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**Fostering the adoption of e-grocery in Lisbon**

Matilde Nunes de Bastos

Master's in Management of Services and Technology

Supervisor:
PhD, Teresa Sofia Sardinha Cardoso de Gomes Grilo, Assistant
Professor, ISCTE-IUL

August, 2025

Department of Marketing, Strategy, and Operations

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**Resumo**

O comércio eletrónico tem crescido de forma constante em toda a Europa, no entanto, em Portugal fica atrás da média da União Europeia, particularmente no mercado do retalho alimentar. Em 2024, as vendas de retalho alimentar online representavam uma pequena percentagem ao nível nacional, sendo utilizadas principalmente por um pequeno grupo de consumidores e, muitas vezes, como suplemento às compras em lojas físicas. Este estudo examina o mercado de produtos alimentares online em Portugal, na cidade de Lisboa. Através de uma metodologia mista - composta por entrevistas semiestruturadas e um questionário envolvendo 231 participantes - visa caracterizar o perfil dos utilizadores, identificar barreiras à adoção e examinar os principais fatores que influenciam a utilização do retalho alimentar online. Os resultados sugerem que o retalho alimentar online em Portugal demonstra uma baixa penetração, sendo os principais obstáculos à adoção a baixa confiança na seleção de produtos, as preocupações com a frescura e a relutância em pagar taxas de entrega e aguardar entregas. Os aspetos de conveniência são os principais motivadores da intenção de utilização do retalho alimentar online. A análise estatística indica que não existe uma associação significativa entre a adoção do retalho alimentar online e os indicadores sociodemográficos, e a maioria dos fatores que influenciam a sua adoção não varia com a frequência de utilização. Este trabalho contribui para colmatar a lacuna na adoção do retalho alimentar online em Portugal. Oferece orientação estratégica aos retalhistas para melhorar a experiência do consumidor, reforçar a confiança e otimizar a eficiência operacional.

Palavras-chave: comércio eletrónico, retalho alimentar online, barreiras à adoção, fatores que influenciam o retalho alimentar online, Lisboa.

Códigos de classificação EL: L81, Y40

**Abstract**

E-commerce has grown steadily across Europe, yet Portugal lags behind the European Union average in e-commerce adoption, particularly in the grocery market. In 2024, e-grocery sales represented a small share of the national grocery market, used mainly by a small group of consumers and often as a supplement to in-store grocery shopping. This study examines the e-grocery market in Portugal, specifically emphasizing the adoption of this channel within the city of Lisbon. Employing a mixed methodology - comprising semi-structured interviews and a quantitative survey involving 231 participants - it aims to characterize user profiles, identify adoption barriers, and examine key factors influencing e-grocery usage. The findings suggest that e-grocery services in Portugal demonstrate low market penetration, with the primary obstacles to adoption comprising limited trust in product selection, concerns regarding freshness, and reluctance to pay delivery fees or await deliveries. Convenience aspects primarily drive motivation for e-grocery intention of use. Statistical analysis indicates no significant association between the adoption of e-grocery and sociodemographic indicators, and most factors influencing e-grocery do not fluctuate with the frequency of use. This work contributes to addressing the gap in e-grocery adoption in Portugal. It offers strategic guidance for retailers to enhance the consumer experience, bolster consumer confidence, and optimize operational efficiency.

Keywords: e-commerce, e-grocery, adoption barriers, factors influencing e-grocery, Lisbon.

EL Classification Codes: L81, Y40

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**Glossary**

E-commerce Gross Domestic Product (E-GDP)

Business-to-Consumer (B2C)

European Union (EU)

United Kingdom (UK)

eCommerce Database (ECDB)

Standard Deviation (Std. Deviation)

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# 1. Introduction

This dissertation will focus on exploring the e-grocery market in Lisbon.

## 1.1 Contextualization

### 1.1.1 E-commerce

E-commerce is generally defined as the sale or purchase of goods or services between businesses, households, individuals, or private organizations through electronic transactions (Eurostat, n.d.). Over the past decade, the Internet has changed today's society more than any other medium since the invention of television. The recent evolution of the Internet as a major new distribution channel has garnered much attention, as it calls into question the viability of traditional retailing. Today, since innovation is a key factor in the Digital Age, the presence in the digital marketplace is essential. E-commerce trends suggest that by 2040, around 95% of purchases will be made through e-commerce. In the past two years, retailers have gained extensive experience in digitalization. This acceleration was significantly pushed by the COVID-19 pandemic, during which e-commerce and retail played an essential role for both the economy and society (Ecommerce Europe & EuroCommerce, 2024).

### 1.1.2 E-commerce Market

E-commerce turnover (B2C) has shown a steady increase from 2019 to 2023, though growth in 2022 and 2023 was nearly flat when adjusted for inflation due to high inflation rates. However, it is expected to grow again in 2024 by 5%. E-GDP has remained steady, with an expected increase in 2024. According to the European E-commerce Report (2024), two leading indicators for understanding the e-commerce market and its future are e-shoppers and internet users. Both internet and e-shopper penetration continue to rise in Europe, from 89% (2020) to 93% (2024), and 66% (2020) to 72% (2024), respectively.

Portugal's e-commerce sector is overshadowed by Spain and France. According to the European E-commerce Report (2024), 56% of Portuguese consumers shop online. However, Portugal's online shopping rate is below the EU average of 72%, ranking 31st out of 42 countries. Despite being one of the smallest markets, it shows potential with an 88% internet usage rate. In Portugal, consumers rely on physical shopping to make their decisions. Luz (2025) reveals that 30% of respondents wanted to see items before making a purchase, and 18% prefer to handle them on the day of purchase. Statista reports that 40% of Portuguese people buy entertainment products online; furthermore, for the grocery market, 68% choose in-store shopping. Fashion is the largest segment, accounting for 32% of e-commerce revenue in Portugal. The top e-commerce players in Portugal are Spanish companies like El Corte Inglés and Zara, along with global giants Amazon and Apple, based on net sales (Luz, 2025).

### 1.1.3   E-Grocery Market

Low margins have hindered the development of e-grocery sales, due to the fragility of some products, the weight of others, and the need to keep products chilled or frozen. However, now consumers everywhere are used to ordering almost everything else online and are increasingly willing to buy groceries in the same way. Nevertheless, many e-grocery retailers are losing money, and for omni-channel, online is likely to result in a dilutive margin. Yet, according to PwC, (2022) survey, customers want a convenient online delivery service, and there are plenty of companies offering that, so grocery retailers cannot refuse to take part without losing market share.

According to The Future of Grocery Shopping Report by Strategy PwC, the current hurdles for online grocery's breakthrough are low economies of scale and respective high unit costs, high operational complexity of food delivery, high investment costs for logistics infrastructure, and consumers' limited willingness to pay for delivery services. Every company will need to adapt and upgrade its operations to stay competitive. In the European E-commerce Report (2024), only 17% of the e-shoppers purchased food/beverages from e-grocery channels or meal-kit providers.

E-grocery sales currently constitute a small segment of Portugal's overall grocery market. In 2024, the share of e-grocery sales is projected to range between zero and five percent. In 2023, Continente, the leading grocery retailer in Portugal with both physical and online channels, showed e-grocery sales accounted for approximately 2.26% of Continente's total revenue (ECDB, 2025).

## 1.2 Research Question

Portugal lags behind the European average in all e-commerce sectors, especially in e-grocery. While European grocers are shaping the future, most Portuguese retailers remain slow and cautious. Based on the previous context, this dissertation aims to address the following research questions for the e-grocery market in Portugal, focusing on Lisbon city: Q1- What is the e-grocery users' profile in the city of Lisbon?; Q2- What are the barriers for the adoption of e-grocery in the city of Lisbon?; and Q3- Which are the key factors influencing e-grocery adoption in the city of Lisbon?.

## 1.3 Research Objectives

Based on the previous research questions, more specific objectives were identified: O1- Characterize the profile of e-grocery users in the city of Lisbon; O2- Identify the primary reasons for non e-grocery adoption in the city of Lisbon; and O3- Characterize the factors influencing e-grocery adoption in the city of Lisbon.

## 1.4 Research Methodology

The research methodology will be a mixed-methods approach, transitioning from qualitative to quantitative methods. Data collected via qualitative tools provides in-depth insights, reinforced by quantitative statistics analysis. In open forums, like semi-structured interviews, participants can express thoughts openly, revealing areas that might be missed in more structured settings

approaches. Although quantitative and qualitative methods differ, they complement each other (Twining et al., 2017).

## 1.5 Research Scope

The research examines Lisbon's e-grocery market to understand key factors influencing adoption. It targets consumers across online and physical grocery channels in the city Lisbon.

## 1.6 Global Structure

The thesis is structured into five distinct phases. The first chapter, introduction, shows the foundational guidelines, explaining the market context, clarifying the problem, illustrating research questions and objectives, and outlining the scope and methodology. The literature review chapter aims to dissect, interpret, and profoundly appraise the literature to illustrate the available material relevant to the research question. It analyzes several articles, examining their approaches to the growth and future predictions of e-grocery in general, as well as within specific countries. Thirdly, the methodology chapter, outlines the methodological approach and tools used to collect data from both qualitative and quantitative methods. This includes tools for gathering data and insights into the issue at hand, such as semi-structured interviews with grocery users and a quantitative survey. Further the fourth chapter, the analysis, we will present the results obtained from both quantitative and qualitative tools. The goal is to gain a clear understanding of the key influencing factors of e-grocery adoption in Lisbon. Lastly, the conclusion, the final chapter aims to address and answer the research questions while also going beyond them by referring to studied strategies previously mentioned in the literature review to improve the success of e-grocery.

## 2. Literature Review

This chapter aims to understand and provide the theoretical background to support the research questions. For the systematic literature review, a combination of three different words was used to describe e-grocery: "grocery e-commerce" OR "online grocery" OR "e-grocery". The database search used was ScienceDirect. Out of the 224 articles identified, none are related to the Portuguese case; therefore, other European contexts are used as a basis. Nevertheless, for the systematic literature review, a total of 170 published articles comprising review articles, research articles, and conference proceedings from 2019 to 2025 were considered. Following a thorough examination of all articles, 74 were considered relevant for the thesis scope.

References identified through database searching keywords:
"grocery e-commerce" OR "online grocery" OR "e-grocery"
(n= 224)

References evaluated based on time range: 2019- 2025
(n= 170)

References evaluated by title
(n= 113)

References excluded by title
(n= 57)

References evaluated by abstract
(n= 74)

References excluded by abstract
(n= 39)

Studies included in the review
(n=74)
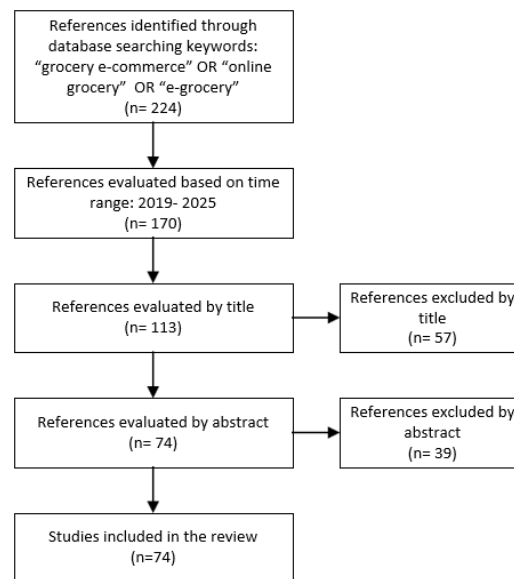
Figure 2-1: PRISMA Diagram

### 2.1 E-Grocery Overview

The rise of online grocery shopping has garnered extensive academic attention. Monoarfa et al. (2024) conducted a comprehensive analysis of 50 country-based studies and concluded that various socio-economic and technological factors significantly shape e-grocery shopping behavior. Convenience - expressed through flexible ordering times, fast and reliable delivery services, and user-friendly digital platforms - emerges as a significant motivator for the adoption

of e-grocery services. Furthermore, customer intention is heavily influenced by service quality, product freshness, price fairness, and overall digital experience, including order tracking and user reviews. These factors also contribute to customer satisfaction, which in turn fosters loyalty and repurchase intentions. Website design, customer service, and brand experience further enhance customer satisfaction and encourage word-of-mouth promotion.

Complementary studies offer more profound insight into specific aspects of e-grocery shopping. Wang et al. (2023) found that consumers generally prefer purchasing standardized items online, which reduces the risk associated with product availability. Nakano (2023) notes that online demand tends to concentrate around popular products, unlike in-store purchases, which support a broader variety. While this concentration supports economies of scale and accurate demand forecasting, it may also promote consumer inertia and reduce unplanned purchases, possibly leading to customer disengagement.

The functionality of digital platforms also significantly impacts consumer perception. Belcore et al. (2024) emphasized that real-time order tracking and transparent delivery status updates are crucial in enhancing consumer satisfaction and promoting repeat use of e-grocery.

Order fulfillment accuracy is another decisive factor. According to Magalhães (2021), the order fill rate is the most critical attribute in determining e-grocery satisfaction. Interestingly, consumers are often willing to accept partial product availability if delivery is free or inexpensive, underscoring the value placed on cost-effective logistics. While environmental awareness is growing among consumers, J. K. Park et al. (2023) noted that purchase decisions are more heavily influenced by brand reputation, personal values, and price sensitivity, which often outweigh ecological considerations.

Switching behavior between online and in-store channels has also been explored in recent literature. Titiloye et al. (2024) found that while e-grocery use does not significantly reduce in-store shopping, those who frequently shop in physical stores are less likely to use online services. Work-related factors like teleworking influence e-grocery adoption, as teleworkers often replace traditional trips with online channel for convenience and time savings (Colaço & de Abreu e Silva, 2025). Nonetheless, the enjoyment associated with in-store grocery shopping and the broader

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selection of perishables still incentivize offline purchases (Titiloye et al.; 2024). Service-related issues are also fundamental for consumer loyalty and switching behavior. Singh & Rosengren (2020) identified delivery-related problems, technical glitches, and perceived unfair pricing as major drivers of customer dissatisfaction and churn. On the other hand, reliable service, product quality, and positive word-of-mouth can significantly build trust and stimulate excitement among consumers, encouraging continued use of e-grocery platforms.

## 2.2 E-Grocery Consumers' Profile

Since the COVID-19 pandemic, researchers have seen socio-demographic traits as useful indicators for e-grocery adopters (Ukil et al., 2025). According to Younes et al. (2022); Shen et al. (2022); and Eriksson & Stenius, (2021) the main characteristics that the authors agree are gender, age, annual gross earnings, and health concerns. This describes an e-grocery persona as an adult woman with high household income and health concerns for herself and others. Minority households, unemployed, or part-time workers tend to have a negative association with e-grocery (Asgari et al., 2023). Trude et al. (2024) supports the same conclusion by studying the e-grocery adoption in low-income communities. Asgari et al. (2023) and Saphores & Xu, (2021) also finds high education levels linked to higher earnings and positive attitudes towards technology, increasing the likelihood of choosing e-grocery.

The e-grocery consumer profile can differ based on the mobility pattern: owning a private car has little impact on e-grocery, since it is seen as a complementary grocery channel (Dominici et al.; 2021); but there is also a group of consumers who enjoy driving and are less likely to replace in-store shopping with e-grocery (Asgari et al., 2023). Dominici et al. (2021) mentions working hours, obesity, and sports participation as factors positively influencing e-grocery, due to its perceived convenience for time savings and mobility. Wang et al. (2023); Driediger & Bhatiasevi, (2019); and Eriksson & Stenius, (2021) mention e-grocery adopters are more likely to live in the capital region or significant urban areas. However, de la Llave Montiel & López (2020) found that short distances between customers and stores force e-grocers to make extraordinary efforts to retain clients.

Some consumers' characteristics are not fully agreed upon by researchers, such as household size. Eriksson & Stenius, (2021) and Asgari et al. (2023) believe that a higher household size has a positive impact on e-grocery adoption. On the contrary, Dominici et al. (2021) affirms that larger households have a negative impact on e-grocery adoption due to higher savings concerns and delivery fees.

Less is known about whether the elderly will switch to e-grocery and under what circumstances. Bezirgani & Lachapelle, (2021); Kvalsvik, (2022); and Yap et al. (2022) conclude that the primary motivations for switching to e-grocery are related to health, mobility issues, and distance to a store.If not constrained by health or mobility issues, they view grocery shopping as a leisure activity and a social opportunity to meet people. Only a small segment of older consumers is positive about e-grocery, but never as their primary grocery channel (Eriksson & Stenius, 2024).

At the end, Brand et al. (2020) advocates that focusing on the "average grocery shopper" is not very helpful if the objective is to understand recent and future changes in the grocery market. Tudoran et al. (2024) emphasizes the importance of predicting Customer Lifetime Value at the individual level to differentiate between valuable and less valuable customers. By understanding purchasing behavior, retailers can allocate resources more effectively.

**2.3 E-Grocery Status**

Following the COVID-19 pandemic, there has been a reported decrease in e-grocery use; however, it remains larger than before (Shen et al., 2022). E-grocery platforms are increasing, but Oncini et al. (2020) notes the growth is followed by centralization of major in-store grocery chains.

The UK e-grocery sector is highly developed, with notable growth. Retailers have invested in online infrastructure and delivery services, offering customers options to shop in-store and online. While online groceries save time, money, and offer convenience, consumer adoption remains inconsistent. In a competitive market where consumers shop interchangeably and exhibit a 'stop/start' pattern, retailers must understand and manage demand by channel (Hood et al., 2020).

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Seidel (2021) has compared two high e-grocery adopters in Europe: France and Germany, by understanding the differences in e-grocery strategies. Regarding operational challenges focusing on cost-efficient logistics, France's drive model offers scalability with low last-mile costs, whereas Germany's home delivery model requires more infrastructure and automation. Seidel (2021) defends decentralization and retailer collaboration on last-mile delivery to reduce costs.

Eriksson & Stenius, (2023) study the Finnish e-grocery user. The categories most highlighted by Finnish regular shoppers were broad assortment, delivery time, flexibility, lower costs, pricing options, user interface, and search efficiency. Consumers preferred a wide range of products and flexible delivery times to suit their schedules. Many other authors, such as Maltese et al. (2021) also emphasize the importance of the last mile. Belcore et al. (2024) and Eriksson & Stenius (2023) demonstrate that reduced prices and delivery times influence consumer decisions, although Belcore et al. (2024) adds that reliability remains a key factor in adopting e-grocery services.

Furthermore, to better understand current trends and challenges in the e-grocery market, this review will be divided into five categories: e-grocery strategies, technology use, operations and last-mile delivery, customer experience, and pricing strategies.

### 2.3.1   E-Grocery Strategies

With the rise in e-grocery, providers must meet this specific market demand, and grocery chains are facing the need for a redesign with a new logistics perspective (Calzavara et al., 2023). As explain by Calzavara et al. (2023) currently, there are several studied options, such as processing directly in stores with internal staff shopping from the shelves during off-peak hours (in-store fulfillment), or creating local hubs that would function as small fulfillment facilities (dark stores fulfillment), or addressing all online orders to a central fulfillment warehouse, however, use stores to complete orders with very fresh products and carry out deliveries (single e-hub fulfillment), and lastly, online orders could be fully managed by multiple e-hubs (multi e-hub fulfillment).

The Single e-hub offers a balanced trade-off between cost and efficiency, ideal for mid-to-large retailers. A dark store suits moderate online volumes but may lead to store closures.

Meanwhile, the multi e-hub is only viable for high online demand due to its significant investment cost. It is also feasible to integrate various strategies to suit the e-grocery market better (Calzavara et al., 2023).

Mkansi & Nsakanda (2021a) confirms that in the United Kingdom market, leveraging physical stores in e-grocery fulfillment provides a sustainable competitive advantage through cost efficiency, brand strength, and operational flexibility. The store network is an irreplaceable asset offering unique, tangible, and intangible benefits that pure online players struggle to match or replicate. Hybrid models, such as Amazon-Whole Foods and Ocado-M&S, highlight the growing importance of store integration in online grocery. This is crucial in the e-grocery market, where space and handling costs are high and hard to offset with customer-friendly delivery charges.

Buldeo Rai et al. (2023) explores a new approach to the e-grocery market, quick commerce, which relies on a network of dark stores and a fleet of available vehicles and staff to provide instant deliveries in Paris. Quick commerce offers grocery deliveries in under twenty minutes, attracting significant venture capital but also facing criticism from urban administrations and communities.

### 2.3.2   Technology Utilization

Technology is the business's best ally in understanding customer needs. It can enhance trust and advice to customers before, during, and after purchase. Gumasing et al. (2023) study the factors influencing online groceries' intention and usage by applying machine learning; and Chakraborty et al. (2024) develop a framework to understand the factors influencing trust in the shopping experience through generative artificial intelligence chatbots by assisting users during the shopping process. Nowadays, more people trust the opinions of other customers than brand advertisements. Consequently, user-generated content, which refers to any content created by consumers, such as product reviews, social media posts, and online forums, is crucial for e-grocery success. User-generated content provides valuable insights into the experiences and opinions of consumers, enabling potential buyers to evaluate the quality and suitability of products and services, allowing them to make informed purchasing decisions (Bruno et al., 2024).

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### 2.3.3 Operational and Last-Mile Delivery

E-grocery enables customers to access a wide variety of products from various e-grocery stores, thereby increasing the pressure to forecast demand and manage inventory accurately. Failure to do so can lead to imbalance and customer dissatisfaction or churn (Saberi et al., 2023). Both articles Ekren et al. (2022) and Ekren et al. (2021) focus on lateral inventory share-based models to enhance food waste management and increase network inventory.

An accurate inventory plays a crucial role in order fulfillment. Therefore, Rodrigues et al. (2021) center his study on post-purchase out-of-stock situations, when products appear available at the time of order but become out of stock after fulfillment. The author explores two substitution policies: matching on the dominant attribute, which boosts acceptance but varies across categories between flavor and brand, or using past purchases, which benefits all products. Combining both policies enhances the effect, especially when matching by flavor rather than brand.

Several authors highlight the importance of a deeper study of perishable products. Cuellar-Usaquén et al. (2024) understands the challenges of sourcing perishable products from multiple suppliers, transporting them to a warehouse, maintaining inventory, and minimizing waste. Therefore, it suggests a simulation that includes the possibility of supplier consolidation, predicts sources of uncertainty, and improves decision-making. Siawsolit & Gaukler (2021) propose a strategy via advanced demand information in the purchasing phase. Over 50% of grocery sales come from perishable items. To handle supply delays and demand fluctuations, retailers stock up, resulting in rapid inventory buildup. If better demand data boosts profits, the retailer might offer discounts for advance orders, cover curbside fulfillment costs, decrease food waste, and attract more customers with discounts.

After the order is closed, it is essential to understand how the various strategies studied in the previous chapter 2.3.1 impact the picking.

Vazquez-Noguerol & Prado-Prado (2025) determined how specific characteristics of store and online orders affect the order picking time, using an in-store picking strategy. Understanding this timing is crucial for estimating staff workload, enabling efficient customer service. The

essential factors are store design, as convenience stores often outperform supermarkets, and congestion negatively impacts order picking time; broader product selection, it can enhance collection efficiency but might also raise picking effort time; purchase characteristics (number of items and amount) significantly affect picking time; picker methods, such as the bagging process, heavy product routes, and pickers preparing fresh products also influence picking time; lastly, store experience, since training is key to enhancing performance.

On the other hand, Arbex Valle & Beasley (2020) investigates the e-grocery picking in a warehouse (e-hub fulfillment), focusing on order batching for picker routing, as online orders can consist of dozens of items. It proposes a formulation that selects orders to batch together, enhancing optimization by approximating the picker routing distance. After batching, it routes each picker for maximum efficiency.

Besides e-grocery strategies to improve picking and stock efficiency, delivery poses operational challenges for e-grocery. Addressing growing customer demands for shorter lead times and more stringent delivery schedules requires new strategies beyond traditional methods.

Marcucci et al. (2021) demonstrate how purchase characteristics, including price, service cost, lead time, time window, travel time, and product range, influence in-store strategies for choosing between home delivery and click-and-pick. Physical grocery shopping remains the primary method, but results show that consumers who prefer e-grocery mainly opt for home delivery. However, price, especially the product's cost, remains the primary concern. Marcucci et al. (2021) recommend incorporating pickup and delivery costs into product prices to increase market share.

Ötken et al. (2023) focus their study on a new approach for home delivery, by better utilizing idle time when existing vehicle fleets can deliver regular customer orders earlier than the start of their time window. In addition to regular orders, it considers sending push notifications to targeted customers about upcoming delivery tours and asking if they would like to place orders (from a limited selection of products) without incurring a delivery fee or meeting the minimum order quantity.

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E-grocery retailers face increasing pressure to optimize home delivery operations while addressing cities' congestion and emissions. Literature indicates that delivery can raise or lower peak-hour emissions and vehicle hours, depending on the distribution center location, logistics efficiency, whether delivery replaces shopping trips or boosts demand, and the timing relative to peak travel periods (Samudio Lezcano et al., 2023).

E-grocery delivery is neither intrinsically sustainable nor necessarily an environmental burden. In the studies of Bjørgen et al. (2021) and Samudio Lezcano et al. (2023), the authors do not understand e-grocery as a substitute for individuals' in-store trips since consumers optimize their trips by adding stops to their tours while on the road for other purposes. However, Bjørgen et al. (2021) finds that e-groceries are less likely to travel by car when revisiting in-store. This emphasizes the importance of integrated urban planning that balances personal mobility and freight transport, particularly in light of the growing e-grocery industry (Bjørgen et al., 2021).

E-groceries take orders and ensure rapid delivery service. The unpredictable timing of orders has a significant impact on the overall efficiency of the delivery network. Therefore, several authors have been studying the best approach to enhance last-mile efficiency. Yowtak et al. (2020) proposes the use of an unmanned aerial vehicle. Li et al. (2024) offers a new method combining traditional shipment and parcel consolidation delivery with unmanned aerial vehicles. However, Yowtak et al. (2020) found that unmanned aerial vehicles are not yet a viable economic replacement. Furthermore, Ehrler et al. (2021) reinforces that electric vehicles are more ecological compared to diesel vehicles, but the entire logistics system - vehicles, infrastructure, and planning tools is optimized for combustion engine vehicles. Currently, these additional investments and costs are not offset by savings. Beyond these models, van robots are also emerging as an option for last-mile delivery (Liu et al., 2022). However, as shown on Liu et al. (2021) and Liu et al. (2022) papers, their low efficiency limits their application since few orders are delivered per trip.

An overlooked strategy, as Tudisco et al. (2025) describes the collaboration with third-party logistics providers. The author proposes a system that utilizes an on-demand vehicle rental service from a third-party logistics provider, allowing e-grocers to tailor their delivery fleet to fluctuating demand. The analysis shows how strategic fleet choices and routing can decrease operational costs.

### 2.3.4 Customer Experience

While e-grocery platforms offer a wide range of cues through mobile apps to cater to buyers' needs, it is ultimately the individual buyer who perceives, values, and assesses the worth of these services. Different factors influence buyers' experiences on e-grocery platforms versus general online shopping due to grocery shopping's unique traits like perishability, variety, and timely delivery (Basu et al., 2024).

As explain by Basu et al. (2024), one crucial point is the buyer-centric design, which creates an intuitive, user-friendly app tailored to buyers' preferences. Implementing seamless navigation, personalized suggestions, and a simple checkout improves the overall experience. Anshu et al. (2022) research concludes that convenience is also a key for customer experience and repurchase intention. Product experience did not significantly affect customers' willingness to repurchase, since most future purchases rely on past ones, highlighting the need for personalized suggestions based on buyer history.

Khalek et al. (2025) finds that most consumer frustrations are related to five dimensions: tangible concerns, the reliability of the service, the assurance in the purchase, the responsiveness of the customer support, and empathy.

The most tangible concerns are product quality and perishability: Existing literature suggests that purchasers prefer physical stores over e-grocery due to the lack of sensory touch, as supported by (Basu et al., 2024) and (Kühn et al., 2020). Kühn et al. (2020) highlighted four different strategies that were explored. Firstly, focus on proposing solutions through direct touch interfaces (touchscreens). Secondly, adapt the price marketing strategy to consider the differences between all retail channels. Thirdly, enhance haptic information, mainly for perishable products, by adjusting online displays with videos and tactile assessments by others to address individual perceptions, as also supported by Ozkan & Sekerkaya (2025). Additionally, Streletskaya et al. (2023) add that to improve product choice, companies can participate in contests for awards or use sensory notes to describe the flavor and potential food pairings. Fourthly, Kühn et al. (2020) highlight the need for investments in high-touch items.

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Service reliability access in customer orders. Discrepancies are assessed by verifying fulfillment, delivery times, and communication, ensuring they align with the original order: Basu et al. (2024) suggested for operational excellence include real-time inventory updates, accurate product descriptions, high-quality images, and advanced tech like demand forecasting, inventory management, and route optimization. These improve transparency, build trust, and improve app dependability. Anshu et al. (2022) finds that fast item delivery encourages repeat purchases. Customers expect reliable, timely service. They also value the ability to choose the date and time of delivery.

The purchase assurance must be transparent and trustworthy, especially about payment and refunds: Payments are a crucial customer touchpoint that can lead to customer attrition and revenue issues for e-groceries. However, retailers often overlook it when designing customer experience strategies. It was found that customers are more likely to choose digital wallets and credit cards over cryptocurrency (Nim et al., 2025).

Customer support responsiveness involves effective communication, timely follow-up, and escalation when necessary: Basu et al. (2024) emphasizes that proactive communication at each stage of the buyer journey, from order confirmation to delivery updates, helps manage expectations and builds control, ultimately improving the overall experience. Customer support can retain clients after a failure experience, and therefore enhance customer retention (Anshu et al., 2022).

Empathy in interactions, especially customer service, is vital as customers need to feel their concerns are addressed: Anshu et al. (2022) describes a new way to address customers in e-grocery by involving them in the process, making them participants in value creation. Studies show customer experience and value co-creation are closely linked, with the effect stronger at lower co-creation levels and decreasing at higher levels, except for delivery experience.

### 2.3.5 Pricing Strategies

In today's attention economy, retailers compete for consumer attention, leading to information overload and increased cognitive effort. Digitalization worsens this, as cognitive effort harms customer loyalty but also enables solutions like personalized marketing, which delivers the right

message to the right shopper at the right time. Most studies focus on recommending products for the next shopping basket, but Hallikainen et al. (2022) suggests that within-basket recommendations are more useful. Personalized price promotions also help mitigate the negative correlation between cognitive effort and loyalty, so recommendations alone may not be optimal for online grocery retailers. line grocery retailers.

It is important to understand how e-grocers can access product pricing. Pan et al. (2022) refers to bundling perishable items strategies. The bundling policy is more sensitive to logistics uncertainties than the separate policy. Unintentional shortages of bundled perishables increase costs and waste due to poor information and unplanned de-bundling and repricing. This shortage can be monitored; thus, retailers should not rigidly adhere to one policy but tailor strategies to different scenarios.

Personalized pricing offers new opportunities for e-grocers. Cebollada et al. (2019) examines the optimal price for multichannel groceries, finding that households shopping online and offline show lower online price sensitivities in some categories. Price sensitivity decreases as distance to the nearest store increases. Retailers can boost profits by adjusting online pricing based on store proximity, suggesting online zone pricing might be more effective according to residential location.

The paper from Cebollada et al. (2019) shows Amazon testing a new dynamic pricing strategy for their only online grocery channel- Amazon Fresh, involving frequent, minor price adjustments across food categories. However, Amazon has not adopted this pricing strategy for other brands with physical channels, as consumers may perceive frequent product price changes as unfair. The same strategy was also identified in Fedoseeva, (2020) paper for sparkling wine at Christmas.

However, in addition to price strategies, it is also important to understand the frequency and basket order to achieve e-grocery profitability. Wagner et al. (2021) analyzed these characteristics on a large omnichannel e-grocer where customers use either a pay-per-delivery or subscription plan. It concluded that subscriptions boost customer loyalty and purchase frequency but decrease profitability due to higher operational costs. Therefore, retailers should boost subscription profits

with targeted promotions and minimum order thresholds, emphasizing alignment of marketing and operations to avoid profit loss.

Retailers compete on both price and variety. Fedoseeva & Herrmann, (2023) finds a positive relationship between assortment depth and prices, but the effect is nonlinear. The "More-is-not-always-better" principle applies, as excessive variety can lower efficiency and reduce price premiums. Additionally, Saberi et al. (2023) studies a new perspective on how assortment can help retain customers at risk of churning and boost revenue. The author helps e-groceries identify customers at risk of churn, understand their product needs, and prevent low-stock items from appearing to regular customers. This ensures limited stock is reserved for high-value at-risk customers.

Another strategy from Kim et al. (2023) suggests e-groceries can gain a competitive edge by securing exclusive distribution rights- differentiating their assortment. Online channels enable adding new products without physical space limits. The study shows that exclusive distribution boosts sales more for brands with extensive product ranges and categories with many competing brands.

## 2.4 Conclusion

In the literature, several strategies have been identified to study e-grocery. Most employed quantitative tools, such as questionnaires, and qualitative tools, such as semi-structured interviews, to understand consumers' perspectives on e-grocery services, followed by various methods to analyze the results. The majority of the literature utilized descriptive analysis to develop user profiles and to highlight the key aspects of e-grocery.

# 3. Methodology

This chapter outlines and details the research methodology employed in this thesis.

## 3.1 Overview

Based on the articles examined in the literature review chapter, the chosen research methodology will be a mixed-methods approach, transitioning from a qualitative approach (semi-structured interviews) to a quantitative approach (questionnaire), as illustrated in Figure 3.1.
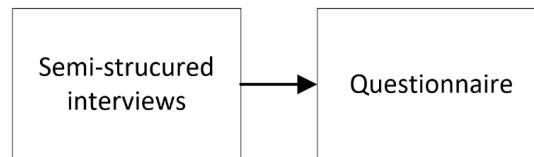


Figure 3.1-1: Research Methodology

There is sometimes confusion about distinctions between mixed methods research and other approaches that use more than one method. The term "mixed methods research" is used as a simple shorthand to refer to research that integrates quantitative and qualitative methods within a single project. The term multi-strategy research can also be used to describe this approach, but mixed methods is the more commonly used term (Bell et al., 2019) .

There are four basic mixed methods designs: convergent parallel design, exploratory sequential design, explanatory sequential design, and embedded design.

The design method chosen for implementation is the exploratory sequential design. This method begins with qualitative data collection and analysis, followed by quantitative data collection and analysis, leading to the interpretation of results. It aims to explain the qualitative results through quantitative data further, leading to richer interpretations.

## 3.2 Qualitative Study: Semi-structured Interviews

Semi-structured interviews were conducted prior to administering the questionnaire to identify new research opportunities and enhance the questionnaire with insights beyond those provided in the literature review. These semi-structured interviews encompassed six participants, comprising three e-grocery consumers and three non-e-grocery consumers, who were asked about their reasons for using or not using e-grocery services. (Appendix A)

## 3.3 Quantitative Study

### 3.3.1 Conceptual Model

The purpose of the present thesis is to identify the key factors influencing the use of e-grocery in Portugal. To do so, a set of hypotheses was created to investigate, and a conceptual framework was developed. In previous studies, as described in chapter 2.2, gender, age, and household size were identified as characteristics that influenced the adoption of e-grocery (H1). Furthermore, the semi-structured interviews described in section 3.1 revealed that most of the points raised by e-grocery users were similar. However, users with different frequencies of use reported different issues as factors motivating e-grocery adoption, justifying the analysis of the e-grocery adoption based on frequency of use (H2). Thus, to evaluate if the mentioned characteristics influence the adoption of e-grocery, H1 and H2 were formulated:

H1: User profile characteristics influence the frequency of e-grocery adoption

    H1 a) Gender characteristics influence e-grocery adoption

    H1 b) Age characteristic influences e-grocery adoption

    H1 c) Household size characteristic influences e-grocery adoption

H1 d) Annual Gross Earnings characteristics influence e-grocery adoption

H2: Frequency of e-grocery usage influences the key factors motivating e-grocery

H2 a) E-grocery frequency of use influences e-grocery product availability

H2 b) E-grocery frequency of use influences e-grocery product pricing

H2 c) E-grocery frequency of use influences e-grocery interface usage

H2 d) E-grocery frequency of use influences e-grocery delivery methods

H2 e) E-grocery frequency of use influences e-grocery delivery costs

H2 f) E-grocery frequency of use influences e-grocery order fulfillment

H2 g) E-grocery frequency of use influences e-grocery communication

H2 h) E-grocery frequency of use influences e-grocery sustainability

To better understand the formulated hypotheses, the conceptual model obtained from them is represented in Figure 3.2.
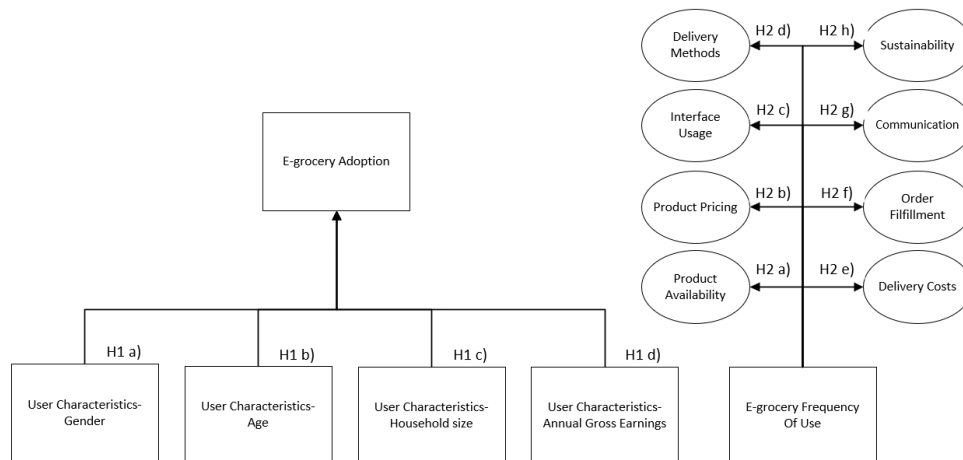


Figure 3.3.1-1: Conceptual Framework comprising H1 and H2

### 3.3.2 Questionnaire

Quantitative research methods have been described as a fundamental approach in social research. It focuses on the numerical side of data, which can be quantified and analyzed through statistical analysis to provide support for claims, thereby generalizing findings and explaining phenomena (Williams, 2011). Given the scope of this research, many questions need to be addressed, making quantitative methods a practical choice for data collection.

A questionnaire will serve as a qualitative tool. It comprises 21 questions to assess consumer attitudes, behaviors, and perceptions regarding the adoption of e-grocery. The questions were administered in three types: single-choice, multiple-choice, and a five-point Likert response scale. The questions originated from various questionnaires examined in the literature review, mainly based on Eriksson & Stenius (2023), and supplemented by insights derived from the results of the semi-structured interviews with six individuals. (Appendix B)

The questionnaire outlines the study's objectives and highlights the participants' anonymity. The structure includes:

- Demographic information: Gender, age, household size, and annual gross earnings.
- Technology Acceptance: Item measuring behavioral intention to use online services.
- E-grocery Barriers: Grocery purchasing motivation on physical channel, modes of transportation used to the physical channel, shopping frequency on physical channel, and barriers to e-grocery adoption.
- E-grocery Shopping Habits: Motivations behind the e-grocery purchasing process, shopping frequency on e-grocery, initiation of e-grocery use, and preferred e-grocery formats.
- Factors influencing e-grocery adoption: All questions employ Likert-scale items to evaluate the most valued variables within the e-grocery context factor, collected through literature review. The factors under evaluation relate to product availability and pricing, interface usage, delivery methods and their associated costs, order fulfillment, communication, and sustainability.

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### *Independent Variables:*

It is widely acknowledged that personal characteristics influence consumers' utilization of e-grocery services. The variables used to characterize shoppers encompass gender, age, household size, and annual gross earnings; additionally, the frequency of e-grocery usage is also an important variable.

Instituto Nacional de Estatística categorizes the variables as follows: gender- female, male; age - 20 to 29 years old, 30 to 39 years old, 40 to 49 years old, 50 to 59 years old, 60 to 69 years old, 70 to 79 years old, and 80 years old or more. The variables household size and income, were based on the previous literature review results, the questionnaire specified the ranges household size from: living with parents/grandparents, alone, in a couple, with kids; and regarding income it was characterized based on gross annual income until 15000€ (low income); 15000 – 24999 (medium low income); 25000 – 34999 (medium income); 35000 – 49999 (high medium income); 50000 – 74999 (high income); and higher than 75000 (highest income). Lastly, the frequency of e-grocery usage had the following ranges: "never", "have tried", "at least once or twice a year," "at least once quarterly," "monthly," "biweekly," and "weekly".

### *Pre-test of the Survey:*

Before distributing the questionnaire to the participants, the authenticity of the content was verified. Six additional semi-structured interviews were conducted with six individuals, comprising three females and three males, to ensure a comprehensive understanding of the questionnaire, identify any flaws, and facilitate refinement for the final version. The feedback received was positive and led to several wording adjustments to enhance clarity for general respondents.

*Sample's characterization:*

The questionnaire was administered via Microsoft Forms and distributed to a random sample of e-grocery users and non-users. The target audience of the questionnaire comprises respondents aged 20 and above, of all genders, residing in Lisbon. This method produced quantitative data for analysis, with 231 responses.

### 3.3.3   Data analysis tools

The quantitative data obtained from the survey were subjected to data analysis through the use of IBM SPSS Software (version 29.0) and the application of two statistical methods, as detailed below:

a)  A descriptive analysis was conducted to understand the profile of the sample, and the variables within the study were categorized as either categorical or ordinal. Subsequently, all other questions regarding sample shopping habits and e-grocery adoption influencing factors were analyzed descriptively to draw conclusions based on the minimum, maximum, and average values, as well as to determine whether the variables showed consensus through std. deviation analysis.

b)  The reliability of questionnaire responses was assessed using Cronbach's alpha statistical measure.

c)  Furthermore, a hypothesis testing procedure will be undertaken to determine if there is enough evidence to refute the null hypothesis about one or more population parameters. The process follows a systematic approach to minimize decision errors. This methodology helps assess hypotheses H1 and H2. Statistical tests are mainly divided into parametric and non-parametric types. Parametric tests are most frequently used, involving hypotheses about population parameters or comparisons across two or more populations. Applying parametric tests requires two key assumptions: normality, verified by the Kolmogorov-Smirnov test to determine if the sample follows a normal distribution; and homoscedasticity, checked with the Levene test to assess whether variances are equal

across groups. When assumptions are met, parametric tests like the t-test for two populations or one-way ANOVA for multiple populations can be used. Regarding non-parametric tests, these do not require the variable to follow a normal distribution, and they are used when the assumptions mentioned above are not met. In this case, the most suitable alternatives are the Wilcoxon-Mann-Whitney test instead of the t-test, and the Kruskal-Wallis test rather than one-way ANOVA. Rejecting the null hypothesis in parametric and non-parametric tests suggests that at least one population mean differs from others, but does not specify which pairs are different. Therefore, post-hoc tests should be conducted: Scheffe's test for parametric tests and Games-Howell for non-parametric tests. This helps to identify which groups differ from one another precisely.

## 3.4 Conclusion

In closing this chapter, Figure 4 summarizes the key ideas, the methods employed to address the research questions, and fulfills the specific objectives:

| Objectives | Research Questions | Analysis Techniques |
|---|---|---|
| O1: Characterize the profile of e-grocery users in the city of Lisbon. | Q1: What is the e-grocery users' profile in the city of Lisbon? | Descriptive Analysis and Hypotheses' Testing (H1) |
| O2: Identify the primary reasons for non e-grocery adoption in the city of Lisbon. | Q2: What are the barriers for the adoption of e-grocery in the city of Lisbon? | Descriptive Analysis |
| O3: Characterize the factors influencing e-grocery adoption in the city of Lisbon. | Q3: Which are the key factors influencing e-grocery adoption in the city of Lisbon? | Semi-structure Interview, Descriptive Analysis and Hypotheses' Testing (H2) |

Table 3.4-1: Summary of Objectives, Research Questions, and Analysis Techniques

# 4. Analysis of Results

This chapter offers an analysis of the data collection process. Initially, semi-structured interviews will be analyzed. Furthermore, the questionnaire will be examined through a reliability analysis, followed by a descriptive analysis of the sample responses, and subsequently by hypothesis testing. The questionnaire will be examined utilizing IBM SPSS (version 29.0).

## 4.1 Qualitative Analysis

### 4.1.1 Sample Characterization

Concerning the initial qualitative data collection, it was conducted with the participation of six randomly selected grocery shoppers.

| Interviewee Gender | Interviewee Age Range | Grocery Shopping Channel |
|:---:|:---:|:---:|
| Male | 60-69 | Physical Channel |
| Female | 30- 39 | Physical Channel |
| Female | 20- 29 | Physical Channel |
| Male | 50-59 | E-grocery Channel |
| Female | 20-29 | E-grocery Channel |
| Female | 40-49 | E-grocery Channel |

Table 4.1.1-1: Interviewee Characterization

### 4.1.2 Results

The interviews were conducted with grocery shoppers distinguished by e-grocery users and non-users. Additionally, these interactions offered valuable insights into the obstacles hindering e-

grocery adoption among non-users, as well as the motivations driving e-grocery usage among current users.

The main obstacle to e-grocery adoption is product selection. All respondents who prefer physical shopping do not use shopping lists and find product searches to be harder. One non e-grocery user mentioned choosing groceries based on discounts but noted that viewing all discounts online was difficult. They also emphasized the importance of real-time inventory data to evaluate potential substitutes. Additionally, concerns regarding product freshness and expiration dates were frequently expressed. Respondents expressed significant criticism regarding delivery fees; one individual considered the distance-based fee unreasonable, while others perceived the combination of elevated product prices and delivery charges, particularly when utilizing delivery platforms, as unfair. Finally, they regard themselves as regular shoppers, making purchases on a weekly or biweekly basis; therefore, delivery fees are particularly significant.

Regarding the e-grocery users, it was observed that all three respondents considered e-grocery as a supplementary service, as they continue to use the physical channel mainly for fresh products. It was observed that the selection of fresh products on e-grocery was not carefully curated and often included items near the expiration dates, which is why these products are not considered for purchase on the e-grocery channel. Nonetheless, the primary motivation for utilizing e-grocery is the perceived ease of product selection and delivery. It was highlighted that providers now offer features like pre-set product lists and ongoing shopping baskets, allowing users to add products until they complete their purchase. Additionally, one respondent said there are no nearby supermarkets, they do not own a car, and the building has no elevator, making e-grocery delivery essential. Another respondent indicated they prefer straightforward shopping without distractions or impulse buys. Lastly, it was mentioned, not as a critical point, but as an improvement, that the platforms from conventional supermarkets are not yet adaptable to different formats such as websites and phone applications.

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## 4.2 Quantitative Analysis

### 4.2.1   Reliability Analysis

To employ the conceptual model provided, it is crucial to analyze the reliability coefficient through Cronbach's alpha. The evaluation of internal consistency across the eight factors influencing e-grocery was conducted using Cronbach's alpha.

While Cronbach's alpha less than 0,7 is considered low, between 0,6 and 0,8 is considered moderate but acceptable, and between 0,8 and 1 is considered very good.  The Cronbach's alpha for the questionnaire has a value of 0,885. When performing for each factor, the Cronbach's alpha values were between 0,541 and 0,905. (Table 4.2)

To improve Cronbach's alpha below 0.7 for Delivery Cost and Order Fulfillment, the impact of each variable on these factors was analyzed. This analysis concluded that removing any delivery cost factor variables would not significantly increase the construct's alpha, so all variables will be maintained. Conversely, for the factor Order Fulfillment, the variable with the lowest score was removed, allowing the Cronbach's alpha value of the factor to increase to 0.762. (Appendix C)

| Factor | Cronbach's alpha (first analysis) | Cronbach's alpha (second analysis) |
|---|---|---|
| Product Availability | 0,798 | 0,798 |
| Delivery Format | 0,541 | 0,541 |
| Delivery Cost | 0,708 | 0,708 |
| Interface Usage | 0,771 | 0,771 |
| Product Price | 0,861 | 0,861 |
| Order Fulfillment | 0,660 | 0,762 |
| Communication | 0,763 | 0,763 |
| Sustainability | 0,905 | 0,905 |

Table 4.2.1-1: Cronbach's alpha for each questionnaire factor

## 4.2.2 Descriptive Analysis

The questionnaire will be analyzed through a descriptive analysis of the sample characterization, e-grocery barriers, e-grocery shopping habits, and factors influencing e-grocery adoption.

### 4.2.2.1 Sample Characteristics

To characterize the sample questionnaire responders, the following variables were considered: gender, age, household composition, annual gross income, and the technological acceptance level. (Appendix D)

Regarding the gender response distribution, with 55.4% female (representing 128 individuals) and 44.6% male (representing 103 individuals), it is possible to observe a relatively balanced.

According to the frequency table, the largest age group among the 231 respondents is the 20-29 years, which accounts for 43.3% of the sample, representing 100 individuals out of the total 231 respondents. The remaining age groups from 30-39, 40-49, 50-59, 60-69 have a similar representation: 50-59 age group with 15.6% from 36 individuals; followed by the 30-39 age group representing 14.7%, corresponding to 34 individuals; the 40-49 age group represents 13.0% amounting to 30 individuals, and the 60-69 age group represents 11.7% which constitutes 27 individuals. Lastly, the two smaller age groups are 70-79 and 80+ years or older, each comprising 0.9% of the respondents, with two respondents in each group.

With regard to the characterization of household composition, the majority are living with children- 29.9%, followed by living as a couple- 29.4%, alone- 22.1%, with parents or grandparents- 18.6%.

Regarding the annual gross income, in euros, the majority of the sample falls within the ranges of 15000-24999 comprising 23.8%, 25000-34999 comprising 22.5%, and 35000-49999 comprising 21.6%. These groups collectively represent 67.9% of the sample and are characterized by a medium yearly gross income. Lastly, earning up to 15000 accounts for 16.9%, while earning

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between 50000-74999 constitutes 7.8%, and individuals earning more than 75000 make up 7.4% of the sample.

Lastly, on level of technology acceptance it has consider three options: high technology acceptance under the statement "Whenever I can, I try to use online services" which accounts with 44.6%; medium technology acceptance under the statement "I sometimes use some online services" corresponding to 40.3%; and low technology acceptance under the statement "Whenever I can, I try to use face-to-face services" representing 15.2%.

### 4.2.2.2 E-grocery Barriers

To better understand shopping behaviors, the variables to be analyzed include the motivation for grocery purchasing on physical channels, modes of transportation used to reach physical channels, shopping frequency on physical channels, and barriers to e-grocery adoption. (Appendix E)

Regarding the motivation behind the purchasing process, the std. deviations range between 0.99 and 1.11, indicating moderate polarization in respondents' perceptions. It is observed that during visits to physical stores, consumers tend to prefer a more expedited process in the final stage, the buying stage, which exhibits the highest mean score (3.67). However, respondents still expressed a high value on shopping at a slow and relaxed pace, with the second highest mean (3.46). The following variables are ranked with a low mean value of two. This suggests that respondents prefer an expedited shopping process, especially during the purchasing stage, while still valuing the product selection.

Regarding the predominant transportation methods employed for physical grocery shopping, it is noteworthy that the majority, 76.5%, use their private vehicles. This underscores that there are no significant difficulties associated with visiting physical stores.

Concerning the frequency of shopping, the respondents answers ranked a mean of 5.22, between shopping biweekly and weekly it is noticed that the sample engages in frequent grocery shopping, therefore predominantly regular shoppers. Additionally, only one respondent chose the

answer "never". The question std. deviation was 1.3, indicating the likelihood that respondents have varying frequencies of shopping; however, it does not contradict that the sample can be characterized as regular shoppers, since 71.0% of the respondents shop between every two weeks to several times a week.

The question addressing the barriers to e-grocery adoption was performed separately to non-e-grocery users and spontaneous e-grocery users. It indicated that the results would not differ significantly between the two groups. The primary obstacles relate to product selection, notably concern regarding product freshness, accounting for 16.6% among non-users and 14.5% among users; and the inability to experience or view product details, corresponding to 20.6% among non-users and 24.9% among users. It is understandable, given that this grocery channel requires a high level of customer trust between the retailer and the consumers. Additionally, during the delivery phase, most respondents are reluctant to pay for delivery, accounting for 13.1% among non-users and 14.1% among users; nor are they willing to wait for it, representing 17.1% among non-users and 11.6% among users. This aligns with the findings of the inquiry regarding the mode of transportation, whereby the majority of respondents reported experiencing no difficulty in traveling to the store using a private vehicle. These barriers related to product selection, freshness, and delivery account, together with almost the exact representation when addressing e-grocery adoption barriers, are 67.4% among non-users and 65.1% among users.

### 4.2.2.3 E-grocery Shopping Habits

To better understand the e-grocery shopping behavior, the sample will analyze the following variables: motivations behind the e-grocery purchasing process, shopping frequency on e-grocery, initiation of e-grocery use, and preferred e-grocery formats. (Appendix F)

In the analysis of the motivation behind e-grocery purchases, it was observed that all variables possess mean scores between three and four, indicating a moderate level of importance attributed to question. Among all variables, the respondents emphasized the most the time-saving aspect, the absence of shopping restrictions, and the minimal effort required, with mean scores of 3.90, 3.78,

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and 3.70, respectively. The time-saving aspect was the variable with the lowest std. deviation of 1.00, highlighting the time convenience aspect. The variable with the lowest mean- 3.03, was related to having a wider variety of items. Lastly, the variable assessing the convenience of transportation score a low mean- 3.20, and exhibits a high std. deviation value- 1.30, indicating that the responses are highly variable and there is no consensus among the respondents.

The respondents were questioned regarding the frequency of their e-grocery shopping, with a mean stating a frequency of use between quarterly and monthly (mean 3.59). However, the high std. deviation of 2.53 shows responses vary widely, indicating no consensus. In this context, the mean alone does not establish a trend. The most prevalent response was never, accounting for 30.7%, followed by having tried the e-grocery, corresponding to 19%. Furthermore, since chapter 4.2.2.2 states most respondents shop physically biweekly and weekly, it was validate that 43,3% of the sample is considered to use e-grocery sporadically, based on the aggregation of variables- at least once or twice annually, at least quarterly, or monthly. Therefore, 6.9% are considered high users of e-grocery, from biweekly users to several times a week. It can be concluded that even for high-frequency users, such as biweekly and weekly, use e-grocery as a supplementary channel. This is evidenced by the data presented in chapter 4.2.2.2 concerning the frequency of physical store purchases, where only one respondent indicated never; few reported at least once or twice a year; and at least once quarterly.

The transition to e-grocery was examined in relation to the COVID-related phases, categorized as before, during, or after the COVID, due to the increased use of online services during this period. It was observed that COVID did not significantly influence the transition to e-grocery, as 55.3% of users had prior experience with it before the pandemic. Nevertheless, COVID prompted 18.6% of the survey sample to try e-grocery services, and 26.1% began to use e-grocery after.

Lastly, regarding the preferred e-grocery formats, e-grocery users exhibit a clear preference for conventional retailers that have both physical and online services, accounting for 59.6%. This is followed by an additional preference for delivery service platforms, representing 37.9%. Lastly, online-only retail services are used by only 2.5% of the sample survey.

**4.2.2.4 Factors influencing e-grocery adoption**

The literature review identified numerous research topics, which were compiled into eight key factors influencing e-grocery adoption. It is aimed at identifying what e-grocery users value most. These factors were product availability, delivery formats, delivery cost fees, interface usage, product price, order fulfillment, communication, and sustainability. (Appendix G)

Concerning product availability, having an extensive selection of products represented the variable with the highest mean- 3.73; additionally, the lower std. deviation- 0.92, indicates a consensus among the survey sample. This is followed by the availability of special dietary products, such as gluten-free and sugar-free options (mean 3.19); however, with the higher std. deviation- 1.23, which suggests some value these options highly, while others less. Alcohol and tobacco products contain the lowest mean- 2.33; however, a std. deviation of 1.10 indicates the presence of a small segment that continues to value them.

Regarding the four delivery formats, the variable selecting time windows for delivery showed a mean rate of 4.19, highlighting a strong preference regarding this personalized delivery option. Fast deliveries are also highly valued, with an average rating of 3.98. Finally, the variants' pick-up points and deliveries within 2-3 days show a lower mean of 3.41 and 3.23, and both exhibited a high std. deviation of 1.20 and 1.22, indicating a diversity of preferences in the general non-valued formats.

Subsequently, when questioned regarding delivery expenses, e-grocery consumers demonstrate a pronounced preference for delivery models offering discounts at strategic time ranges, which exhibits the highest mean score of 3.85 and the lowest std. deviation of 0.95. There is a good acceptance of prices adjusted to the size of the order (mean 3.63) or the type of delivery (mean 3.57), which indicates that consumers accept pay based on the size and delivery method of their purchase. Subscription models exhibit moderate acceptance (mean 3.25), but are more controversial, with a std. deviation of 1.22, which may be attributed to their frequency of use. Finally, real-time dynamic pricing exhibits limited acceptance (mean 2.98); and the high std. deviation of 1.23 indicates divergent opinions.

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Subsequently, when inquiring about their experience and the usability of the e-grocery platforms, consumers placed high value on tools such as "Intelligent search engine to find the product more quickly through the use of keywords" and platform adaptability through the variable "Ease of use of the platform", with mean scores of 4.29 and 4.23, respectively. These findings are supported by a broad consensus, as indicated by std. deviations of 0.90 and 0.96, respectively. Intelligent automation features, such as grouping by product characteristics or pairing groceries with recipes, are also appreciated but hold less significance, mean score of 3.72 and 3.70. Lastly, more diverse search criteria, for example by packaging color, had the lowest mean score of 3.08 and a high std. deviation score of 1.24, indicating a diversity of opinions, since even appealing for the visuals, it could be considered impractical.

Regarding product price, consumers value transparency and visibility in prices and discounts, with the highest mean being 4.25. There is a strong expectation of economic advantage in e-grocery, whether through reduced prices with a mean score of 4.03, progressive discounts with a mean score of 3.99, or a range of promotional offers with a mean score of 4.00. The variable concerning price differentiation based on delivery method is regarded as less significant (mean 3.69). This is expected, as the previous question in this section, concerning delivery methods, identified the pick-up option as the least preferred choice.

Regarding the e-grocery order fulfillment process, respondents rated the freshness and quality of the products with a highly mean score of 4.55 and a low std. deviation of 0.83. The variable concerning product shelf life achieved a slightly lower mean of 4.22 and a higher std. deviation of 1.08. Nonetheless, both variables exhibit high mean scores, indicating their significant importance.

When addressing the inquiry concerning communication processes between the e-grocery providers and the user, both variables related to contact between the retailer and the customer for order clarification and for obtaining better information about store inventory to validate product replacements have the same moderate high importance level, with a mean score of 3.99; and moderate std. deviation scores of 1.07 and 1.01 respectively.

Finally, concerning the sustainability protocols, none of the variables were highly valued; all four variable means ranged between 3.62 and 3.76. However, the variable with the highest mean

score was the reduction of pollutant emissions, indicating that consumers recognize the importance of logistics efficiency as an environmentally friendly practice.

### 4.2.3 Hypothesis Testing

The hypotheses will now be tested. To evaluate H1 and H2, the assumptions for parametric tests were examined. Normality was assumed for groups with over 30 samples. When confirmed, Levene's test checked homoscedasticity. Parametric tests were used when assumptions were met; otherwise, non-parametric tests. Post-hoc tests were performed for variables with significant group differences.

The following hypothesis tests aim to understand if there are significant differences between means of socio-demographic characteristics and the respondents' frequency of use of e-grocery. For all variables, normality was assumed for every group, since all of them have $n > 30$; and homoscedasticity was confirmed through the Levene Test. The ANOVA and the T-student test was performed. (Table 4.2.3-1)

| Hypothesis | Levene | ANOVA | T-Student |
|---|---|---|---|
| Gender | 0.185 | - | 0.185 |
| Age | 0.138 | 0.011 | - |
| Household Size | 0.617 | 0.946 | - |
| Annual Gross Earnings | 0.901 | 0.512 | - |

Table 4.2.3-1: Hypothesis test for independent variables "Gender", "Age", "Household Size" and "Annual Gross Earnings"

On the variable "Age", the Post-Hoc test showed no significant difference between the groups. (Appendix H)

Regarding the study of e-grocery frequency of use impacts the way consumers value product availability, for all variables, normality was assumed for every group, since all of them have $n > 30$; and homoscedasticity was confirmed through the Levene Test. The ANOVA test was performed. (Table 4.2.3-2)

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| Variables | Levene | ANOVA |
|---|---|---|
| A wide and varied range of products | 0.096 | 0.005 |
| A range that included trendy items | 0.083 | 0.126 |
| Ethnic/other cultural products | 0.395 | 0.208 |
| Special dietary products (gluten-free, sugar-free) | 0.620 | 0.138 |
| Ready meals and recipe suggestions | 0.335 | 0.103 |
| Larger selection of organic and vegan products | 0.644 | < 0.001 |
| Alcohol and/or tobacco products | 0.095 | 0.506 |

Table 4.2.3-2:  Hypothesis test for the independent variable, frequency of e-grocery use, and factor product availability

Table 4.2.3-2 shows that there is a significant difference for the variables "A wide and varied range of products" and "Larger selection of organic and vegan products"; the significance obtained was low ($p < 0,05$). The Post-Hoc test was performed and showed that for the variable "A wide and varied range of products", the groups "At least once a quarter", "At least once a month", and "Have tried it" show different perspectives. (Appendix I)

Regarding the study of e-grocery frequency of use impacts the way consumers value product pricing, for all variables, normality was assumed for every group, since all of them have $n > 30$; and homoscedasticity was confirmed through the Levene Test. The ANOVA test was performed. (Table 4.2.3-3)

| Variables | Levene | ANOVA |
|---|---|---|
| Clearly visible discounts | 0.203 | 0.573 |
| Differentiation in purchase cost depending on delivery method (home delivery or pick-up points) | 0.846 | 0.252 |
| Greater offers and/or discounts depending on purchase value | 0.206 | 0.732 |
| More offers and/or discounts | 0.520 | 0.896 |
| Lower prices on online platforms | 0.899 | 0.834 |

Table 4.2.3-3: Hypothesis test for the independent variable, frequency of e-grocery use, and factor product price

Table 4.2.3-3 shows that there is no significant difference in any variable between all groups accessed on e-grocery frequency of use (p > 0,05).

Regarding the study of e-grocery frequency of use impacts the way consumers value interface usage, for all variables, normality was assumed for every group, since all of them have n > 30. Homoscedasticity was tested through the Levene Test but not confirmed for all variables. Therefore, ANOVA was tested for the variable tested by the Levene Test. On the contract, the variables "Ease of use of the platform by adaptable platforms: applications or websites" and "Reduction of manual steps, creating smarter features in the shopping cart, through association between recipes and shopping list" were not approved by the Levene Test. Thus, the Kruskal-Wallis test was applied. (Table 4.2.3-4)

| Variables | Levene | ANOVA | Kruskal-Wallis |
|---|---|---|---|
| Grouping of products based on their characteristics such as low-sugar, gluten-free, or low-salt products | 0,126 | 0.290 | - |
| More diverse search criteria, searches based on color or packaging pattern | 0,228 | 0.389 | - |
| Ease of use of the platform (adaptable platforms: applications or websites) | 0,024 | - | 0.121 |
| Intelligent search engine to find the product more quickly through the use of keywords | 0,167 | 0.126 | - |
| Reduction of manual steps, creating smarter features in the shopping cart, through association between recipes and shopping list | 0,022 | - | 0.009 |

Table 4.2.3-4: Hypothesis test for the independent variable, frequency of e-grocery use, and factor interface usage

On the variable "Reduction of manual steps, creating smarter features in the shopping cart, through association between recipes and shopping list", the Post-Hoc test shown: between the groups "Have tried it" and "every two weeks" and "at least once a month"; and among the groups "biweekly" and "At least 1 to 2 times a year" the sig is less than 0.05; concludes that different groups have different responses to this variable. (Appendix J)

Regarding the study of e-grocery frequency of use impacts the way consumers value delivery methods, for all variables, normality was assumed for every group, since all of them have n > 30. "Deliveries in 2-3 days", "Pickup points", and "Selection of delivery time slots" were tested for homoscedasticity, and ANOVA was run. "Fast deliveries in minutes" was not approved by the homoscedasticity test; therefore, the Kruskal-Wallis test was applied. (Table 4.2.3-5)

| Variables | Levene | ANOVA | Kruskal-Wallis |
|---|---|---|---|
| Deliveries in 2-3 days | 0.051 | 0.063 | |
| Fast deliveries in minutes | 0.022 | - | 0.097 |
| Pick-up points | 0.153 | 0.064 | |
| Selection of delivery time slots | 0.269 | 0.502 | |

Table 4.2.3-5: Hypothesis test for the independent variable, frequency of e-grocery use, and factor delivery methods

Table 4.2.3-5 shows that there is no significant difference in any variable between all groups accessed on e-grocery frequence of use (p > 0,05).

Regarding the study of e-grocery frequency of use impacts the way consumers value delivery costs, for all variables, normality was assumed for every group, since all of them have n > 30; and homoscedasticity was confirmed through the Levene Test. The ANOVA test was performed. (Table 4.2.3-6)

| Variables | Levene | ANOVA |
|---|---|---|
| Delivery rates with dynamic pricing based on real-time demand | 0.086 | 0.748 |
| Delivery rates with a fixed annual price/subscription fee | 0.808 | 0.171 |
| Price differentiation between home delivery and the pick-up points | 0.363 | 0.548 |
| Different home delivery prices depending on the size of the order | 0.51 | 0.740 |
| Cheaper home delivery, taking advantage of discounts based on time (morning or evening deliveries/orders) | 0.1 | 0.008 |

Table 4.2.3-6: Hypothesis test for the independent variable, frequency of e-grocery use, and factor delivery cost

On the variable "Cheaper home delivery, taking advantage of discounts based on time (morning or evening deliveries/orders)", the Post-Hoc test showed no significant difference between the groups. (Appendix L)

Regarding the study of e-grocery frequency of use impacts the way consumers value the order fulfillment, for all variables, normality was assumed for every group, since all of them have n > 30; however, homoscedasticity was not confirmed for any variable. The Kruskal-Wallis test was performed. (Table 4.2.3-7)

| Variables | Levene | ANOVA | Kruskal-Wallis |
|---|---|---|---|
| Freshness and quality of products | <0.001 | - | 0.149 |
| Do not deliver products with short expiration dates, namely those with less than three days remaining before expiration | 0.010 | - | 0.041 |

Table 4.2.3-7: Hypothesis test for the independent variable, frequency of e-grocery use, and factor order fulfillment

On the variable "Do not deliver products with short expiration dates, namely those with less than three days remaining before expiration", the Post-Hoc test shown that between the groups "at least once every quarter" and "Have tried it", the sig is less than 0.05; this concludes there are significant differences between the groups. (Appendix M)

Regarding the study of e-grocery frequency of use impacts the way consumers value communication, for all variables, normality was assumed for every group, since all of them have n > 30; and homoscedasticity was confirmed through the Levene Test. The ANOVA test was performed. (Table 4.2.3-8)

| Variables | Levene | ANOVA |
|---|---|---|
| Contact between the retailer and the end customer to clarify orders or make product replacements | 0.197 | 0.359 |
| Better information about store inventory | 0.251 | 0.023 |

Table 4.2.3-8: Hypothesis test for the independent variable, frequency of e-grocery use, and factor communication

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On the variable "Better information about store inventory", the Post-Hoc test showed no significant difference between the groups. (Appendix N)

Regarding the study of e-grocery frequency of use impacts the way consumers value sustainability, for all variables, normality was assumed for every group, since all of them have n > 30; however, homoscedasticity was only not confirmed for the variable "Possibility of returning some packaging used in delivery for reuse.". Thus, ANOVA and Kruskal-Wallis tests were performed accordingly. (Table 4.2.3-9)

| Variables | Levene | ANOVA | Kruskal-Wallis |
|---|---|---|---|
| Packaging materials should allow for differentiation in recycling, for example, not using bags that mix paper with plastic. | 0.917 | 0.312 | - |
| Possibility of returning some packaging used in delivery for reuse. | 0.014 | - | 0.188 |
| Possibility of using recyclable boxes for regular customers. | 0.087 | 0.404 | - |
| Reduce pollutant emissions by concentrating several deliveries on a single transport. | 0.830 | 0.522 | - |

Table 4.2.3-9: Hypothesis test for the independent variable, frequency of e-grocery use, and factor sustainability

Table 4.2.3-9 shows that there is no significant difference in any variable between all groups accessed on e-grocery frequency of use ($p > 0,05$).

## 4.3 Results Discussion

The data collected indicates that the respondents exhibit a moderate to high level of technology acceptance, which could suggest a firm adherence to e-grocery. However, when inquired about their shopping habits, it was observed that they continue to value the selection process of groceries, and their primary concerns are related to ensuring the freshness of products. This aspect of the e-grocery process would consequently require a high level of trust in the retailers. This is also observed as e-grocery users, when questioned about their preferred format, predominantly favor

traditional supermarket brands with which they are already familiar and about which they have formed established opinions about. Additionally, the majority of the survey sample indicated that they prefer not to pay for purchases or wait for delivery. This is also associated with the lack of evidence of difficulties in traveling to physical stores, as most respondents stated that they have their own car.

Additionally, the questionnaire aimed to identify which aspects respondents who use e-grocery or have tried the service value most. When inquired about the motivation behind e-grocery purchasing, it was evident that the practicality aspects, such as time-saving, absence of shopping restrictions, and the service effort, were regarded as the most significant. Further, the transition to e-grocery from the survey sample was also established not to be pandemic-related.

Furthermore, data were collected across various variables organized under eight factors. It aim to identify consumer priorities and extract meaningful insights concerning e-grocery.

On the factors related to the products characteristics and selection- product availability and price, order fulfillment, and communication protocols. Firstly, the results indicate that respondents prioritize product freshness. Additionally, it aligns with the concern of product selection with a short shelf life; nevertheless, this variable exhibits some differences based on the less frequent users (H2f). Secondly, the pricing and promotional offers are highly significant and serve as compelling influences on purchasing decisions. Thirdly, the consumer service and communications, including customer-retailer contact and inventory transparency, reflect that the customers value effective communication and real-time information. Additionally, a wide assortment and a specialized selection are also valued at a moderate level, not a critical driver to e-grocery, and with different significant value between users' frequency of use (H2a).

Results show that fresh product choices in e-grocery depend on trust in the retailer and satisfaction with the shopping experience, especially clear inventory and avoiding near-expiry items. The quality of the customer experience can enhance loyalty and promote repurchase intentions. Customer service variables, especially real-time communication and substitution validation, support consumer confidence and help reduce. This aligns with prior findings concerning certain obstacles to e-grocery adoption, as consumers continue to highly value the

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selection process of groceries highly. Furthermore, price and promotion show consumer drivers of use. Pricing and promotions appear to influence purchase behavior more directly than assortment diversity.

To understand what consumers value in the last mile, an analysis was conducted on delivery formats and costs. The results indicate that, in last-mile delivery, consumers significantly favor the selection of a delivery time slot that aligns with their schedules. While there is considerable interest in rapid delivery, however, less valued. Consumers want speed and flexibility, but above all, they want control over delivery timing. Adjusted price strategies according to order size or delivery method are seen as reasonable to consumers. Consumers want transparent and fair delivery pricing, with the option to save money if they are flexible and choose low-fee time slots. This could enable the retailer to reschedule the consumer delivery window to off-peak hours. Nevertheless, although the consumers also highlight fast delivery, this particular delivery method, often linked to dynamic pricing or fixed subscriptions, does not appear to be as attractive on a delivery cost perspective.

Furthermore, the factor of interface usability was examined. The importance of an improved search function through keywords, as well as the ease of use and adaptability of the format across different devices, was identified as one of the most critical factors for survey participants in overall e-grocery use services. The effort required to navigate and find products should be lower online than in physical stores in order to provide added value to the shopper. However, reducing manual steps by linking recipes directly to the shopping cart shows a noticeable difference between usage frequencies (H2c). Still, it can be understood that if the e-grocery is used as a complementary channel, it does not add much value to the consumer.

Lastly, the sustainability practices had a moderate level of importance in the overall impression that the consumers did not value the e-grocery based on their sustainability impact.

The respondents' answers were submitted to a hypothesis test. It was concluded that the sociodemographic characteristics do not influence the e-grocery frequency of use (H1). Further, overall, the frequency of use does not influence the majority of the variables on the eight factors influencing e-grocery adoption. In summary, the e-grocery profile of consumers is not dependent

on sociodemographic characteristics, nor does the frequency of use significantly impact the most valued characteristics of the service. (Table 4.3-1)

| Hypothesis | Conclusions |
|---|---|
| H1 a) | Non-rejection |
| H1 b) | Non-rejection |
| H1 c) | Non-rejection |
| H1 d) | Non-rejection |
| H2 a) | Partial Rejection: Rejection for "A wide and varied range of products" Non-rejection for the remaining variables |
| H2 b) | Non-rejection |
| H2 c) | Partial Rejection: Rejection for "Reduction of manual steps, creating smarter features in the shopping cart, through association between recipes and shopping list" Non-rejection for the remaining variables |
| H2 d) | Non-rejection |
| H2 e) | Non-rejection |
| H2 f) | Partial Rejection: Rejection for Do not deliver products with short expiration dates, namely those with less than 3 days remaining before expiration" Non-rejection for the remaining variables |
| H2 g) | Non-rejection |
| H2 h) | Non-rejection |

Table 4.3-1: Hypothesis testing results

# 5. Conclusion

## 5.1 Problem Context

Over the past two years, the COVID-19 pandemic has accelerated digitalization; however, adoption of e-grocery remains limited. Structural challenges, such as low profit margins, fragile and bulky products, temperature requirements, and high operational and logistics costs, continue to obstruct profitability. Although consumers continue to demand convenient e-grocery options, leading to margin pressure for retailers, choosing to avoid this may result in losing market share. In Portugal, e-commerce adoption lags behind the European average. This disparity is particularly evident in the grocery sector: consumers prefer in-store purchases and often appreciate the opportunity to inspect and observe products prior to purchase. These trends are further exacerbated by the country's elderly population, who are generally less inclined toward digital options, resulting in an undersized e-grocery market despite growing consumer demand for convenience.

## 5.2 Contributions

This thesis advances the study of e-grocery adoption by addressing a significant gap in the literature on the Portuguese market, with a focus on the Lisbon area. By combining qualitative interviews with a questionnaire, the study offers both theoretical and practical insights from a consumer perspective of the e-grocery channel. This thesis aims to provide a more comprehensive description of the Lisbon e-grocery profile and examine the barriers to achieving a high level of adoption of e-grocery. Furthermore, it facilitates grocery providers in gaining a comprehensive understanding of their consumers within the online channel and refining their services to serve clients better, optimizing operations, scaling services efficiently, and improving profit margins within the e-grocery market.

### 5.3 Answer to Research Questions

This study allowed to answer the different research questions as described below.

**Q1:** What is the e-grocery users' profile in the city of Lisbon?

The analysis of results shows that the profile of e-grocery consumers in Lisbon is not significantly influenced by sociodemographic variables such as gender, age, household size, or income, since all H1 hypotheses were rejected. This contrasts with findings on the literature from Younes et al. (2022), Shen et al. (2022), Asgari et al. (2023), and Eriksson & Stenius (2021) identified demographic factors as strong predictors of e-grocery adoption.

Instead, the Lisbon profile aligns with the results supported by Hood et al. (2020), who described a pattern of interchangeable use between online and offline shopping. Thesis findings show most respondents regularly visit physical stores, shopping for groceries from biweekly to weekly (mean 5.22), with only 0.4% never shopping in-store. Online shopping occurs quarterly to monthly (mean 3.59), indicating e-grocery is mainly a supplementary channel.

Given the absence of significant sociodemographic predictors, the Lisbon e-grocery profile is best defined by behavioral patterns and attitudes towards grocery shopping. The primary motivations include the time-saving aspect, the absence of restrictions regarding shopping times or days, and the minimal effort required, with mean scores of 3.90, 3.78, and 3.70, respectively. The transportation convenience variable has a high std. deviation of 1.30. This can also be attributed to the fact that the survey sample predominantly owns a car. Regarding the preferred format, traditional retailers operating both physical and online stores account for 59.6% of respondents' preference, which shows a high level of trust in familiar retailers to select products on behalf of consumers.

Finally, it was concluded that the shift to online grocery shopping is not pandemic-related, as most respondents tried the service before COVID-19 (55,3%); however, usage increased during the pandemic.

Overall, the Lisbon e-grocery consumer is convenience-driven and trust-oriented.

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**Q2:** What are the barriers for the adoption of e-grocery in the city of Lisbon?

It was observed that respondents highly valued the experience of shopping on the physical channel at a slow and relaxed pace (mean 3.46). The purchasing stage differs, as consumers prefer a faster process during in-store visits, especially at the final buying phase (mean 3.67). Additionally, it is found that the primary obstacle to e-grocery usage is the difficulty in assessing product freshness and expiration dates during e-grocery shopping. This aligns with Basu et al. (2024) and Kühn et al. (2020), who found that product quality and perishability remain the most tangible concerns for e-grocery, due to the lack of sensory characteristics. That said Bruno et al. (2024) proposes using user-generated content, such as product reviews, social media posts, and online forums, since nowadays, more people trust the opinions of other customers than brand advertisements.

Delivery costs are the second most mentioned barrier, with 13.1% of non-users and 14.1% of users indicating unwillingness to pay for delivery. These perceptions are consistent with Singh & Rosengren (2020), who identified pricing dissatisfaction as a driver of churn, and by Belcore et al. (2024), who highlighted the importance of balancing delivery cost with service value.

Most respondents (76.5%) prefer using a private vehicle for grocery shopping in physical stores, enabling quick and effortless visits. This significantly reduces the perceived advantage of home delivery, as shown in the thesis results, with most respondents being reluctant to pay for delivery, accounting for 13.1% among non-users and 14.1% among users; nor are they willing to wait for it, representing 20.6% among non-users and 11.6% among users. This aligns with Dominici et al. (2021), that concluded that car ownership often diminishes e-grocery's appeal; and with de la Llave Montiel and López (2020), who observed that shorter distances between customers and stores hold back e-grocers' ability to retain online customers, as exemplified in Lisbon.

In Lisbon, barriers to e-grocery adoption are less about technological limitations and more about consumer trust in the retailer and overall cost. These two groups of e-grocery barriers together, product selection and freshness concerns, and delivery fees and waiting account for 67.4% of the mentioned barriers among non-users and 65.4% among users.

**Q3:** Which are the key factors influencing e-grocery adoption in the city of Lisbon?

The results of this study, supported by existing literature, indicate that the main factors influencing e-grocery adoption in Lisbon are related to order fulfillment, pricing and promotions, communication, and interface.

It is understood that order fulfilment factors related to product freshness and product expiring date are a top driver to e-grocery adoption, as supported by Magalhães (2021); therefore, it should be a top priority for retailers. Freshness of products has the highest mean and the lowest std. deviation of all variables across all factors (mean 4.55 and std. deviation 0.828). Secondly, products' expiring dates also have a high ranking (mean 4.22). According to Singh & Rosengren (2020), product freshness and careful product selection on expiring dates contribute to a reliable service with product quality, leading to positive word-of-mouth, boosting consumer trust, and e-grocery adoption. Ozkan & Sekerkaya (2025), Kühn et al. (2020), Basu et al. (2024), and Streletskaya et al. (2023) suggest several strategies to improve product selection on e-grocery, such as touch interfaces, enhancing haptic information, and displays with videos and sensory notes.

The product price factor is the second factor, with a high amount of variables ranked with high means and low std. deviations, such as "clear visibility of promotion leads" (mean 4.25), alongside with "lower online prices" (mean 4.03) and "more offers/ discounts" (mean 4.00). This shows that price and promotions are clear drivers of e-grocery adoption. In the literature Hallikainen et al. (2022) suggest that within-basket recommendations help reduce the negative link between cognitive effort and loyalty towards e-grocery.

Consistent with previous research, Anshu et al. (2022) and Basu et al. (2024) highlight that proactive and empathetic communication is also a key factor in e-grocery adoption and customer retention. Respondents rated both variables, "retailer contact for order clarification" and "better stock information for substitutions" with a high mean (mean 3.99). Therefore, Anshu et al. (2022) emphasize the need to involve consumers in the value creation process in order to strengthen loyalty, even after a failed service. Additionally, Rodrigues et al. (2021) propose two substitution policies that could be considered for e-grocery. Furthermore, Chakraborty et al. (2024) believe that

through generative artificial intelligence chatbots, e-grocery could assist users during the shopping process.

Additionally, Basu et al. (2024) and Anshu et al. (2022) also determined that buyer-centric design, which creates an intuitive, user-friendly app tailored to buyers' preferences, enhances e-grocery adoption. This is in accordance with the results that show "intelligent search" as the second highest mean of all variables and factors (mean 4.29); and "intuitive and adaptive platforms" (mean 4.23) are also highly valued by consumers.

Factors related to delivery, such as delivery methods and costs, have a moderate impact on e-grocery adoption, which aligns with the previous conclusion about the e-grocery profile (Q1) and e-grocery barriers (Q2). The last mile is a crucial difference between physical shopping and e-grocery services; however, it is often undervalued. Nevertheless, consistent with previous search from Marcucci et al. (2021), flexible delivery windows are highly ranked throughout the variable "selecting delivery time windows" (mean 4.19); additionally, consumers also valued "fast delivery" (mean 3.98). On delivery costs, the survey results show that consumers prefer "cheaper home delivery via fixed discount windows" (mean 3.85 and low std. deviation 0.95), which can be used in coordination with the variable "selecting delivery time windows" and benefit retailers by performing deliveries during off-peak hours. Additionally, "price adjustments by basket size or method" also seem reasonable to consumers. Moreover, Marcucci et al. (2021) suggest that to increase retailers' market share, they could incorporate pick-up and delivery costs into product prices, and therefore reduce the perceived delivery fee perception.

Although environmental concerns are growing, The study results show a moderate mean values for all sustainability variables, which is also mentioned by J.K. Park et al. (2023) that price and convenience typically outweigh sustainability in grocery decisions.

Lastly, the least ranked factor is related to product availability. Respondents perceived value mainly in having a wide varied range of products (mean 3.73), but as noted by Wang et al. (2023) found that consumers generally prefer purchasing standardized items online, and Nakano (2023) notices that consumers online tend to concentrate on popular products. This can be understood as beneficial to retailers since it helps them to manage inventory and short stocks, and as Fedoseeva

& Herrmann (2023) affirm, there is a positive relationship between assortment depth and prices, but the effect is nonlinear.

## 5.4 Limitations and Future Research

Despite the conclusions drawn, certain limitations should be acknowledged. One such limitation is the narrow focus on a single city, as both quantitative and qualitative methods exclusively gather data from residents of Lisbon, given the grocery business's nationwide scope. Additionally, the sample size is neither statistically significant nor sufficiently extensive to allow for broad generalization, thereby limiting the applicability of the findings to the wider grocery sector.

Several lines of future research can be followed by expanding the sample size in both qualitative and quantitative analyses, which represents another viable alternative approach. This aspect offers a substantial research opportunity to gain a deeper understanding of Portuguese consumers as a whole, including their expectations and barriers regarding e-grocery services across all regions of the country. Additionally, future research should address these limitations by expanding the scope of the study to encompass a national-level analysis. This expansion would necessitate a more extended data collection period due to the requirement for additional resources.

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## 7. Annex

## Appendix A- Semi-structured Interviews

O meu nome é Matilde Bastos e sou aluna do Mestrado de Gestão de Serviços e da Tecnologia no ISCTE. Estou a realizar um estudo, para a minha Dissertação de Mestrado, sobre a utilização de serviços online no retalho alimentar, em Portugal.

## 1. Entrevistado
1.1 Género
1.2 Idade

## 2. Questões
2.1 Realiza compras de retalho alimentar pelos canais online?

2.1.1　Porque é que usa o canal online?

2.1.2　Porque e que não usa o canal online?

## Appendix B- Questionnaire

Annex B.1- Questionnaire References

| Question | Reference |
|---|---|
| Gender? | Eriksson, N., & Stenius, M. (2023); Titiloye, I., Sarker, M. A. A., Jin, X., & Watts, B. (2024); Hood, N., Urquhart, R., Newing, A., & Heppenstall, A. (2020); Younes et al. (2022); Eriksson, N., & Stenius, M. (2021); Ukil, S., Misra, A., Henderson, A., & Marshall, W. (2025) |
| Age? | Eriksson, N., & Stenius, M. (2023); Titiloye, I., Sarker, M. A. A., Jin, X., & Watts, B. (2024); Hood, N., Urquhart, R., Newing, A., & Heppenstall, A. (2020); |

| | |
|---|---|
| | Younes et al. (2022); Eriksson, N., & Stenius, M. (2021); Ukil, S., Misra, A., Henderson, A., & Marshall, W. (2025) |
| Annual Gross Earnings? | Titiloye, I., Sarker, M. A. A., Jin, X., & Watts, B. (2024); Younes et al. (2022); Eriksson, N., & Stenius, M. (2021); Ukil, S., Misra, A., Henderson, A., & Marshall, W. (2025) |
| Household size? | Eriksson, N., & Stenius, M. (2021) |
| Level of technological acceptance? | Titiloye, I., Sarker, M. A. A., Jin, X., & Watts, B. (2024) |
| What modes of transportation do you use when traveling to physical grocery stores? | Titiloye, I., Sarker, M. A. A., Jin, X., & Watts, B. (2024); Semi-structured Interviews |
| How do you rate the following motivations in the purchasing process? | Titiloye, I., Sarker, M. A. A., Jin, X., & Watts, B. (2024); Semi-structured Interviews |
| How often do you shop at physical grocery stores? | Eriksson, N., & Stenius, M. (2023); Hood, N., Urquhart, R., Newing, A., & Heppenstall, A. (2020); Younes et al. (2022) |
| How often do you shop through e-grocery platforms? | Eriksson, N., & Stenius, M. (2023); Hood, N., Urquhart, R., Newing, A., & Heppenstall, A. (2020); Younes et al. (2022) |
| Why not use retailers' online platforms? | Younes et al. (2022) |
| When did you start shopping online? | Eriksson, N., & Stenius, M. (2023) |
| Preferred online retail formats? | Eriksson, N., & Stenius, M. (2023); Hood, N., Urquhart, R., Newing, A., & Heppenstall, A. (2020) |
| How do you rate each of the following motivations for using online retail? | Hood, N., Urquhart, R., Newing, A., & Heppenstall, A. (2020); Younes et al. (2022); Semi-structured Interviews |

| | |
|---|---|
| How do you rate the following offers from the online retailer? | Eriksson, N., & Stenius, M. (2023); Titiloye, I., Sarker, M. A. A., Jin, X., & Watts, B. (2024) |
| How do you rate the following online retailer delivery options? | Eriksson, N., & Stenius, M. (2023) |
| How do you rate the following delivery options in terms of format and respective cost in online retail? | Eriksson, N., & Stenius, M. (2023). |
| How do you rate the following options in terms of the efficiency of the interface and search function on the retailer's online platform? | Eriksson, N., & Stenius, M. (2023); Semi-structured Interviews |
| How do you rate the following options, given the price offered by the online retailer? | Eriksson, N., & Stenius, M. (2023) |
| How do you rate the following options for choosing products from online retailers? | Eriksson, N., & Stenius, M. (2023); Semi-structured Interviews |
| How do you rate the following options concerning communication during the order collection phase by the online retailer? | Eriksson, N., & Stenius, M. (2023) |
| How do you rate the following options in terms of the sustainability of the delivery and packaging of products from online retailers? | Eriksson, N., & Stenius, M. (2023); Semi-structure Interviews |

Annex B.2- Questionnaire in Portuguese

## Questionário - Dissertação de Mestrado 2025 ✂️

O meu nome é Matilde Bastos e sou aluna do Mestrado de Gestão de Serviços e da Tecnologia no ISCTE.
Estou a realizar um estudo, para a minha Dissertação de Mestrado, sobre a utilização de serviços online no retalho alimentar, em Portugal. O questionário é totalmente anónimo e é estimado que a sua resposta não exceda 10 minutos.
Obrigada pela disponibilidade, Matilde Bastos

* Obrigatória

## Perfil dos participantes no questionário

1. Género *

○ Masculino

○ Feminino

2. Idade *

○ 20 - 29

○ 30-39

○ 40-49

○ 50-59

○ 60-69

○ 70-79

○ 80+

3. Rendimento anual bruto em euros € *

- ○ até 15000
- ○ 15000 - 24999
- ○ 25000 - 34999
- ○ 35000 - 49999
- ○ 50000 - 74999
- ○ mais de 75000

4. Como é composto o agregado familiar *

- ○ Com os pais/ avós
- ○ Sozinho
- ○ Em casal
- ○ Com filhos

5. Nível de adaptação tecnológica *

- ○ Sempre que posso, tento recorrer a serviços presenciais
- ○ Uso, por vezes, alguns serviços online
- ○ Sempre que posso, tento recorrer a serviços online

## Comportamentos e atitudes no retalho alimentar

Retalho alimentar é a área do comércio que se dedica à venda de alimentos diretamente ao consumidor final (exemplo: supermercados, mercearias, minimercados, ...)

6. Quais os modos de transporte que utiliza aquando da deslocação às lojas físicas dos retalhistas (selecione uma ou mais opções) *

- [ ] Uso transporte público regularmente, para economizar dinheiro

- [ ] Gosto de usar o transporte público, para ajudar a reduzir o congestionamento de trânsito

- [ ] Não detenho um veículo particular e uso meios alternativos

- [ ] Uso maioritáriamente veículo particular

- [ ] Usufruo de modelos de transporte partilhado (exemplo carsharing)

7. Como avalia cada uma das seguintes motivações no processo de compra *

| | Nunca | Poucas vezes | Algumas vezes | Frequentemente | Sempre |
|---|---|---|---|---|---|
| Passear pelas áreas comerciais é agradável e revigorante | ○ | ○ | ○ | ○ | ○ |
| Gosto de fazer compras com calma | ○ | ○ | ○ | ○ | ○ |
| Às vezes, uso as compras como desculpa para sair de casa ou do trabalho | ○ | ○ | ○ | ○ | ○ |
| Quando vou aos estabecimentos físicos, prefiro o serviço mais rápido (exemplo caixas automáticas) | ○ | ○ | ○ | ○ | ○ |
| Evito ter de ir aos estabecimentos físicos | ○ | ○ | ○ | ○ | ○ |

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8. Com que frequência faz compras nas lojas físicas dos retalhistas? *

○ Nunca

○ Pelo menos 1 a 2 vezes por ano

○ Pelo menos 1 vez por trimestre

○ Pelo menos 1 vez por mês

○ De duas em duas semanas

○ Semanalmente

○ Várias vezes por semana

9. Com que frequência faz compras através da plataformas online dos retalhistas? *

○ Nunca

○ Já experimentei

○ Pelo menos 1 a 2 vezes por ano

○ Pelo menos 1 vez por trimestre

○ Pelo menos 1 vez por mês

○ De duas em duas semanas

○ Semanalmente

10. Porque é que não usa as plataformas online dos retalhistas? (selecione uma ou mais opções) *

☐ Não quero pagar pela entrega

☐ Estou preocupado com a privacidade, ou a segurança nas compras online

☐ Tenho dificuldade em usar aplicativos ou sites de compras online

☐ Outras

☐ Não quero ficar a aguardar pela entrega da encomenda

☐ Prefiro o contacto humano durante o processo de compra

☐ Não faço compras para casa

☐ As informações sobre produtos online nem sempre são precisas

☐ Não consigo experimentar ou ver com detalhe o que estou a comprar

☐ Estou preocupado que os produtos que compro não sejam frescos

☐ Tenho a perceção que há menos oferta no canal online do que nas lojas convecionais


11. Quando começou a fazer compras no retalho online *

○ Pós COVID / Recentemente

○ Apenas durante o COVID

○ Antes do COVID

## Perguntas relativas ao retalho alimentar online

Retalho alimentar é a área do comércio que se dedica à venda de alimentos diretamente ao consumidor final (exemplo: supermer-cados, mercearias, minimercados, ...)

12. Formatos de retalho online preferido *

　○ Retalhistas convencionais com serviço online (exemplo: Continente Online)

　○ Retalhistas apenas online (exemplo: Gettir)

　○ Plataformas de serviços de entrega (exemplo: Glovo/ Uber Eats)

13. Como avalia cada uma das seguintes motivações para o uso do retalho online *

| | Nada Importante | Pouco Importante | Moderadamente importante | Importante | Muito Importante |
|---|---|---|---|---|---|
| Economiza-se tempo | ○ | ○ | ○ | ○ | ○ |
| É mais fácil seguir a minha lista de compras | ○ | ○ | ○ | ○ | ○ |
| Valorizo que transportem-me as compras | ○ | ○ | ○ | ○ | ○ |
| Posso fazer compras a qualquer hora do dia sem restrições de horário | ○ | ○ | ○ | ○ | ○ |
| Requer pouco esforço (conveniência) | ○ | ○ | ○ | ○ | ○ |
| Ajuda-me a priorizar outras atividades no meu dia-a-dia | ○ | ○ | ○ | ○ | ○ |
| Posso comparar preços com mais facilidade | ○ | ○ | ○ | ○ | ○ |
| Posso evitar ir à loja de supermercado física | ○ | ○ | ○ | ○ | ○ |
| Tem uma variedade maior de artigos | ○ | ○ | ○ | ○ | ○ |

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14. Como avalia as seguintes opções de oferta no retalho online *

| | Nada importante | Pouco importante | Moderadamente importante | Importante | Muito importante |
|---|---|---|---|---|---|
| Um conjunto de produtos variado e amplo | ○ | ○ | ○ | ○ | ○ |
| Um conjunto de produtos que inclua artigos de tendência | ○ | ○ | ○ | ○ | ○ |
| Produtos étnicos/ outras culturas (exemplo: comida mexicana) | ○ | ○ | ○ | ○ | ○ |
| Produtos dietéticos especiais (sem glúten, sem açúcar, etc.) | ○ | ○ | ○ | ○ | ○ |
| Comida pronta e sugestões de receitas | ○ | ○ | ○ | ○ | ○ |
| Maior seleção de produtos biológicos e vegan | ○ | ○ | ○ | ○ | ○ |
| Álcool e/ou produtos de tabaco | ○ | ○ | ○ | ○ | ○ |

15. Como avalia as seguintes opções de formatos de entrega do retalhista online *

| | Nada importante | Pouco importante | Moderadamente importante | Importante | Muito importante |
|---|---|---|---|---|---|
| Entregas em 2-3 dias | ○ | ○ | ○ | ○ | ○ |
| Entregas rápidas em minutos | ○ | ○ | ○ | ○ | ○ |
| Seleção de janelas de tempo para a entrega | ○ | ○ | ○ | ○ | ○ |
| Pontos de recolha | ○ | ○ | ○ | ○ | ○ |

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16. Como avalia as seguintes opções de oferta quanto ao formato de entrega e respetivo custo no retalho online *

| | Nada importante | Pouco importante | Moderadamente importante | Importante | Muito importante |
|---|---|---|---|---|---|
| Diferenciação no preço entre a entrega ao domicílio e o levantamento num ponto de recolha | ○ | ○ | ○ | ○ | ○ |
| Diferentes preços de entrega ao domicílio, dependendo da dimensão da encomenda | ○ | ○ | ○ | ○ | ○ |
| Entrega ao domicílio mais barata, tirando partido dos descontos, em função do horário (entregas em janelas horarias fixas mais baratas) | ○ | ○ | ○ | ○ | ○ |
| As taxas de entrega com preço dinâmico, consoante a procura em tempo real | ○ | ○ | ○ | ○ | ○ |
| As taxas de entrega com um preço anual fixo/taxa de subscrição | ○ | ○ | ○ | ○ | ○ |

17. Como avalia as seguintes opções, relativamente à eficiência do interface e da pesquisa na plataforma online do retalhista *

| | Nada importante | Pouco importante | Moderadamente importante | Importante | Muito importante |
|---|---|---|---|---|---|
| Facilidade de utilização da plataforma (plataformas adaptáveis: aplicações ou websites) | ○ | ○ | ○ | ○ | ○ |
| Redução de passos manuais, criando funcionalidades mais inteligentes no cesto de compras, através de associação entre as receitas e lista de compras | ○ | ○ | ○ | ○ | ○ |
| Agrupamento de produtos com base nas suas características, como produtos com baixo teor de açúcar, sem glúten, ou com baixo teor de sal | ○ | ○ | ○ | ○ | ○ |
| Motor de busca inteligente, de forma a encontrar o produto mais rapidamente (utilização de palavras-chave) | ○ | ○ | ○ | ○ | ○ |
| Critérios de pesquisa mais diversificados, pesquisas com base na cor, ou no padrão da embalagem | ○ | ○ | ○ | ○ | ○ |

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18. Como avalia as seguintes opções, face ao preço da oferta do retalhista online *

| | Nada importante | Pouco importante | Moderadamente importante | Importante | Muito importante |
|---|---|---|---|---|---|
| Mais ofertas e/ou descontos | ◯ | ◯ | ◯ | ◯ | ◯ |
| Preços mais baixos na plataformas online | ◯ | ◯ | ◯ | ◯ | ◯ |
| Diferenciação do custo de compra, em função da modalidade de entrega (entrega ao domicilio ou em ponto de recolha) | ◯ | ◯ | ◯ | ◯ | ◯ |
| Descontos bem visíveis | ◯ | ◯ | ◯ | ◯ | ◯ |
| Maior oferta e/ou desconto, em função do valor de compra | ◯ | ◯ | ◯ | ◯ | ◯ |

19. Como avalia as seguintes opções de escolha dos produtos pelo retalhista online *

| | Nada importante | Pouco importante | Moderadamente importante | Importante | Muito importante |
|---|---|---|---|---|---|
| Não entregar produtos com datas de validade curtas, designadamente com menos de 3 dias de validade | ◯ | ◯ | ◯ | ◯ | ◯ |
| Frescura e qualidade dos produtos | ◯ | ◯ | ◯ | ◯ | ◯ |
| Considerar produtos de substituição | ◯ | ◯ | ◯ | ◯ | ◯ |

20. Como avalia as seguintes opções, relativamente à comunicação na fase de recolha de encomendas pelo retalhista online *

| | Nada importante | Pouco importante | Moderadamente importante | Importante | Muito importante |
|---|---|---|---|---|---|
| Contacto entre o retalhista e o cliente final para esclarecer pedidos | ◯ | ◯ | ◯ | ◯ | ◯ |
| Melhor informação sobre o inventário da loja, para validar substituições de produtos | ◯ | ◯ | ◯ | ◯ | ◯ |

21. Como avalia as seguintes opções, relativamente à sustentabilidade da entrega e da embalagem dos produtos do retalhista online *

| | Nada importante | Pouco importante | Moderadamente importante | Importante | Muito importante |
|---|---|---|---|---|---|
| Os materiais de embalagem devem permitir a diferenciação na reciclagem, por exemplos, não usar sacos que misturem papel com plástico | ◯ | ◯ | ◯ | ◯ | ◯ |
| Possibilidade de utilização de embalagens recicláveis para os clientes habituais | ◯ | ◯ | ◯ | ◯ | ◯ |
| Possibilidade de devolução de algumas embalagens utilizadas na entrega, para reutilização | ◯ | ◯ | ◯ | ◯ | ◯ |
| Reduzir as emissões poluentes, ao concentrar num único transporte diversas entregas | ◯ | ◯ | ◯ | ◯ | ◯ |

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## Appendix C- Cronbach's Alpha Items Analysis

Table C.1- Delivery Format Factor Cronbach's Alpha Items Analysis

| Delivery Format | Cronbach's Alpha if Item Deleted |
|---|---|
| Deliveries in 2-3 days | 0.516 |
| Fast deliveries in minutes | 0.524 |
| Pickup points | 0.479 |
| Selection of delivery time slots | 0.349 |

Table C.2- Order Fulfillment Factor Cronbach's Alpha Items Analysis

| Order Fulfillment | Cronbach's Alpha if Item Deleted |
|---|---|
| Consider substitute products | 0.762 |
| Freshness and quality of products | 0.501 |
| Do not deliver products with short expiration dates, namely those with less than 3 days remaining before expiration | 0.413 |

**Appendix D- Sample Descriptive Analysis**

| Variables | Percent (%) |
|---|---|
| **Gender** | |
| Female | 55.4 |
| Male | 44.6 |
| **Age** | |
| 20-29 | 43.3 |
| 30-39 | 14.7 |
| 40-49 | 13.0 |
| 50-59 | 15.6 |
| 60-69 | 11.7 |
| 70-79 | 0.9 |
| 80+ | 0.9 |
| **Household Composition** | |
| With children | 29.9 |
| With parents or grandparents | 18.6 |
| Living as a couple | 29.4 |
| Alone | 22.1 |
| **Annual Gross Income (euros €)** | |
| Until 15000 | 16.9 |
| 15000 - 24999 | 23.8 |
| 25000 - 34999 | 22.5 |
| 35000 - 49999 | 21.6 |
| 50000 - 74999 | 7.8 |
| More than 75000 | 7.4 |
| **Technology Acceptance** | |
| Whenever I can, I try to use online services | 44.6 |
| I sometimes use some online services | 15.2 |
| Whenever I can, I try to use face-to-face services | 40.3 |

**Appendix E- E-grocery Barriers Descriptive Analysis**

Table E.1 – Questions "Motivation behind the purchasing process" and "Frequency of grocery shopping on the physical channel" descriptive analysis

| Variables | Mean | Std. Deviation | Minimum | Maximum |
|---|---|---|---|---|
| **Motivation behind the purchasing process** | | | | |
| Avoid having to go to physical stores | 2.37 | 1.01 | 1 | 5 |
| Like to shop calmly | 3.46 | 1.09 | 1 | 5 |
| Walking around shopping areas is pleasant and invigorating | 2.53 | 0.99 | 1 | 5 |
| When I go to physical stores, I prefer faster service | 3.67 | 1.11 | 1 | 5 |
| Sometimes I use shopping as an excuse to leave home or work | 2.03 | 1.03 | 1 | 5 |
| **Frequency of grocery shopping on the physical channel** | | | | |
| frequência faz compras nas lojas físicas dos retalhistas | 5.2 | 1.31 | 1 | 7 |

Table E.2 – Questions "Frequency of grocery shopping on the physical channel", "Modes of transport used when go for groceries on physical channel", "Barriers to e-grocery adoption - spontaneous e-grocery users" and "Barriers to e-grocery adoption - non e-grocery users" relative frequency

| Varibale | Percent (%) |
|---|---|
| **Frequency of grocery shopping on the physical channel** | |
| Never | 0.4 |
| At least once or twice a year | 2.2 |
| At least once a quarter | 9.5 |
| At least once a month | 16.9 |
| Every two weeks | 19.0 |
| Weekly | 37.7 |
| Several times a week | 14.3 |
| **Modes of transport used when go for groceries on physical channel** | |
| I like to use public transportation | 2.9 |
| I don't own a private vehicle and use alternative means of transportation | 10.5 |
| I mainly use a private vehicle | 76.5 |
| I use public transportation regularly | 8.0 |
| I use shared transportation models (car sharing) | 2.1 |
| **Barriers to e-grocery adoption - spontaneous e-grocery users** | |
| Online product information is not always accurate | 10.0 |
| I am concerned about privacy or security when shopping online | 4.1 |
| I am concerned that the products I buy are not fresh | 14.5 |
| I cannot try or inspect what I am buying | 24.9 |
| I do not shop for home delivery | 2.1 |
| I do not want to wait for the order to be delivered | 11.6 |
| I do not want to pay for delivery | 14.1 |
| I prefer human contact during the purchasing process | 10.0 |
| I perceive that there is less choice online than in conventional stores | 6.2 |
| I find it difficult to use online shopping apps or websites | 2.5 |
| **Barriers to e-grocery adoption - non e-grocery users** | |
| Online product information is not always accurate | 9.1 |
| I am concerned about privacy or security when shopping online | 4.0 |
| I am concerned that the products I buy are not fresh | 16.6 |
| I cannot try or see in detail what I am buying | 20.6 |
| I don't want to wait for the order to be delivered | 17.1 |
| I don't want to pay for delivery | 13.1 |
| Other | 1.1 |
| I prefer human contact during the purchasing process | 10.3 |
| I perceive that there is less choice online than in conventional stores | 4.6 |
| I find it difficult to use online shopping apps or websites | 3.4 |

**Appendix F- E-grocery Shopping Habits Descriptive Analysis**

Table F.1 – Questions "Motivation behind e-grocery purchases" and "Frequency of e-grocery shopping" descriptive analysis

| Variables | Mean | Std. Deviation | Minimum | Maximum |
|---|---|---|---|---|
| **Motivation behind e-grocery purchases** | | | | |
| It helps me prioritize other activities in my daily life | 3.55 | 1.13 | 1 | 5 |
| It saves time | 3.90 | 1.00 | 1 | 5 |
| I can compare prices more easily | 3.50 | 1.07 | 1 | 5 |
| I can avoid going to the physical supermarket | 3.19 | 1.18 | 1 | 5 |
| I can shop at any time of day without time restrictions | 3.78 | 1.13 | 1 | 5 |
| It requires little effort (convenience) | 3.70 | 1.04 | 1 | 5 |
| There is a wider variety of items | 3.03 | 1.13 | 1 | 5 |
| I appreciate that they deliver my purchases | 3.29 | 1.30 | 1 | 5 |
| It is easier to follow my shopping list | 3.27 | 1.13 | 1 | 5 |
| **Frequency of e-grocery shopping** | | | | |
| Frequency of e-grocery shopping | 3.59 | 2.53 | 1 | 8 |

Table F.2 – Questions "Frequency of e-grocery shopping", "Transition to e-grocery ", "Preferred e-grocery formats" relative frequency

| Variable | Percent (%) |
|---|---|
| **Frequency of e-grocery shopping** | |
| Never | 30.7 |
| I've tried it | 19 |
| At least once or twice a year | 10 |
| At least once a quarter | 14.7 |
| At least once a month | 18.6 |
| Every two weeks | 3.9 |
| Weekly | 3 |
| **Transition to e-grocery** | |
| Before COVID | 55.3 |
| During COVID | 18.6 |
| Post COVID/ Recently | 26.1 |
| **Preferred e-grocery formats** | |
| Delivery service platforms | 37.9 |
| Conventional retailers with online service | 59.6 |
| Online-only retailers | 2.5 |

## Appendix G- Factors Influencing E-grocery Adoption Descriptive Analysis

| Factor | Variable | Mean | Std. Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| Product Availability | A wide and varied range of products | 3.73 | 0.92 | 1 | 5 |
| Product Availability | Special dietary products (gluten-free, sugar-free) | 3.19 | 1.23 | 1 | 5 |
| Product Availability | A range that included trendy items | 2.90 | 1.11 | 1 | 5 |
| Product Availability | Ethnic/other cultural products | 2.89 | 1.15 | 1 | 5 |
| Product Availability | Ready meals and recipe suggestions | 2.76 | 1.15 | 1 | 5 |
| Product Availability | Larger selection of organic and vegan products | 2.76 | 1.13 | 1 | 5 |
| Product Availability | Alcohol and/or tobacco products | 2.33 | 1.10 | 1 | 5 |
| Product Price | Clearly visible discounts | 4.25 | 0.90 | 1 | 5 |
| Product Price | Lower prices on online platforms | 4.03 | 1.01 | 1 | 5 |
| Product Price | More offers and/or discounts | 4.00 | 0.96 | 1 | 5 |
| Product Price | Greater offers and/or discounts depending on purchase value | 3.99 | 0.98 | 1 | 5 |
| Product Price | Differentiation in purchase cost depending on delivery method (home delivery or pick-up points) | 3.69 | 1.03 | 1 | 5 |
| Interface Usage | Intelligent search engine to find the product more quickly through the use of keywords | 4.29 | 0.90 | 1 | 5 |
| Interface Usage | Ease of use of the platform (adaptable platforms: applications or websites) | 4.23 | 0.96 | 1 | 5 |
| Interface Usage | Grouping of products based on their characteristics such as low-sugar, gluten-free, or low-salt products | 3.72 | 1.10 | 1 | 5 |
| Interface Usage | Reduction of manual steps, creating smarter features in the shopping cart, through association between recipes and shopping list | 3.70 | 1.15 | 1 | 5 |
| Interface Usage | More diverse search criteria, searches based on color or packaging pattern | 3.08 | 1.24 | 1 | 5 |
| Delivery Methods | Selection of delivery time slots | 4.19 | 1.02 | 1 | 5 |
| Delivery Methods | Fast deliveries in minutes | 3.98 | 1.09 | 1 | 5 |
| Delivery Methods | Pick-up points | 3.41 | 1.20 | 1 | 5 |
| Delivery Methods | Deliveries in 2-3 days | 3.23 | 1.22 | 1 | 5 |
| Delivery Cost | Cheaper home delivery, taking advantage of discounts based on time (morning or evening deliveries/orders) | 3.85 | 0.95 | 1 | 5 |
| Delivery Cost | Different home delivery prices depending on the size of the order | 3.63 | 1.01 | 1 | 5 |
| Delivery Cost | Price differentiation between home delivery and the pick-up points | 3.57 | 1.06 | 1 | 5 |
| Delivery Cost | Delivery rates with a fixed annual price/subscription fee | 3.25 | 1.22 | 1 | 5 |
| Delivery Cost | Delivery rates with dynamic pricing based on real-time demand | 2.98 | 1.23 | 1 | 5 |
| Order Fullfilment | Freshness and quality of products | 4.55 | 0.83 | 1 | 5 |
| Order Fullfilment | Do not deliver products with short expiration dates, namely those with less than 3 days remaining before expiration | 4.22 | 1.08 | 1 | 5 |
| Communication | Contact between the retailer and the end customer to clarify orders or make product replacements | 3.99 | 1.07 | 1 | 5 |
| Communication | Better information about store inventory | 3.99 | 1.01 | 1 | 5 |
| Sustainability | Reduce pollutant emissions by concentrating several deliveries on a single transport. | 3.76 | 1.20 | 1 | 5 |
| Sustainability | Possibility of returning some packaging used in delivery for reuse. | 3.70 | 1.18 | 1 | 5 |
| Sustainability | Possibility of using recyclable boxes for regular customers. | 3.65 | 1.17 | 1 | 5 |
| Sustainability | Packaging materials should allow for differentiation in recycling, for example, not using bags that mix paper with plastic. | 3.62 | 1.13 | 1 | 5 |

Appendix H- Post-Hoc test on "Age" variable

| Age | | Sig. |
|---|---|---|
| Never | At least once or twice a year | 0.600 |
| | At least once a quarter | 0.260 |
| | At least once a month | 1.000 |
| | Every two weeks | 0.979 |
| | Weekly | 0.794 |
| | Have tried it | 0.973 |
| At least once or twice a year | Never | 0.600 |
| | At least once a quarter | 1.000 |
| | At least once a month | 0.622 |
| | Every two weeks | 0.528 |
| | Weekly | 1.000 |
| | Have tried it | 0.970 |
| At least once a quarter | Never | 0.260 |
| | At least once or twice a year | 1.000 |
| | At least once a month | 0.318 |
| | Every two weeks | 0.368 |
| | Weekly | 1.000 |
| | Have tried it | 0.861 |
| At least once a month | Never | 1.000 |
| | At least once or twice a year | 0.622 |
| | At least once a quarter | 0.318 |
| | Every two weeks | 0.989 |
| | Weekly | 0.784 |
| | Have tried it | 0.971 |
| Every two weeks | Never | 0.979 |
| | At least once or twice a year | 0.528 |
| | At least once a quarter | 0.368 |
| | At least once a month | 0.989 |
| | Weekly | 0.602 |
| | Have tried it | 0.852 |
| Weekly | Never | 0.794 |
| | At least once or twice a year | 1.000 |
| | At least once a quarter | 1.000 |
| | At least once a month | 0.784 |
| | Every two weeks | 0.602 |
| | Have tried it | 0.965 |
| Have tried it | Never | 0.973 |
| | At least once or twice a year | 0.970 |
| | At least once a quarter | 0.861 |
| | At least once a month | 0.971 |
| | Every two weeks | 0.852 |
| | Weekly | 0.965 |

Appendix I- Post-Hoc test on "Larger selection of organic and vegan products" and "A wide and varied range of products" variables

| Dependent Variable | Independent Variable | | Sig. |
|---|---|---|---|
| Larger selection of organic and vegan products | At least once or twice a year | At least once a quarter | 0.765 |
| | | At least once a month | 0.731 |
| | | Every two weeks | 0.793 |
| | | Weekly | 0.989 |
| | | Have tried it | 0.864 |
| | At least once a quarter | At least once or twice a year | 0.765 |
| | | At least once a month | 1.000 |
| | | Every two weeks | 0.181 |
| | | Weekly | 1.000 |
| | | Have tried it | 0.042 |
| | At least once a month | At least once or twice a year | 0.731 |
| | | At least once a quarter | 1.000 |
| | | Every two weeks | 0.162 |
| | | Weekly | 1.000 |
| | | Have tried it | 0.024 |
| | Every two weeks | At least once or twice a year | 0.793 |
| | | At least once a quarter | 0.181 |
| | | At least once a month | 0.162 |
| | | Weekly | 0.638 |
| | | Have tried it | 0.993 |
| | Weekly | At least once or twice a year | 0.989 |
| | | At least once a quarter | 1.000 |
| | | At least once a month | 1.000 |
| | | Every two weeks | 0.638 |
| | | Have tried it | 0.736 |
| | Have tried it | At least once or twice a year | 0.864 |
| | | At least once a quarter | 0.042 |
| | | At least once a month | 0.024 |
| | | Every two weeks | 0.993 |
| | | Weekly | 0.736 |
| A wide and varied range of products | At least once or twice a year | At least once a quarter | 0.885 |
| | | At least once a month | 0.041 |
| | | Every two weeks | 0.375 |
| | | Weekly | 0.651 |
| | | Have tried it | 0.951 |
| | At least once a quarter | At least once or twice a year | 0.885 |
| | | At least once a month | 0.364 |
| | | Every two weeks | 0.817 |
| | | Weekly | 0.955 |
| | | Have tried it | 1.000 |
| | At least once a month | At least once or twice a year | 0.041 |
| | | At least once a quarter | 0.364 |
| | | Every two weeks | 1.000 |
| | | Weekly | 1.000 |
| | | Have tried it | 0.145 |
| | Every two weeks | At least once or twice a year | 0.375 |
| | | At least once a quarter | 0.817 |
| | | At least once a month | 1.000 |
| | | Weekly | 1.000 |
| | | Have tried it | 0.691 |
| | Weekly | At least once or twice a year | 0.651 |
| | | At least once a quarter | 0.955 |
| | | At least once a month | 1.000 |
| | | Every two weeks | 1.000 |
| | | Have tried it | 0.901 |
| | Have tried it | At least once or twice a year | 0.951 |
| | | At least once a quarter | 1.000 |
| | | At least once a month | 0.145 |
| | | Every two weeks | 0.691 |
| | | Weekly | 0.901 |

Appendix J- Post-Hoc test on "Reduction of manual steps, creating smarter features in the shopping cart, through association between recipes and shopping list" variable

| Reduction of manual steps, creating smarter features in the shopping cart, through association between recipes and shopping list | | Sig. |
|---|---|---|
| At least once or twice a year | At least once a quarter | 0.937 |
| | At least once a month | 0.419 |
| | Every two weeks | 0.030 |
| | Weekly | 0.823 |
| | Have tried it | 0.976 |
| At least once a quarter | At least once or twice a year | 0.937 |
| | At least once a month | 0.981 |
| | Every two weeks | 0.203 |
| | Weekly | 0.993 |
| | Have tried it | 0.551 |
| At least once a month | At least once or twice a year | 0.419 |
| | At least once a quarter | 0.981 |
| | Every two weeks | 0.319 |
| | Weekly | 1.000 |
| | Have tried it | 0.049 |
| Every two weeks | At least once or twice a year | 0.030 |
| | At least once a quarter | 0.203 |
| | At least once a month | 0.319 |
| | Weekly | 0.810 |
| | Have tried it | 0.005 |
| Weekly | At least once or twice a year | 0.823 |
| | At least once a quarter | 0.993 |
| | At least once a month | 1.000 |
| | Every two weeks | 0.810 |
| | Have tried it | 0.547 |
| Have tried it | At least once or twice a year | 0.976 |
| | At least once a quarter | 0.551 |
| | At least once a month | 0.049 |
| | Every two weeks | 0.005 |
| | Weekly | 0.547 |

Appendix L- Post-Hoc test on "Cheaper home delivery, taking advantage of discounts based on time (morning or evening deliveries/orders" variable

| Cheaper home delivery, taking advantage of discounts based on time (morning or evening deliveries/orders | | Sig. |
|---|---|---|
| At least once or twice a year | At least once a quarter | 0.995 |
| | At least once a month | 0.728 |
| | Every two weeks | 0.507 |
| | Weekly | 0.817 |
| | Have tried it | 0.973 |
| At least once a quarter | At least once or twice a year | 0.995 |
| | At least once a month | 0.934 |
| | Every two weeks | 0.706 |
| | Weekly | 0.935 |
| | Have tried it | 0.666 |
| At least once a month | At least once or twice a year | 0.728 |
| | At least once a quarter | 0.934 |
| | Every two weeks | 0.954 |
| | Weekly | 0.998 |
| | Have tried it | 0.087 |
| Every two weeks | At least once or twice a year | 0.507 |
| | At least once a quarter | 0.706 |
| | At least once a month | 0.954 |
| | Weekly | 1.000 |
| | Have tried it | 0.147 |
| Weekly | At least once or twice a year | 0.817 |
| | At least once a quarter | 0.935 |
| | At least once a month | 0.998 |
| | Every two weeks | 1.000 |
| | Have tried it | 0.457 |
| Have tried it | At least once or twice a year | 0.973 |
| | At least once a quarter | 0.666 |
| | At least once a month | 0.087 |
| | Every two weeks | 0.147 |
| | Weekly | 0.457 |

Appendix M- Post-Hoc test on "Do not deliver products with short expiration dates, namely those with less than 3 days remaining before expiration" variable

| Do not deliver products with short expiration dates, namely those with less than 3 days remaining before expiration | | Sig. |
|---|---|---|
| At least once or twice a year | At least once a quarter | 0.069 |
| | At least once a month | 0.977 |
| | Every two weeks | 0.124 |
| | Weekly | 0.566 |
| | Have tried it | 1.000 |
| At least once a quarter | At least once or twice a year | 0.069 |
| | At least once a month | 0.232 |
| | Every two weeks | 1.000 |
| | Weekly | 1.000 |
| | Have tried it | 0.035 |
| At least once a month | At least once or twice a year | 0.977 |
| | At least once a quarter | 0.232 |
| | Every two weeks | 0.353 |
| | Weekly | 0.844 |
| | Have tried it | 0.981 |
| Every two weeks | At least once or twice a year | 0.124 |
| | At least once a quarter | 1.000 |
| | At least once a month | 0.353 |
| | Weekly | 1.000 |
| | Have tried it | 0.094 |
| Weekly | At least once or twice a year | 0.566 |
| | At least once a quarter | 1.000 |
| | At least once a month | 0.844 |
| | Every two weeks | 1.000 |
| | Have tried it | 0.564 |
| Have tried it | At least once or twice a year | 1.000 |
| | At least once a quarter | 0.035 |
| | At least once a month | 0.981 |
| | Every two weeks | 0.094 |
| | Weekly | 0.564 |

Appendix N- Post-Hoc test on "Better information about store inventory" variable

| Better information about store inventory | | Sig. |
|---|---|---|
| At least once or twice a year | At least once a quarter | 0.948 |
| | At least once a month | 0.122 |
| | Every two weeks | 0.268 |
| | Weekly | 0.959 |
| | Have tried it | 0.926 |
| At least once a quarter | At least once or twice a year | 0.948 |
| | At least once a month | 0.505 |
| | Every two weeks | 0.611 |
| | Weekly | 1.000 |
| | Have tried it | 1.000 |
| At least once a month | At least once or twice a year | 0.122 |
| | At least once a quarter | 0.505 |
| | Every two weeks | 0.995 |
| | Weekly | 0.985 |
| | Have tried it | 0.452 |
| Every two weeks | At least once or twice a year | 0.268 |
| | At least once a quarter | 0.611 |
| | At least once a month | 0.995 |
| | Weekly | 0.940 |
| | Have tried it | 0.601 |
| Weekly | At least once or twice a year | 0.959 |
| | At least once a quarter | 1.000 |
| | At least once a month | 0.985 |
| | Every two weeks | 0.940 |
| | Have tried it | 1.000 |
| Have tried it | At least once or twice a year | 0.926 |
| | At least once a quarter | 1.000 |
| | At least once a month | 0.452 |
| | Every two weeks | 0.601 |
| | Weekly | 1.000 |