Online Food Shopping: Determinants and Profile of Portuguese Buyers in the Pandemic Context*

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ABSTRACT: The COVID-19 pandemic brought the opportunity to accelerate the acceptance and usage of existing behaviors and innovations by society and the market. Amongst these innovations, e-commerce food stands out, allowing food companies to redesign their models to face the demand during the pandemic. This research aims to recognize the profile of online food buyers within Portugal and understand the determinants of online food purchase intention in the context of the pandemic. The methodology applied is quantitative, using the Partial Least Squares method to test the hypotheses formulated by the proposed structural model. The data used resulted from applying an online questionnaire to 358 food consumers in Portugal. The results show that situational factors directly related to eating behavior positively impact the online food shopping experience, increasing the intention to purchase food online during COVID-19. Concerning the profile of the e-consumer, it seems that owning a vehicle negatively influences the intention to purchase food in e-commerce, as opposed to the level of income, which is a positive factor. On the theoretical side, this research contributes to the literature by contributing on the theme of food e-commerce in a pandemic time, which is currently very scarce. As for practical contributions, through the identification of the trends in consumer behavior during and after the pandemic, companies can better

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COMPRA DE ALIMENTOS EN LÍNEA: DETERMINANTES Y PERFIL DE LOS COMPRADORES EN PORTUGAL DURANTE LA PANDEMIA

RESUMEN: la pandemia de COVID-19 permitió acelerar la aceptación y el uso de comportamientos e innovaciones existentes por parte de la sociedad y el mercado, entre los que destaca la compra de alimentos en línea, mecanismo que hizo posible que las empresas de alimentos rediseñaran sus modelos de negocio para hacer frente a la demanda durante la pandemia. Esta investigación tiene como objetivo reconocer el perfil de los compradores de alimentos en línea en Portugal y comprender los determinantes de la intención de compra de alimentos mediante este canal en el contexto de la pandemia. La metodología aplicada es de tipo cuantitativo, con el uso de mínimos cuadrados parciales para contrastar las hipótesis formuladas en el modelo estructural propuesto. Los datos utilizados resultaron de la aplicación de un cuestionario en línea a 358 consumidores de alimentos en Portugal. Los resultados muestran que los factores situacionales directamente relacionados con los hábitos alimenticios impactan positivamente la experiencia de compra de alimentos en línea, favoreciendo la intención de compra bajo esta modalidad durante la pandemia de COVID-19. En cuanto al perfil del e-consumidor, parece que tener un vehículo influye negativamente en la intención de compra de alimentos de manera electrónica, mientras que el nivel de ingresos se constituye como un factor positivo. Desde una perspectiva teórica, esta investigación aporta a la literatura sobre el comercio electrónico de alimentos en tiempos de pandemia, que actualmente es un tema poco abordado. En cuanto a las implicaciones prácticas, la identificación de tendencias en el comportamiento de los consumidores durante y después de la pandemia permiten que las empresas puedan anticiparse y prepararse mejor para satisfacer las nuevas necesidades y perfiles de consumidores, desarrollando nuevas estrategias e incrementando sus niveles de ventas en el canal electrónico. Dado que Portugal cuenta con una población digital pequeña y menos de 35 % de sus habitantes son nativos digitales, el protagonismo de los estudios en esta área del conocimiento es modesto. Por ello, la presente investigación resulta ser original e innovadora, ya que son escasos los estudios que analizan el comportamiento del consumidor en el comercio electrónico de alimentos de dicho país, y específicamente durante una pandemia.

PALABRAS CLAVE: comercio electrónico, comportamiento, intención de compra, COVID-19, online, alimentos.

COMPRAS DE ALIMENTOS ON-LINE: DETERMINANTES E PERFIL DOS COMPRADORES PORTUGUESES NO CONTEXTO PANDÊMICO

RESUMO: a pandemia ocasionada pela covid-19 trouxe a oportunidade de acelerar a aceitação e o uso de comportamentos e inovações existentes pela sociedade e pelo mercado. Entre essas inovações, destaca-se o *e-commerce* de alimentos, que permitiu que as empresas de alimentos redesenhassem seus modelos para enfrentar a demanda durante a pandemia. Esta pesquisa tem como objetivo reconhecer o perfil dos compradores de alimentos on-line dentro de Portugal e entender os determinantes da intenção de compra de alimentos on-line no contexto da pandemia. A metodologia aplicada é quantitativa, a partir do método Parcial Least Squares para testar as hipóteses formuladas pelo modelo estrutural proposto. Os dados utilizados resultaram da aplicação de um questionário on-line a 358 consumidores de alimentos em Portugal. Os resultados mostram que fatores situacionais diretamente relacionados ao comportamento alimentar impactam positivamente a experiência de compra de alimentos on-line, aumentando a intenção de comprar alimentos on-line durante a pandemia. Com respeito ao perfil do consumidor eletrônico, parece que possuir um veículo influencia negativamente a intenção de comprar alimentos no *e-commerce*, ao contrário do nível de renda, que se revelou um fator positivo. Quanto ao aspecto teórico, esta pesquisa colabora para a literatura ao contribuir com o tema do *e-commerce* alimentar no período pandêmico, que atualmente é muito escasso. Quanto às contribuições práticas, por meio da identificação das tendências de comportamento do consumidor durante e após a pandemia, as empresas podem antecipar e se preparar melhor para novas necessidades e perfis de consumidores e, consequentemente, desenvolver novas estratégias e aumentar suas vendas no *e-commerce*. Como Portugal tem uma pequena população digital e menos de 35% de nativos digitais, o destaque dos estudos nessa área é menor. A pesquisa atual é original e inovadora, pois estudos que analisam o comportamento do consumidor no comércio eletrônico de alimentos neste país, especificamente durante uma pandemia, são mais escassos.

PALAVRAS-CHAVE: *e-commerce*, comportamento, intenção de compra, covid-19, on-line, alimento.

LES ACHATS ALIMENTAIRES EN LIGNE : DÉTERMINANTS ET PROFIL DES ACHETEURS PORTUGAIS DANS LE CONTEXTE DE LA PANDÉMIE

RÉSUMÉ : La pandémie de COVID-19 a été l'occasion d'accélérer l'acceptation et l'utilisation des comportements existants et des innovations par la société et le marché. Parmi ces innovations, l'alimentation en ligne se distingue, ce qui permet aux entreprises alimentaires de redéfinir leurs modèles pour faire face à la demande pendant la pandémie. Cette recherche vise à reconnaître le profil des acheteurs d'aliments en ligne au Portugal et à comprendre les déterminants de l'intention d'achat d'aliments en ligne dans le contexte de la pandémie. La méthodologie appliquée est quantitative, en utilisant la méthode des moindres carrés partiels pour tester les hypothèses formulées par le modèle structurel proposé. Les données utilisées proviennent de l'application d'un questionnaire en ligne à 358 consommateurs de produits alimentaires au Portugal. Les résultats montrent que les facteurs situationnels directement liés au comportement alimentaire ont un impact positif sur l'expérience d'achat de produits alimentaires en ligne, en augmentant l'intention d'acheter des produits alimentaires en ligne pendant la période COVID-19. En ce qui concerne le profil de l'e-consommateur, il semble que le fait de posséder un véhicule influence négativement l'intention d'acheter des aliments en ligne, contrairement au niveau de revenu, qui est un facteur positif. Sur le plan théorique, cette recherche contribue à la littérature en apportant une contribution sur le thème de l'e-commerce alimentaire en période de pandémie, ce qui est actuellement très rare. Quant aux contributions pratiques, grâce à l'identification des tendances dans le comportement des consommateurs pendant et après la pandémie, les entreprises peuvent mieux anticiper et se préparer aux nouveaux besoins et profils des consommateurs, et donc développer de nouvelles stratégies et augmenter leurs ventes de commerce électronique. Comme le Portugal a une petite population numérique et moins de 35% de natifs numériques, la prééminence des études dans ce domaine est mineure. La recherche actuelle est originale et innovante, car les études qui analysent le comportement des consommateurs dans le commerce électronique alimentaire dans ce pays, spécifiquement pendant une pandémie, sont plus rares.

MOTS-CLÉ : Commerce électronique, comportement, intention d'achat, COVID-19, en ligne, alimentation.

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anticipate and prepare for new consumer needs and profiles, consequently developing new strategies and increasing their e-commerce sales. Since Portugal has a small digital population and less than 35% of digital natives, the prominence of studies in this area is minor. The current research is original and innovative, as studies that analyze consumer behavior in food e-commerce in this country, specifically during a pandemic, are scarcer.

KEYWORDS: behavior, buying intention, COVID-19, E-commerce, food, online.

Introduction

The recent COVID-19 pandemic caused an upsurge of stress and anxiety never seen in the past years (Zwanka & Cheryl, 2020) and instigated changes in traditional social contacts such as job, school, leisure, and shopping behavior (Eger *et al.*, 2021). Since pandemics affect consumer behavior (Koch *et al.*, 2020), when COVID-19 arose, policymakers in numerous countries quickly realized that messages regarding food availability should be announced to avoid shopping panic and hoarding. Policymakers also tried to minimize the impact of the COVID-19 pandemic by providing staff, messengers, and volunteers assuring that supply chains were not short of food and cleaning products. Consequently, during the mandatory confinement, the supply chains were never interrupted, despite the fear of the scarcity of available products (Hao *et al.*, 2020; Oliveira *et al.*, 2021).

With the emergence of COVID-19, consumer behavior towards food consumption has changed, and consumers began accumulating food, consequently increasing their domestic stocks (Long & Khoi, 2020). Moreover, the number of consumers who started to prefer to buy food online (to practice social distancing and to be able to have food products without facing long and dangerous lines in stores and supermarkets) increased substantially (Alaimo *et al.*, 2020). Likewise, there has been a change in the use of digital technology and its applications, making it more common to use it to shop online and not be isolated from society (Sheth, 2020).

For Kirk and Rifkin (2020), history has proved that there are transformations within society in times of crisis. These authors point out changes in consumer behavior in three different stages: i) reacting (e.g., hoarding and rejecting), ii) coping (e.g., social connectedness maintaining, DIY behaviors, changing views of brands), and iii) longer-term adapting (e.g., possible changes in consumption and individual and social identity).

In recent years, academics have seen a growing interest in investigating new information technologies (Gao *et al.*, 2020; Goldfarb & Tucker, 2019). Most investigations study e-commerce through the economic, cultural, and social characteristics of users (cultural differences, salary, place of residence, qualifications, age, habits, and gender) (Bin *et al.*, 2003; Heidarian, 2019; Norum, 2008; Stylianou *et al.*, 2003; Yoon, 2009; Zhu *et al.*, 2020). The interest in studying e-commerce was more accentuated by the current COVID-19 pandemic.

At this point, e-commerce channels help to control food purchases, therefore, disabling panic and preventing consumers from accumulating food. E-commerce allows consumers to make their purchases without leaving their homes, thus avoiding large groups of people in physical stores, and assures that consumers are not infected with the COVID-19 pandemic, as they do not need to leave their homes for shopping. With the advent of this pandemic, the main increase in consumer spending on groceries was sensed by online retailers (Grashuis *et al.*, 2020).

To cater to the growing number of e-commerce purchases, retail food companies have strengthened their food delivery services to customers' homes (Gao *et al.*, 2020; Hao *et al.*, 2020; Tran, 2021). The number of visitors to retail food companies' websites in China increased by 127.5%, as well as the quantities ordered and the value per order. In turn, e-commerce purchases for fresh products (vegetables, meat, or fish) grew by 167% and purchases by about 80% (Hao *et al.*, 2020).

Disasters such as tsunamis, hurricanes, earthquakes, pandemics, or others often affect the supply chains and all their actors (retailers, distributors, sellers, and producers). Consumers are not indifferent and tend to adapt their behavior to the new circumstances they are living. On the other hand, retailers also tend to adjust to consumers' needs. However, sometimes under difficult periods such as COVID-19, retailers have to impose some criteria to maintain the fulfillment of orders, e.g., limiting some items to one per purchase (Grashuis *et al.*, 2020). Thus, the adoption of e-commerce and its development are significant to examine (Yoon, 2009) as consumers are increasingly adopting new technologies. In times of pandemic, as a rule, consumers tend to shop online to avoid becoming infected. Studies that analyze consumer behavior in e-commerce food during a pandemic are scarce (Gao *et al.*, 2020; Hao *et al.*, 2020), being a relevant topic of analysis.

The significant upsurge in online food purchases was also evidenced in the research by Reardon *et al.* (2021) and

Kuijpers *et al.* (2020). Reardon *et al.* (2021) mention that, as happened in previous crises, the COVID-19 pandemic induced strong purchasing growth in supermarkets in several developing countries, with a sharp increase in consumer demand for foodstuffs and retail supply via electronic commerce. The study by Kuijpers *et al.* (2020) divulges that the pandemic has increased the frequency and participation in online food purchases by 16% and 70%, respectively. Consumers also mentioned that they expect to continue to buy food through e-commerce channels.

The pandemic led to a surge in online grocery shopping as health authorities forced consumers into confinement, reducing the possibility of people circulating for a few months. On the other hand, the pandemic caused generalized fear of contracting the COVID-19 virus when going to supermarkets, thus stimulating the demand for online grocery stores. Also, online shopping platforms have become increasingly easier to use, helping online sales to grow. Therefore, motivations for online shopping have changed during the pandemic, and a good experience on the part of consumers can determine the intention to buy online in the future. In this context, the main objective of this paper is to understand the profile of online food buyers and to know the determinants of online food purchase intention during and after the pandemic in Portugal. The proposed study is based on a quantitative approach through the application of a questionnaire to online food consumers in Portugal, adapted from a study previously carried out by Wang *et al.* (2020).

The obtained results allowed us to confirm that the profile of online food consumers and the income of households is directly related to the online food shopping experience and that owning a vehicle negatively influences the intention to purchase food in e-commerce. The results also suggest that the greater the negative eating behavior, the worse the situational facts are.

This research is original and innovative, as few studies analyze consumer behavior in food e-commerce in Portugal during a pandemic. This research contributes to augmenting the literature on the theme of food e-commerce during a time pandemic, which is currently scarce. By identifying consumer trends and behavior during and

after the pandemic, companies can better anticipate and prepare for new consumer needs, adapt to the new consumer profile, and develop new strategies to increase their e-commerce sales.

This paper starts with an introduction, contextualizing the study, highlighting, and briefly presenting the respective objectives, methodology, and results. In the second part, a literature review of e-commerce food is elaborated. In part three, the methodology and the data collection method are described. In part four, results are presented and compared with the relevant literature. Finally, the conclusions are presented as well as theoretical and practical contributions and clues for future investigation.

Literature review

Food shopping and e-commerce

During the past decade, there has been an increasing academic interest in the influence of stressful conditions on consumer behavior (Guthrie *et al.*, 2021). Despite being a rapidly growing area, there are not many studies that address the issue of consumer behavior when buying food online. Nevertheless, there is a certain uncertainty if the growing trend of online purchasing persists (Guthrie *et al.*, 2021). Some authors, such as Ali *et al.* (2021), Hansen (2005), Wang and Somogyi (2018), applied behavioral theories to explain the intention to buy food online.

Hansen (2005) developed a theoretical model aimed at exploring online food purchasing behavior, arguing that the acceptance and adoption of online food purchases by consumers are affected by five innovation-adoption characteristics: i) perceived social norms (an influence that family members and friends have on choosing to adopt online shopping); ii) perceived complexity (degree of difficulty perceived by online food buyers, both in terms of available information and ease of use of technologies); iii) perceived compatibility (compatibility of online shopping with lifestyle and personal values); iv) perceived relative advantage (advantages of online shopping over traditional shopping channels); v) perceived risk (risks associated with the online purchase process, both in terms of the method of payment and the quality of the product delivered). According to this study, consumers buying food online are more compatible with this type of tool, consider the online shopping process as not complex, and see relative advantages. The model from Hansen (2005) was also confirmed by Wang and Somogyi (2018), concluding that perceived incentive positively affects consumer behavior. These behaviors include elements such as social norms, perceived compatibility, and perceived relative advantage. It was also found that consumer behavior is negatively affected by perceived compatibility.

Several authors use the Theory of Planned Behavior (TPB) to explain various human behaviors (Ajzen, 1991). This theory explains the factors that are related to behavioral intentions, namely: attitude to behavior (evaluation that the individual makes about a certain behavior or action as being valuable and useful); subjective norms (social pressure exerted by people's opinions on the proposed behavior); and perceived behavioral control (the propensity to act and the perceived feasibility of exhibiting a particular behavior).

Hansen (2008) combined TPB with consumers' values, demonstrating that they exert a relevant influence on their attitudes with the influence of previous online shopping experiences. The study by Ali *et al.* (2021), which adopted the Theory of Technology Readiness to study consumer personality traits (innovation, optimism, discomfort, and insecurity) and their relationship to actual intentions/behaviors for using online food delivery services, concluded that optimism and innovation capacity positively and significantly influences online food purchase intentions, while insecurity and discomfort have a negative relationship with these intentions.

Alaimo *et al.* (2020) consider that the intention to buy food products online is related to the acceptability of modern technologies in the daily lives of consumers and the perception of benefits/risks associated with their use. However, they alert to the fact that many studies analyze the behavior of consumers under normal conditions, underestimating that choice may be linked to situational factors like socio-demographic characteristics (age, gender, place of living, household composition, level of education, and income) that are often ignored.

In this line of thought, Hand *et al.* (2009) consider that online food consumers are not influenced by cognitive processes, relative advantages, or perceptions of complexity but by situational factors related to life events that trigger online shopping.

Online shopping offers an alternative to everyday shopping, usually driving a vehicle. During the COVID-19 pandemic, retailers have spent a lot of energy and resources to build, improve, and promote their online stores (Koch *et al.*, 2020). However, despite the energy savings inherent to the option of online shopping, several studies show that the intensification of e-commerce does not necessarily imply a reduction of vehicle use, as a vehicle is used for many tasks besides buying food (Berg & Henriksson, 2020). Another reason is that shopping is associated with pleasure,

leisure, and social interaction (Mokhtarian, 2004). As the pandemic slowly stabilizes, consumers consider it "a new normal." This new normal keeps several patterns of unchanged consumer behavior, such as online food delivery (Grashuis *et al.*, 2020). This is likely to stay as a standard behavior amongst a large part of the population (Nielsen, 2020).

E-commerce of food during crises and disasters

Pei *et al.* (2020) consider that online shopping can represent a new consumption model, with agri-food development capable of achieving sustainable standards and goals. It is a fact that consumer preferences and the development of information technologies can provide sustainable responses to global needs, so buying online can be a way to implement and achieve sustainable competitive advantages in the business world (Alaimo *et al.*, 2020).

Cavallo *et al.* (2020) refer that the registered e-commerce of food increased significantly during the pandemic, tripling their online purchases compared to the figures registered in the previous year. During lockdown time, the use of new technologies has increased dramatically for all age groups, which has led to the increased use of online services for food delivery or meals provided by restaurants.

The study by Chenarides *et al.* (2021) also refers that, with the COVID-19 pandemic, online food purchases increased by 255% and food delivery service by 158%. These increments can be explained by the fear of contagion and the sensation of insecurity consumers feel. Another reason for online purchases is people's fear of future health issues (Eger *et al.*, 2021).

The Protection Motivation Theory explains that people's reactions under certain circumstances can lead to positive changes in their behavior due to the protective motivation to overcome that specific situation (Rogers, 1975). Moon *et al.* (2021) concluded that this theory is better suited than TPB to explain consumer behavior toward online shopping when faced with an unprecedented and risky situation such as the COVID-19 pandemic. According to these authors, when consumers feel more negative about their surroundings and circumstances (such as the pandemic), they are more likely to use online shopping channels. The study also reveals that individuals use more online shopping channels when people around them feel negative about using traditional shopping channels. Additionally, consumers who better understand pandemics government regulations assume a preference for online shopping channels (Moon *et al.*, 2021).

Concerning gender relations, Mylan and Southerton (2018) reveal that gender relations influence the daily dynamics of family management. In the case of food purchases by Swedish families, these seem to be equally distributed between women and men. On the other hand, the authors show different gender relations in the British context, which recognizes a less equitable distribution of roles to the disadvantage of women. The authors also expose that online food shopping facilitates daily life with children for both women and men.

Regarding the online food consumer profile, Hernández *et al.* (2011) demonstrate that once individuals become experienced e-shoppers, their behavior is similar, regardless of their socioeconomic characteristics. The authors consider that the market has become suitable for all genders, ages, and incomes.

Mayakkannan (2018) investigated the purchasing behavior of consumers regarding instant food products. The study assesses the influence of personal factors such as age, sex, marital status, academic qualifications, occupation, family income, eating habits, purchase decisions, and spending on instant food on the general satisfaction of consumers. It was found that there is no significant relationship between personal factors and the general satisfaction of e-consumers.

In the opposite direction, a study by Bryła (2018) applied to e-buyers of organic food reveals that individuals with higher incomes, whose priority is quality elements, are willing to pay a premium price for organic food. Consequently, they are more likely to be e-organic consumers; on the contrary, the greater the age and importance attributed to the product's appearance, the less likely it is to be an e-consumer.

Hypothesis development

Situational factors related to the perception of health status and the daily practice of physical exercises can positively influence the purchase of food online. According to Hand *et al.* (2009), online food purchase is influenced by events related to life circumstances, such as health problems or the presence of small children in the house. In this way, situational factors can be important in shaping and reinforcing online shopping motivations (Morganosky & Cude, 2000). The following hypothesis was formulated:

H1: *Situational factors positively impact the online food shopping experience during the pandemic.*

Beverage and food consumption behaviors during COVID-19 can influence consumers' overall perception of health and, as such, influence situational factors. Healthy (positive) food and beverage consumption behavior is a positive motivation for online shopping, within the scope of the Protection Motivation Theory (Ajzen, 1991; Rogers, 1975).

A healthier, balanced, and diversified diet is part of risk management strategies during COVID-19 (Gasmi *et al.*, 2020). This way, during the pandemic, there was greater consumer awareness of the significance of health, well-being, and more sustainable food choices. This paradigm shift has positively altered consumer behavior relative to beverage and food purchases during COVID-19 (Marty *et al.*, 2021; Sorić *et al.*, 2021). Thus, we formulate the following hypotheses:

H2a: *The greater the positive eating behavior, the better the situational factors during the pandemic.*

H2b: *The greater the negative eating behavior, the worse the situational factors during the pandemic.*

During the pandemic, health authorities imposed a period of confinement, with restricted access to the movement of people. Also, public transport has reduced its daily flow. On the other hand, consumers feared that when using public transport, they would be more exposed to the virus, reducing its use (Berg & Henriksson, 2020). Naturally, consumers needing to go to grocery stores use their own vehicles. Consumers who do not own vehicles tend to buy more online (Shen *et al.*, 2022). Thus, we formulate the following hypotheses:

H3: *Owning a vehicle decreases the intention to purchase food online after a pandemic.*

According to Hansen (2005), there are several reasons for buying groceries online. These reasons are associated with several advantages, such as compatibility with personal life and social values, perceived convenience, time savings, price comparison, and secure payment methods. These determinants affect not only consumer behavior but also the intention to continue shopping online for groceries (Venkatesh *et al.,* 2000). For Alaimo *et al.* (2020), the perceived value influence, ease to use, and usefulness, and the perceived benefits and risks influence the behavioral intention based on the level of satisfaction. Thus, satisfaction is an antecedent of online purchase intention (Abdul-Muhmin, 2010; Chiu *et al.*, 2012). We formulate the following hypotheses:

H4: *A better online food shopping experience during the pandemic increases the intention to purchase food online after the pandemic.*

Due to the central family role that women have and that they accumulate with their professional situation, women tend to be more vulnerable in terms of health, with a greater risk of psychological diseases than men (Lau *et al.*, 2008; Lau *et al.*, 2010; Naushad *et al.*, 2019; Taylor *et al.*, 2008). Studies on the effects of the pandemic have shown that women report greater problems with anxiety, depression, and stress and a worse perception of their health in general (Wang *et al.*, 2020). We formulate the following hypotheses:

H5: *Women tend to have worse situational factors during the pandemic.*

Consumers with higher incomes are generally busier and see greater advantages in shopping for groceries online, such as time savings, convenience, and the possibility of purchasing groceries online at any time of the day (Hansen, 2005; Naseri & Elliott, 2011). On the other hand, as they have higher incomes, they have a more flexible budget and can buy luxury or very specific grocery products that are often only available online (Frank & Peschel, 2020). The following hypothesis was formulated:

H6: *A higher annual household income positively impacts the online food shopping experience during COVID-19.*

According to Bryła (2018), online consumption can vary directly with age. Older age means greater work experience, higher professional status, and higher annual income. Consumers with higher levels of education also tend to occupy better-paid positions (Ruiu & Ruiu, 2019). Thus, we formulate the following hypotheses:

H7a: *Older online food consumers tend to have higher annual household incomes.*

H7b: *More academically qualified food consumers tend to have higher annual household incomes.*

As the main objective of this study is to understand the online food buyer's profile and assess the determinants of the intention to purchase online food after and during COVID-19. Based on the relevant literature, the theoretical structural model shown in figure 1 was built, which considers the intention to purchase online food during and after the pandemic, sociodemographic variables as control variables, consumption experience, and situational factors.

Methods

This research addresses consumer behavior, in this case about online consumers, and uses a quantitative methodology. Thus, allowing to generalize of the conclusions obtained for the population of interest and replicating

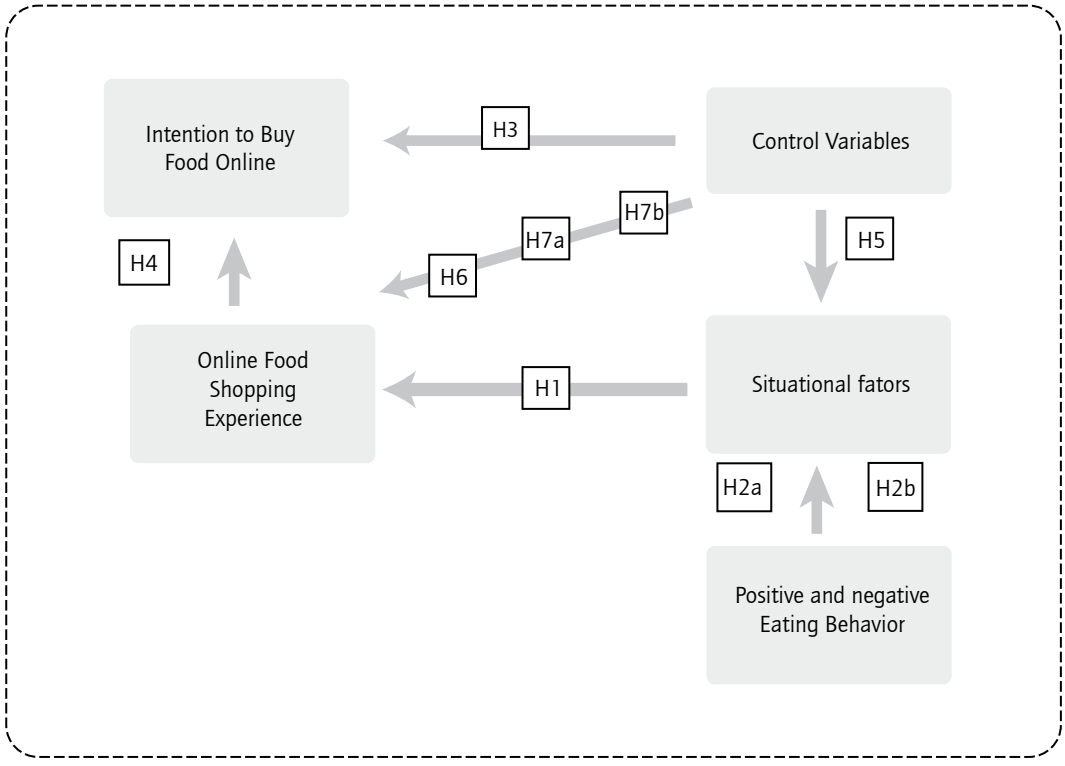

Figure 1. Theoretical structural model. Source: authors.

this methodology in other databases (Chrysochou, 2017; Malhotra *et al.*, 2017).

Sample

The sample comprises 1,432 responses collected through an online questionnaire applied to Portuguese consumers between November 2020 and March 2021 through social networks (LinkedIn and Facebook). Informed consent was obtained from all participants. Participants were informed about the purpose of the study, and the participation was voluntary. A pre-test was carried out to validate all the questions in the questionnaire. The responses of consumers who have already shopped for food online were filtered, and a sub-sample of 358 observations was obtained. In this case, 25% of surveyed Portuguese consumers have experienced buying food online before and during the pandemic.

Measures

The questionnaire was adapted from the model of Wang *et al.* (2020) that analyzed changes in consumers' grocery shopping behaviors during the U.S. pandemic using a sample of 2,500 consumers. The results of this study show that consumers who feel more insecure in stores reduced the time spent in physical stores for food shopping and changed shopping hours and spent per purchase to reduce the frequency of going to physical stores. However, Wang *et al.* (2020) research is a descriptive study, the present study is distinguished by quantitatively testing the relationships between the determinants of the online food shopping experience and the online purchase intention after COVID-19.

The questionnaire consists of six groups of questions: (G1) experience of buying food online with seven questions related to the ease of ordering, the availability of finding what you want, the fact that the food is fresh, the price, the rate and delivery time and the order is in accordance with the order; (G2) post pandemic food purchase intention online with one question; (G3) situational factors with three questions associated to the perception of physical health and the practice of daily physical exercise; (G4) positive eating behaviors with 11 questions about the consumption of legumes, whole grains, fruits, vegetables, foods low in saturated fat and high in mono and polyunsaturated fats, dairy products low-fat, cooked foods, water consumption and use of natural sweeteners; (G5) negative eating behaviors with 10 questions around the consumption of additional consumption of salt, processed meats, frozen and pre-cooked meals, fried foods, sugary drinks,

sweets, fast food, snacks, white sugar and artificial sweeteners; (G6) sociodemographic characteristics (education, age, gender, annual household income in the last year and owning a vehicle). Regarding the metrics in the questions, except for sociodemographic data, all groups of questions use a 7-point Likert scale.

Methodology

A statistical analysis (figure 1) was first carried out on the questions from G1 to G5 (table 2), and then the relations formed in the structural model were tested by Partial Least Squares (PLS) method. The theoretical path model shown in figure 2 was estimated by the PLS method in Smart PLS 3.0 software (Ringle & Sarstedt, 2016). This method, also called PLS path modeling, is a variance-based model that has as a base assumption the non-distribution of data and allows the application of advanced techniques of multivariate statistical analysis, combining aspects of factor analysis and regressions. As in the social sciences, which is the case in our research, data is collected through questionnaires, these do not have a normal distribution, and many indicators are collected and then aggregated into several latent variables (constructs). In such a manner, the PLS allows analyzing the relationships between latent variables and between these and the indicators that measure them, allowing the identification of significant relationships and testing of complex theoretical relationships (Hair *et al.*, 2019; Ringle *et al.*, 2020). As a variance-based model, the PLS algorithm estimates the path coefficients and other parameters to maximize the explained variance of the endogenous latent variables (Hair *et al.*, 2019; Leguina, 2015).

According to Ringle *et al.* (2020), the application of the PLS method is carried out in two phases: in the first phase, the PLS algorithm is used for the structural model (figure 3), in the second, a bootstrap analysis is performed testing the formulated hypotheses (table 4).

Evaluation of the PLS model

According to the structural model (figure 1), the intention to buy food online after a pandemic is directly influenced by the experience of online food shopping during the pandemic and by sociodemographic variables (control variables) and indirectly by situational factors. The experience of online food shopping during the pandemic is directly influenced by situational factors and sociodemographic variables (control variables) and indirectly by positive and negative eating behavior. In turn, situational factors are directly influenced by positive and negative eating behavior.

The theoretical structural model resulted in the theoretical path model shown in figure 2. In this model, ten latent variables were created that are represented in circles and to which 37 indicators are associated, represented in rectangles. Regarding the latent variables, four are endogenous (online food shopping experience, situational factors, intention to buy food online, and annual income), and six are exogenous (positive eating behavior, negative eating behavior, and the three control variables —gender, age, and qualifications academics). It is noteworthy that, in terms of sociodemographic variables (control variables), gender (male or female) directly influences the situational factors; owning a vehicle, an intention to buy food online; age, and academic qualifications influence the household's annual income, which in turn directly influences the online food shopping experience.

Considering the theoretical path model, the aforementioned hypotheses to be tested in this research were formulated, which are also identified in figure 2.

The evaluation of the model obtained in PLS must consider reflective measures such as composite reliability and Cronbach's Alpha to assess the internal consistency, the outer loadings (individual indicator reliability), and the average variance extracted (AVE) of each indicator used for assessing the convergent validity. The Fornell-Larcker criterion is used to assess discriminant validity. Appendix 1 contains the results of the reflective measures.

The internal consistency of the latent variables is evaluated by the composite reliability and Cronbach's Alpha. In the estimated model, these indicators have values greater than 0.70 —reference values, according to Hair *et al.* (2019). Therefore, we can conclude that the internal convergence is "satisfactory to good." Regarding outer loadings, as we can see in appendix 1, they are higher than 0.516, and the rule is that a latent variable must explain a substantial part of the variance of each indicator, usually at least 50%, also complying with the reliability of the indicators of each variable. The AVE is the sum of the squared external loads of the indicators associated with the latent variables divided by the number of indicators. The reference value is 0.50; on average, the latent variable explains more than half of the variance of its indicators. In all latent variables, the AVE is greater than 0.50, except for the online food shopping experience latent variable, which presents an AVE of 0.472.

The Fornell-Larcker criterion is used to assess discriminant validity through cross-loadings analysis. In this criterion (table 1), each AVE of the latent variables (elements on the main diagonal that are in bold) is superior to all the squared correlations of the latent variables (elements off

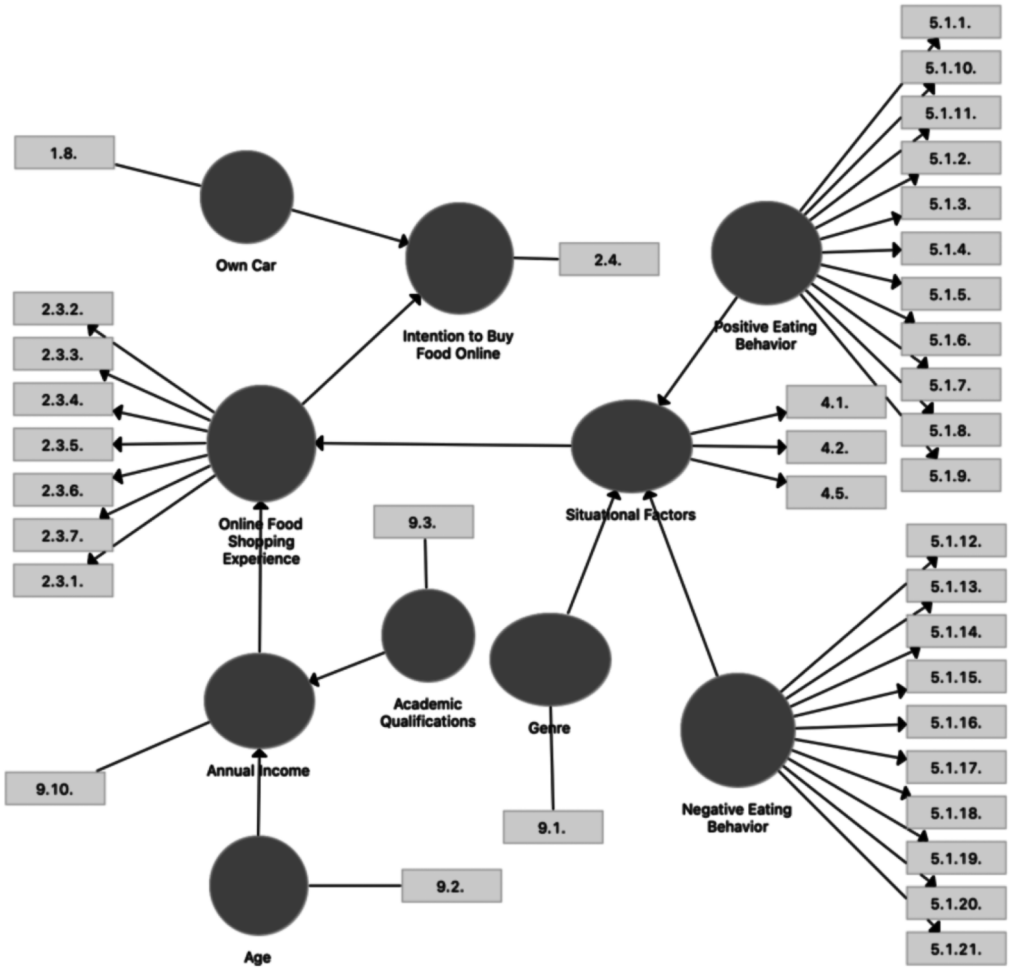

Figure 2. Theoretical path model. Source: authors.

the diagonal), thus, establishing the discriminant validity of each of the four latent variables.

Once reflective measures have validated the model, we need to evaluate the structural model after applying the PLS algorithm to the model, as shown in figure 2. Consequently, we obtain the PLS-SEM Path Model shown in figure 3.

The structural model's evaluation implies analyzing the model's predictive precision through the R Square (R^2) values of the endogenous (dependent) latent variables, that is, the online food shopping experience, situational factors, intention to buy food online, and annual income. In the social sciences area, and according to Cohen (1988), an R^2 of 0.02 represents a "small" effect, 0.15 represents a "medium" effect, and 0.35 represents a "high" effect. The R^2 of the latent variables' intention to buy food online (0.166) and situational factors (0.219) is "medium," and the latent variables' online food shopping experience and annual income are "small."

Results

Descriptive analysis

Table 2 shows the characterization of the participants. In the case of gender, 0 was used for men and 1 for women; in academic qualifications, 1 – secondary education, 2 – undergraduate degree, 3 – master's, 4 – doctorate, and 5 – other; own vehicle, 1 – no and 2 – yes. The statistics of sociodemographic characteristics are described in table 2. In summary, 68.2% of the customers of online food surveyed are women, and 64.5% are under 30 years. The literature review demonstrates that women are the most prominent online food consumers (Naseri & Elliot, 2011) and the main ones responsible for food shopping (Frank & Peschel, 2020). Regarding annual household income, 73.8% is less than EUR 39,999, and 68.2% own a vehicle. In addition, 43.3% of respondents have completed secondary education, and 39.4% have a degree.

Table 1.
Results of the Fornell-Larcker criterion.

	Education level	Age	Annual income	Gender	Intention to buy food online	Negative eating behavior	Online food shopping experience	Vehicle ownership	Positive eating behavior	Situational factors
Education level	**1.000**									
Age	0.334	**1.000**								
Annual income	0.068	0.143	**1.000**							
Gender	0.078	0.048	-0.083	**1.000**						
Intention to buy food online	0.002	0.045	0.127	-0.057	**1.000**					
Negative eating behavior	-0.069	-0.201	0.042	-0.084	0.013	**0.760**				
Online food shopping experience	-0.041	0.058	0.135	-0.080	0.396	-0.068	**0.687**			
Vehicle ownership	0.100	0.083	-0.124	-0.165	-0.032	-0.075	0.161	**1.000**		
Positive eating behavior	0.057	-0.132	0.098	0.017	0.101	0.019	0.175	-0.067	**0.739**	
Situational factors	0.002	-0.066	0.082	-0.154	0.148	-0.231	0.219	0.172	0.361	**0.730**

Source: authors.

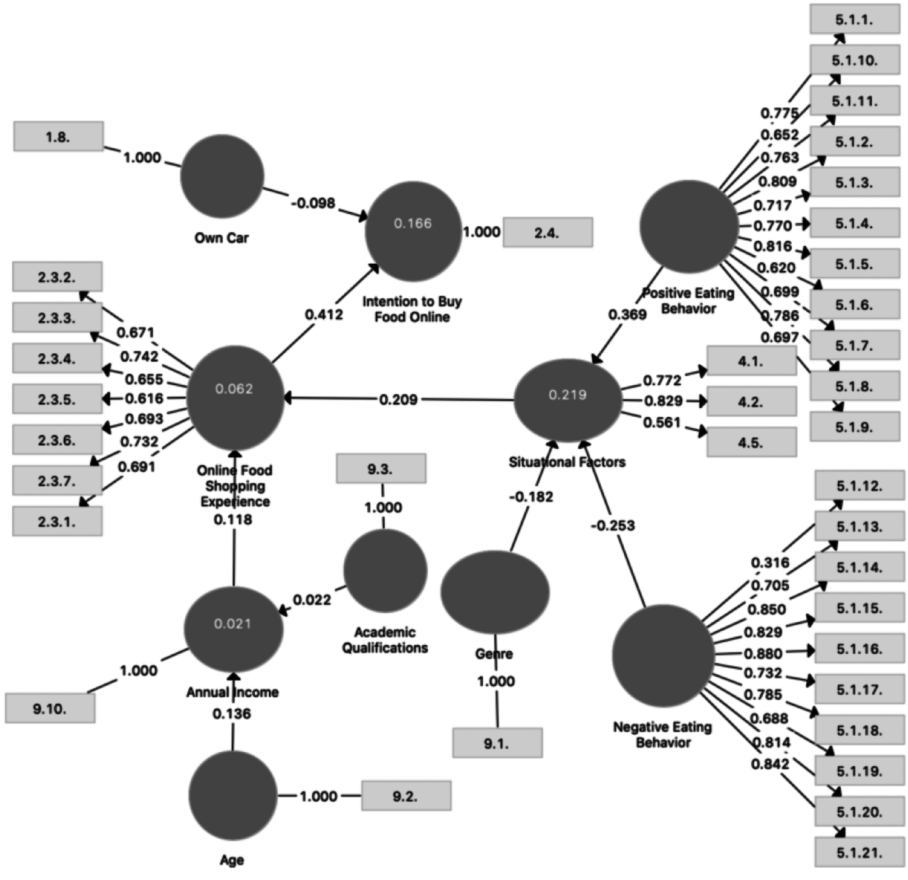

Figure 3. PLS-SEM path model. Source: authors.

Table 2.
Statistics of sociodemographic characteristics.

	Frequency	Valid percent	Cumulative percent
Gender			
Man	114	31.8	31.8
Women	244	68.2	100
Age (years)			
Less than 20	106	29.6	29.6
Between 21 and 30	125	34.9	64.5
Between 31 and 40	39	10.7	75.2
More than 41	88	24.7	100
Annual household income			
Less than EUR 20,000	131	36.6	36.6
Between EUR 20,000 and 39,999	133	37.2	73.7
Between EUR 40,000 and 59,999	40	11.2	84.9
More than EUR 60,000	54	15.1	100
Own vehicle			
No	114	31.8	31.8
Yes	244	68.2	100
Education degree			
Secondary level	155	43.3	43.3
Undergraduate	141	39.4	82.7
Master	41	11.5	94.1
Doctorate	6	1.7	95.8
Other	15	4.2	100

Source: authors.

Statistical analysis

As for the questions from G1 to G5 exposed in table 3, they represent the mean and standard deviation of the responses from the surveyed Portuguese food consumers.

Table 3.
Mean and standard deviation (groups G1 to G5).

	Mean	Std. Deviation
G1 - Online food shopping experience		
Simple to order	5.99	1.201
I find everything I want	5.3	1.386
The food is fresh	5.62	1.216
Food cost is adequate	4.83	1.431
Delivery rate	4.51	1.729
Delivery time	5.13	1.526
The order arrived as requested	5.73	1.419
G2 - Intention to buy food online		
What is the probability of buying food after the pandemic?	5.34	1.845
G3 - Situational factors		
How would you describe your overall physical health?	5.3	1.253
During the pandemic, how did your physical health change?	4.17	1.477
During the pandemic, on average, how much time did you spend exercising every day?	28.18	35.119
G4 - Positive eating behavior*		
I eat more fruit	4.47	1.797
I eat more vegetables	4.44	1.85
I eat more whole grains	3.76	1.851
I eat more foods low in saturated fats and cholesterol	4.07	1.747
I eat more foods that are rich in monounsaturated and polyunsaturated fats	4.35	1.683
I use more natural sweeteners	3.31	1.931
I drink more water	4.99	1.792
I eat more cooked, steamed, poached foods, grilled	4.41	1.8
I eat more lean meats, such as eggs, fish, and poultry	4.62	1.787
I consume more low-fat dairy products	4.12	1.909
I consume more legumes	4.15	1.804
G5 - Negative eating behavior*		
I eat more refined grains	3.98	1.777
I consume more white sugar or other artificial sweeteners	3.33	1.833
Like more "snacks" like chocolate, French fries, or/and candy	3.82	1.933
I drink sugary drinks such as sports drinks, fruit juices and soft drinks	3.2	1.924
I eat more fried foods	3.29	1.844
I eat more frozen or/and pre-packaged meals	3.37	1.912
I eat more processed meats like sausages, bacon, ham	3.35	1.836
I add more salt to food	2.62	1.776
I eat more fast food	3.2	1.961
Like more sweets and/or products like cakes, pies, and croissants	3.37	1.918

*The questions from groups G1 to G5 are used to compare consumption behavior before and during COVID-19. Source: authors.

As for the group of questions G1 related to the experience of online food shopping, the questions that, on average, generated greater agreement were the ease of placing the

order (5.99), the fact that the order arrived as requested (5.73), and the food being fresh (5.62). Portuguese consumers surveyed in average terms report that it is likely that they will continue to buy food online after the pandemic (G2 – 5.34). In the questions related to situational factors (G4), Portuguese consumers classify, on average, their health in general as good (5.3) and that it neither improved nor worsened during COVID-19 (4.17). On average, they spend 28.18 minutes in daily physical exercise. As for the group of questions G4 - Positive eating behavior, the questions that generated the greatest agreement were, on average, higher water consumption during the pandemic (4.99), more lean meats, such as eggs, fish, and poultry (4.62), more fruits (4.47) and more vegetables (4.44). In the G5 - Negative eating behavior, the Portuguese consumers surveyed revealed that their eating habits during the pandemic did not worsen, and the issues that generated less agreement were, on average, the consumption of more salt (2.62), and more sugary drinks, such as sports drinks, fruit juices and soft drinks (3.2), and fast food (3.2).

Confirmatory analysis

Once the PLS model was validated, a bootstrap analysis was performed in Smart PLS to assess their statistical significance (95%). Table 4 shows that all latent variables are significant for $p < 0.05$ and $p < 0.1$, except for Education level, which is not significant to explain the annual income.

The results demonstrate that consumers' situational factors and higher annual income positively influence the online food shopping experience (β = 0.209 and β = 0.118), confirming hypotheses 1 and 6. For Hand *et al.* (2009), several situational factors, such as birth or health problems, may trigger buying groceries online. A higher annual household income positively influences the online food shopping experience during COVID-19. Therefore, this result goes against the advocated by Bryła (2018).

The positive eating behavior has a positive influence on situational factors (β = 0.369), as opposed to negative eating behavior that negatively influences it (β = -0.253), confirming hypotheses 2a and 2b. Therefore, it is concluded that the results show a positive relationship between positive earnings behavior and situational factors in a pandemic environment, verifying the Protection Motivation Theory, defended by Rogers (1975) and Ajzen (1991).

Owning a vehicle tends to negatively influence the intention to buy food online (β = -0.098), confirming hypothesis 3; this result reinforces the study by Berg and Henriksson (2020), according to which vehicle ownership does not reduce store purchases.

A positive online food shopping experience tends to positively influence the intention to buy food online (β = 0.412), confirming hypothesis 4. The obtained result is found in the relevant literature; it seems that the pandemic increased the number of consumers who prefer to buy food online (Alaimo *et al.*, 2020; Cavallo *et al.*, 2020; Chenarides *et al.*, 2021; Sheth, 2020). Women tend to have worse situational factors during the pandemic (β = -0.182), confirming hypothesis 5. Regarding the impact of gender, the results confirm that women tend to have worse situational factors, that is, a worse general perception of health and less daily practice of physical exercise. As in our sample, the surveyed Portuguese consumers are mostly women, so gender has a negative impact on situational factors (Ajzen, 1991; Rogers, 1975). Older consumers tend to have a higher annual income (β = 0.136), confirming hypothesis 7a. This generation of consumers are active players in e-commerce

Table 4.
Structural model path coefficients.

	Original Sample (O)	Sample mean (M)	Standard deviation (STDEV)	T Statistics (|O/STDEV|)	*p* values
H1: Situational factors → Online food shopping experience	0.209	0.211	0.063	3.327	0.001**
H2a: Positive eating behavior → Situational factors	0.369	0.371	0.048	7.725	0.000**
H2b: Negative eating behavior → Situational factors	-0.253	-0.253	0.077	3.299	0.001**
H3: Own vehicle → Intention to buy food online	-0.098	-0.095	0.052	1.889	0.059*
H4: Online food shopping experience → Intention to buy food online	0.412	0.416	0.050	8.260	0.000**
H5: Gender → Situational factors	-0.182	-0.180	0.049	3.690	0.000**
H6: Annual income → Online food shopping experience	0.118	0.119	0.055	2.138	0.033**
H7a: Age → Annual income	0.136	0.134	0.058	2.345	0.019**
H7b: Academic qualifications → Annual income	0.022	0.025	0.058	0.385	0.701

*$p < 0.1$; **$p < 0.05$. Source: authors.

(Hernández *et al.*, 2011) and is becoming a significant business area for e-commerce. Some researchers are still focused on younger ones (Lian & Yan, 2014). In the case of Portugal, the younger generation (born between 1980 and 2010) represents circa 33% (Pordata, 2018). The results demonstrate that the relationship between academic qualifications and annual income is not statistically significant, rejecting hypothesis 7b. According to Mayakkannan (2018), there is no significant relationship between educational qualifications and buying behavior.

Discussion

Food culture is profoundly entrenched in the country's concepts of personal satisfaction, familiarity, and physical well-being. These factors are substantially different between cultures (Beer *et al.*, 2002).

The situational factors measured by the perception of the surveyed Portuguese consumers on their physical health and the daily practice of physical exercise positively impact the online food shopping experience during the pandemic. This result is in line with that obtained by Hand *et al.* (2009), according to which online food purchase is influenced by events related to life circumstances.

The more remarkable positive eating behavior, such as low-fat dairy products, cooked foods, water consumption, use of natural sweeteners, foods low in saturated fat and high in mono and polyunsaturated fats, pulses, whole grains, fruits, and consumption of vegetables, has a positive influence in situational factors during the pandemic, thus, improving the perception of health and encouraging the practice of daily physical exercise. Therefore, it is concluded that the results show a positive relationship between positive earnings behavior and situational factors, in a pandemic environment, verifying the Protection Motivation Theory, defended by Rogers (1975) and Ajzen (1991). Vehicle ownership allowing physical travel to food stores negatively impacts the intention to purchase food online after the pandemic. This result reinforces the study by Berg and Henriksson (2020), according to which vehicle ownership does not reduce store purchases.

A good online food shopping experience during the COVID-19, measured by the ease of ordering, availability to find the desired items, the freshness of food, the price, rate, and delivery time, and the order compliance with the requested has a positive impact on the intention to purchase food online after the COVID-19. The obtained result is found in the relevant literature. It seems that the pandemic increased the number of consumers who prefer to buy food online (Alaimo *et al.*, 2020; Cavallo *et al.*, 2020; Chenarides *et al.*, 2021; Sheth, 2020).

Major negative eating behaviors, such as consumption of additional salt intake, processed meats, frozen and precooked meals, fried foods, sugary drinks, sweets, fast food, snacks, and white sugar and artificial sweeteners, have a negative impact on the situational factors during the pandemic. This result is outlined in the Protection Motivation Theory (Ajzen, 1991; Rogers, 1975). Still reporting to this theory, regarding the impact of gender, the results confirm that women tend to have worse situational factors, that is, a worse general perception of health and less daily practice of physical exercise. As in our sample, the surveyed Portuguese consumers are primarily women, so gender has a negative impact on situational factors.

A higher annual household income positively influences the online food shopping experience during the pandemic. This result goes against Bryła (2018), who defends the existence of a positive relationship between the income earned and the e-consumption of food.

Also, according to the study by Bryła (2018), the obtained results confirm that online consumption varies directly with age. Consequently, as a result of older age, the greater the work experience, the greater the likelihood of advancement in professional careers. Thus, the age of online food consumers positively impacts annual household income. On the other hand, the most academically qualified consumers tend to obtain higher annual household incomes. However, this control variable was not significant in our model. Also, Mayakkannan (2018) concludes that there is no significant relationship between educational qualifications and the general satisfaction of e-consumers.

A summary of the hypotheses and the relevant literature associated with each hypothesis is presented in table 5.

Managerial implications

As a result of the pandemic, existing behaviors are being quizzed. The traditional manner of food shopping in physical stores is being rapidly replaced by online stores. The trends generated during this pandemic may persist in the near future, thus imposing severe consequences on traditional physical stores (Koch *et al.*, 2020).

The COVID-19 pandemic brought changes in the economic and financial systems, society, and individual behavior in general. The spread of the COVID-19 pandemic and the associated global crisis leveraged new forms and practices of consumption, pushing global businesses to adjust to new

Table 5.
Summary of the hypotheses.

Hypotheses	Status	Relevant literature
H1: Situational factors positively impact on the online food shopping experience during the pandemic	Supported	Hand *et al.* (2009); Morganosky and Cude (2000)
H2a: The greater the positive eating behavior, the better the situational factors during the pandemic	Supported	Rogers (1975); Ajzen (1991); Marty *et al.* (2021); Sorić *et al.* (2021); Gasmi *et al.* (2020)
H2b The greater the negative eating behavior, the worse the situational factors during the pandemic	Supported	
H3: Owning a vehicle decreases the intention to purchase food online after a pandemic	Supported	Berg and Henriksson (2020); Shen *et al.* (2022)
H4: A better online food shopping experience during COVID-19 increases the intention to purchase food online after COVID-19	Supported	Alaimo *et al.* (2020); Sheth (2020), Cavallo *et al.* (2020); Chenarides *et al.* (2021); Abdul-Muhmin (2010); Chiu *et al.* (2012)
H5: Women tend to have worse situational factors during COVID-19	Supported	Rogers (1975); Ajzen (1991); Taylor *et al.* (2008); Lau *et al.* (2008); Lau *et al.* (2010); Naushad *et al.* (2019); Wang *et al.* (2020)
H6: A higher annual household income positively influences the online food shopping experience during the pandemic	Supported	Bryła (2018); Hansen (2005); Naseri & Elliott, (2011); Frank and Peschel, (2020)
H7a: Older online food consumers tend to have higher annual household incomes	Supported	Bryła (2018); Hernández *et al.* (2011); Lian and Yan (2014)
H7b: More academically qualified food consumers tend to have higher annual household incomes	Not supported	Mayakkannan (2018); Ruiu and Ruiu (2019)

Source: authors.

realities and forcing firms to adopt new marketing and distribution models. On the other hand, the patterns of communication and marketing of products and services are undergoing profound changes associated with the proliferation of the internet and the development of ICT.

Concerning the food sector, this global change has led to an increase in online shopping to comply with the containment plans imposed by the governments of most countries, including Portugal, which prevented, amongst other limitations, the free movement of people. Therefore, during the pandemic period, there was an increase in e-commerce in the food sector, which will probably continue in the long term.

The literature on the economy mentioned above addresses the different dimensions of online food purchases linked to different theoretical approaches. When looking at food purchases online, it is possible to realize that countries with a greater digital approach and cultural openness to technology are more exposed to food e-commerce. In the case of Portugal, only 33% of the population is a digital native (Pordata, 2018). The other part of the equation is related to the restaurant's openness to technology which facilitates food e-commerce. Most restaurants still fail to adopt technologies that favor the non-traditional form of food commerce, this can be seen in traditional cultures such as the Portuguese. If restaurants cannot attend to digital customers' needs, they will fail to enter the food e-commerce (Feinberg *et al.*, 2016). As the new digital consumers are not willing to buy traditionally, it is difficult to benchmark or study some markets within the restaurant industry (Zhong, 2019). Considering these realities and the fact that the Portuguese digital landscape is not wide enough, there are no relevant studies on food e-commerce before or after the COVID-19 pandemic. As such, the authors consider this research innovative and original as it deals with consumer behavior in e-commerce food, applied to the Portuguese case, where studies are very scarce.

As for the recommendations to the food industry, this paper shows weaknesses that should be addressed, such as investment in new technologies that can cope with online purchases regardless of the age of potential customers. Since the pandemic increased the number of consumers who prefer to buy food online (Alaimo *et al.*, 2020; Cavallo *et al.*, 2020; Chenarides *et al.*, 2021; Sheth, 2020), regardless of educational qualification (Mayakkannan, 2018), there are significant opportunities for food retailers to develop tailor-made business strategies (Grashuis *et al.*, 2020).

When looking into the pandemic context, this study will allow for inferences about the behavior of these consumers in crises, and these changes in behavior will probably be maintained in the long term. In this sense, this research

will contribute to the enrichment of the relevant economic literature, simultaneously providing companies with the knowledge that will be useful for decision-making, namely marketing and communication. The realization and dissemination of knowledge in this area further enrich science and create innovation that provides value to organizations. This knowledge performs as a source of improvement in the company's products and services, allowing to increase sales and taking the offer of companies closer to the interests and needs of customers, ensuring a long-term relationship with these stakeholders.

COVID-19 brought to academia an extensive range of events that generally studied the pandemic's impact on individuals and organizations (Zwanka & Cheryl, 2020). Nonetheless, the object of study is variable and dependent on factors such as country, culture, and personal interpretation of well-being. Europe's southern countries have a growing older population. Since online consumption varies directly with age, Bryła (2018) future studies need to focus more on the population's age to obtain an accurate picture of consumer habits and behaviors, taking into account the tradeoff between physical and online shopping.

Conclusions

This research is based on applying 1,432 questionnaires to e-food consumers. It allowed us to verify that the intention towards purchasing food online during the pandemic is positively affected by the online food shopping experience and consumers' positive eating behavior (and negatively affected by negative eating behavior). The research also allowed identifying some interesting characteristics of the online food consumer profile: the older the person is, the higher the consumer's income; the higher the consumer's income, the greater the purchase intention; individuals with their own vehicle will have a lower purchase intention.

Although this research shows interesting and innovative empirical implications and an impact on decision-making by managers, it also reveals some limitations that could be considered in future studies.

First, it should be noted that the results obtained cannot be generalized to other countries, cultures, or other sectors. Thus, it would be stimulating for future investigations to compare the results obtained for the Portuguese context with other countries in Europe and the world, hence obtaining a broader sample with greater potential for generalizing the results.

Secondly, this research analyzes consumer behavior at a given point in time. Consequently, future studies should carry out a longitudinal study to understand the evolution of consumer behavior and compare this behavior during and after the pandemic and over a long period.

Finally, it would also be motivating for future works to include within the consumers' characteristics aspects such as the marital status of respondents, education level, profession, eating habits, expenditure on food, and the type of products purchased online.

Disclosures

Authors declare no institutional or personal conflicts of interest.

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Appendix 1. Results of the model's reliability and validity measurements.

	Education level	Age	Annual income	Gender	Intention to buy food online	Negative eating behavior	Online food shopping experience	Own vehicle	Positive eating behavior	Situational factors
G1 - Online food shopping experience										
2.3.1. Easy to order							0.691			
2.3.2. I find everything I want							0.671			
2.3.3. The food is fresh							0.742			
2.3.4. Food price							0.655			
2.3.5. Delivery fee							0.616			
2.3.6. Delivery time							0.693			
2.3.7. The order arrived as requested							0.732			
G2 - Intention to buy food online										
2.4. What is the probability of buying food after the pandemic (shopping online)?					1.000					
G3 - Situational factors										
4.1. How would you describe your overall physical health?										0.772
4.2. During COVID-19, how did your physical health change?										0.829
4.5. During COVID-19, on average, how much time did you spend exercising every day? (Type your answer in minutes)										0.561
G4. Positive eating behavior										
5.1.1. I eat more fruit									0.775	
5.1.2. I eat more vegetables									0.809	
5.1.3. I eat more whole grains (e.g., brown rice, buckwheat, quinoa, oats)									0.717	
5.1.4. I eat more foods low in saturated fats and cholesterol									0.770	
5.1.5. I eat more foods that are rich in monounsaturated and polyunsaturated fats (e.g., fish, olive oil, avocado, nuts, and seeds)									0.816	
5.1.6. I use more natural sweeteners (e.g., raw honey, coconut sugar, dates)									0.620	
5.1.7. I drink more water									0.699	
5.1.8. I eat more cooked, steamed, grilled, or poached foods									0.786	
5.1.9. I eat more lean meats, such as poultry, fish, and eggs									0.697	

(*Continues*)

	Education level	Age	Annual income	Gender	Intention to buy food online	Negative eating behavior	Online food shopping experience	Own vehicle	Positive eating behavior	Situational factors
5.1.10. I consume more low-fat dairy products (e.g., low-fat milk, yogurt, sour cream, cheese)									0.652	
5.1.11. I consume more legumes (e.g., beans, lentils, peas, peanuts)									0.763	
G5 - Negative eating behavior										
5.1.12. I eat more refined grains (e.g., white rice, white bread, white flour)						0.516				
5.1.13. I consume more white sugar or other artificial sweeteners						0.705				
5.1.14. Like more "snacks" like French fries, chocolate and/or candy						0.850				
5.1.15. I drink sugary drinks such as soft drinks, fruit juices, and sports drinks						0.829				
5.1.16. I eat more fried foods (e.g., French fries, fried chicken)						0.880				
5.1.17. I eat more frozen and/or pre-packaged meals						0.732				
5.1.18. I eat more processed meats like sausages, bacon, ham						0.785				
5.1.19. I add more salt to my food						0.688				
5.1.20. I eat more fast food						0.814				
5.1.21. I like more sweets and/or products like croissants, pies, cakes						0.842				
G6 - Control variables										
9.1. Gender				1.000						
9.2. Age		1.000								
9.3. Education level	1.000									
9.10. Annual Income			1.000							
1.8. Private automobile								1.000		
Cronbach's Alpha	1.000	1.000	1.000	1.000	1.000	0.929	0.813	1.000	0.917	0.749
Composite reliability	1.000	1.000	1.000	1.000	1.000	0.929	0.862	1.000	0.929	0.769
Average variance extracted (AVE)	1.000	1.000	1.000	1.000	1.000	0.578	0.472	1.000	0.547	0.532

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