggested that protective motivation theory (PMT) is often used when an individual's self-protective behaviors arise through fear, such as the fear many people have experienced contracting COVID-19. In the context of the pandemic we are experiencing, PMT can help understand how consumers perceive threats and how their reaction, when faced with them, impacts their behavior. PMT has been used to predict behaviors related to health protection when it is subjected to several threats (Min *et al.*, 2021), as well as to show that the perceived threat and the effectiveness of the response could contribute to fear, which is a predictor of consumer behavior during the COVID-19 pandemic (Kim *et al.*, 2021).

Other studies have used PMT to explain that people's fear influences their behavioral responses in such a way that they can minimize the resulting trauma, which explains why many people engage in risk-reducing behaviors through self-protection in the face of COVID-19 to reduce the possibility of infection (Liu *et al.*, 2021). In this sense, behaviors that minimize risks (e.g., wearing masks, maintaining social distance, washing hands regularly) are present in people who fear the consequences of COVID-19 (Adunlin *et al.*, 2021). In other words, PMT helps to understand people's cognitive process when evaluating a threat, considering their ability to deal with it, resulting in possible protective actions. Therefore, given the current pandemic, consumers' perceived threats and coping evaluations may influence the protective actions they take, for example, when visiting a restaurant or engaging in activities with others (Min *et al.*, 2021).

Sustainability of consumption and current business models (topic 3)

Many consumers have been financially affected by the pandemic, so their long-term purchasing behavior has become more frugal; that is, consumers buy what they really need instead of making unnecessary purchases. Hence, one of the consequences of the pandemic has been the shift toward more responsible purchasing behavior, due not only to limited resources but also focused on sustainability (Mehta *et al.*, 2020). In other words, consumers with sustainable consumption behavior tend to have a deeper holistic outlook and concern about moderation in consumption (Phang *et al.*, 2021). Radcliffe *et al.* (2021) pointed out that the sustainability of face-to-face food systems and markets has been widely discussed and criticized

in the literature, especially from the point of view of resilience. These authors highlighted the potential of bringing these spaces online to contribute to sustainability in the face of system shocks such as during the COVID-19 pandemic. Ha *et al.* (2021) found that consumers who were resilient during the pandemic, that is, were able to recover quickly after a crisis, were more likely to patronize small businesses, thus contributing to their survival.

The pandemic brought as a consequence a change in the priorities of consumers, generating new purchasing behaviors to cope with the uncertainty of the pandemic, demonstrating greater concern for the social and ecological, and supporting efforts to achieve sustainability and well-being of the society in this new economic environment (Sharma *et al.*, 2021). As COVID-19 spread throughout the world, consumers faced major changes in their daily activities, including the closure of many businesses that did not know how to adapt, while those that did experience supply chain disruptions were influenced by product availability (Ha *et al.*, 2021). In this context, people spent much more time in their homes, so they had to adopt different technologies to make purchases, and they were much more aware of the importance of saving water and energy, which has generated greater awareness of waste, as well as the adoption of some pro-environmental and social practices (Arias *et al.*, 2021). Phang *et al.* (2021) stated that individuals with sustainable consumption behavior could alter their behaviors to favor mindful consumption, adopting less panic and compulsive buying relative to those who do not.

Focusing on the economic impact of the COVID-19 pandemic, most companies, regardless of their size or sector, have been forced to rethink their strategies, especially concerning their operations related to stakeholders (Vătămănescu *et al.*, 2021). In this context, it is more important than ever for small businesses to be able to understand the behavior of their customers so that they can maintain themselves and be profitable (Arias *et al.*, 2021). These authors identified that small companies are especially vulnerable in times of crisis due to a lack of resources compared to large companies. Therefore, small businesses must analyze how, when, where, and to whom they sell their products to achieve long-awaited sustainability during and after the crisis (Ha *et al.*, 2021). In this sense, small businesses could benefit from a better understanding of their consumers, such as knowing their emotions related to the pandemic (resilience, optimism, etc.) and their profile (generational category, employment situation, income, etc.). By segmenting their customers, they will have more and better tools to give them what they need with limited resources (Ha *et al.*, 2021).

COVID-19 has significantly impacted small businesses, many of which remain at risk of disrupting operations. However, now more than ever, it is vital to understand the factors that contribute to the survival of small businesses in the face of a crisis, such as the frequency of purchase by their consumers and the number of services used and preferred, which can serve to achieve their survival during this difficult time (Ha *et al.*, 2021). Vătămănescu *et al.* (2021) empirically validated the importance of product sustainability attributes, highlighting that social and environmental sustainability practices are necessary for good business performance, especially during the pandemic. In addition, small businesses must build trust with their consumers to foster long-term, mutually beneficial relationships; they can achieve this by posting relevant information on their social networks to generate a feeling of identification among their followers (Ha *et al.*, 2021). In that sense, online communities can be considered helpful for building a community around shared ethics and beliefs that can support the greater use of sustainable consumption practices (Radcliffe *et al.*, 2021).

The pandemic moves online consumption (topic 4)

Pham *et al.* (2020) analyzed the role of COVID-19 as a moderating variable between the consumer's perception of interest and their online shopping activities, finding that this situation encourages consumers to make purchases using digital channels, significantly reducing the number of purchases and visits to physical stores due to fear of contagion. Instead, they shopped online much more than before due in part to restrictions on movement, which may hold when things return to normal due to convenience (Borsellino *et al.*, 2020). These authors identified that the increase in online purchases had affected food deliveries since, in some cases, they were not only delayed but not even shipped. On the consumer side, it is increasingly necessary for them to have information to control, prevent, or respond to fear and perceived risks, which generates a high level of interactivity and social presence in electronic commerce platforms (Addo *et al.*, 2020). This will enable them to adopt new attitudes, such as shopping on different websites, changing stores when shopping, eating at nearby restaurants and using store pickup (Anastasiadou *et al.*, 2020).

The COVID-19 pandemic has accelerated digital transformation, with digital channels becoming more important than ever. In contrast, the lockdown has made companies aware of the importance of digitalization throughout the value chain to improve not only resilience and efficiency but also demand forecasting (Vătămănescu *et al.*, 2021).

The need to face the pandemic crisis has forced small companies and intermediaries to embrace vertical integration and omnichannel strategies (Gutiérrez-Leefmans, 2022). This crisis period has prompted a change in consumer behavior that has migrated from physical stores to online purchases, which is likely to continue in the future, increasing the frequency of online purchases and changing their consumption habits (Yin *et al.*, 2021). Along the same lines, Mehta *et al.* (2020) indicated that these changes in behavior result in a change in the spending pattern, as well as the use of various electronic contact points to buy, such as the official product site, social networks, mobile platforms, etc. This impacted the reduction of traditional outdoor advertising and decreased visits to shopping centers due to social distancing. The challenge for companies now is developing an effective omnichannel strategy where the marketing mix is consistent across channels.

Yin *et al.* (2021) argued that previous studies found that changes in consumer behavior due to COVID-19 have created many opportunities for industry reform, which should be used to integrate offline processes with online processes since, in this way, economic development will be promoted (Yin *et al.*, 2021). Akram *et al.* (2021) point out that online consumption and digitization in a crisis context not only impact customers' well-being but also imply great challenges and development opportunities for the retail industry. Therefore, the evolution of online markets can make it possible for customers to connect with local suppliers, fostering the creation of a community around ethical and responsible consumption. In this sense, online markets can help efficiently connect customers and suppliers to reduce physical contact and interactions in public spaces, potentially fostering a real community based on caring, shared interest, and consumption ethics (Radcliffe *et al.*, 2021).

In the new normal, digital technologies play a fundamental role in maintaining retail operations and in the possibility of offering quality and uninterrupted customer service; these technologies help retailers improve their crisis management capabilities, which benefits the entire value chain (Jiang & Stylos, 2021). It is important to remark that those companies with capabilities based on digital technologies can optimize their businesses with much more flexibility in response to changes that arise in the external environment (Wang *et al.*, 2020). This avoids crowding in their premises and the consequent spread of contagion by offering free store pick-up or home delivery to clients (Borsellino *et al.*, 2020), and strategically improves their online presence and attracting consumers with offers specific to their profile, thus mitigating the decrease in sales (Koch *et al.*, 2020).

Conclusions

There has been an evolution in the topics investigated between 2020 and 2021: the lockdown due to the impact of the coronavirus (topic 1) on interaction as a natural topic of study in the first year of the pandemic; while in the second year, it was essential to know more about the necessary protection to be able to maintain business operations (topic 2), as well as the change in consumer behavior and organizations towards sustainability (topic 3), which was reflected in the evaluation of current business models. However, topic 4 stands out as a stream of literature that continues to evolve and will most likely continue to do so. As we approach the third year (2022) of the pandemic and many activities begin to normalize, it will be interesting to analyze the development of research trends in the near future. For example, topics 2 (security) and 3 (sustainability) will remain relevant to academics. The four topics were organized in a theoretical model (figure 4), which is the main contribution of our research.

The generalized lockdown generated changes in the behavior of consumers, who, unable to go out for shopping or work, have had to carry out their daily activities from home. External and internal drivers, which traditionally affect consumer behavior (personality type, brand image, status, etc.), have become obsolete in the pandemic context, with other drivers emerging, such as recycling and the reuse of products that need to be studied in depth. This situation has made the attributes of comfort and personalization much more valued by consumers. However, there are few studies on how this trend of staying at home for so long has affected planned versus unplanned consumption. Hence, some old habits may disappear because, in this new context, the consumer has discovered more convenient, affordable, and accessible consumption alternatives. However, future research is needed to analyze which behaviors will return and which will remain post-pandemic.

In crises, small businesses should convey positive emotions to consumers through context-specific marketing messages, which could be shared through their social networks. Studies can be conducted to assess whether these types of marketing actions, not only personalized but also with messages specific to the context of the pandemic, help increase loyalty and therefore increase the average customer purchase ticket. In addition, it could be interesting to know the role of social media during the pandemic or which sectors benefited or suffered from its effects. Other studies can look at how consumers assess perceived risks and their severity during the pandemic to determine different levels of protection, as well as different levels of coping, which will influence the adoption of responsible and recommended behaviors. Therefore, it is essential to deepen this topic in further studies to help small businesses adapt to these new requirements and governments so that they can define public policies that help promote responsible behavior. As a result, security and sustainability issues related to the pandemic have become relevant.

Methodologically, surveys appeared among the most prominent words, which stresses the high use of this methodology by researchers in both years. This is confirmed by looking at the most cited research on consumer behavior and COVID-19. Consequently, we encourage using qualitative analysis and other methodologies to contribute to the marketing trends and consumer behavior literature. Technology facilitates online research methods and should be further exploited. A topic that did not appear among the most cited in the database used and could be exploited for future research was education. Besides the shift to the online mode, scholars can inquire about how the behavior of students and teachers changed concerning education as a result of COVID-19 and how educational marketing strategies should also change. Finally, the main limitation of this study is related to using only the Scopus database; hence, other studies could extend this work to other databases.

Research agenda

We propose the following research agenda derived from our analysis and confirming previous studies in the literature. In contrast to previous studies, we find that future research areas go beyond technology and information search (Cruz-Cárdenas *et al.*, 2021) or social and cause-related marketing (Maulana, 2020). It is important to highlight a particular emphasis needed in studies related to small companies' business models and digital transformation. Various core marketing areas need researchers' attention in the context of COVID-19, such as:

- Social media advertising and communication.

- Regulations and policies for SMEs in the new normal.

- Issues and challenges for educational marketers.

- Local purchase preference and ethical consumption.

- Omni-channel marketing strategy and distribution.

- Porter's value chain and customer service.

- Consumer value shifts and new business models.

- Green business models and responsible behavior.

- Cashless payments and digital transformation.

- Protective behavior and e-commerce deliveries.

Two important future research areas related to consumer behavior are the study of augmented reality (AR) and neuromarketing, where few studies can be found. Relating the pandemic's effects on consumers' emotions and desires to an immersive reality where users can feel safe and have a unique experience can certainly bring interesting insights.

Among our findings' practical and managerial implications are the focus needed on marketing for local consumption. In omnichannel strategies, a special emphasis is needed on customer service, which literature related to COVID-19 has also highlighted. Not only is digitalization required but understanding customer value shifts seems to be vital for successful business models. Also, innovative ways to enhance the digital experience should be explored, such as AR, where technology will play a vital role for companies.

Regarding policy implications, security and consumer protection are still issues businesses face. Hence, the need for proper regulations that help them continue operations, ensuring consumer safety. Other issues concerning government regulations are the need for sustainable business models and digital transformation. In some countries, SMES receive financial help from governments to survive and invest. However, that is not a common trend in developing countries, where SMES represent an important part of employment.

Disclosures

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