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**OMNICHANNEL ÉRTÉKESÍTÉS A FENNTARTHATÓSÁG
TÜKRÉBEN**

OMNICHANNEL RETAIL IN THE LIGHT OF SUSTAINABILITY

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1. Introduction

Sustainability has played an extremely important role in recent years in both academic journals and media. Due to the pandemic, the field of omnichannel sales has become increasingly popular in academic articles (see Rodríguez-Torrico, Apadula and Cabezudo, 2020; Zhuang, Fang and Cai, 2020). The main motivation was that the study and the research should address a current topic. The main question of the study is (1) how omnichannel retail and purchase can be interpreted from a consumer perspective in light of sustainability, (2) how customers choose between alternatives and (3) what the main influencing factors are during the decision-making process.

Sustainability is very important today and appears in all areas of the lives of customers, for example, in omnichannel retail. Previous research (see Coyne, 1986; O'Shannassy, 2008) have confirmed the importance and key role of sustainability in building and maintaining a firm's competitive advantage. Furthermore, environmental issues are also of paramount importance to institutions, as it is common for them to appear on the agendas of politicians in several countries and conduct research on climate change and sustainability (Giuffrida et al., 2019).

Regarding the retail industry, it is a challenge for retailers to gain competitive advantages due to the fact that the market is saturated, and it is difficult to differentiate products and prices. As a result of this phenomenon, retailers need different strategies to have positive impacts on customer satisfaction. On the other hand, due to significant transformations, the retail industry is constantly changing. These transformations are necessary for companies to survive and adapt. The development of the retail industry is accelerated by technology, constantly changing consumer behaviours and demands. Integrating channels is no longer a distinctive factor but rather a prerequisite of competitiveness. Integration has many benefits for companies as it allows retailers to treat inventory as a shared asset and facilitate integrated offers across channels, improving financial performance, increasing customer satisfaction and loyalty, reducing inefficiencies of traditional channel-based management approaches, and overall sales (Sousa et al., 2021).

The commercial sector has changed radically in recent years, thanks to the opportunities offered by the Internet. Consumers have changed their behaviour for these reasons and are buying different products by combining several commercial channels (online and in-store shopping). Omnichannel retail has encouraged the development of retail models by integrating online channels (e.g., web stores, mobile stores) and offline channels (e.g.,

physical stores). As a result of this, customers began to adapt and started to purchase online and in-store and combine several retail channels for a single purchase (Buldeo Rai, 2019). Nowadays retailers have the opportunity to offer multiple integrated offline and online channels to customers and, in the meantime, customers use multiple offline and online channels throughout their shopping journeys (Buldeo Rai et al., 2019a). Although this pre-existing process has also recently been accelerated by the COVID-19 epidemic, which has led to an increase in consumer acceptance of omnichannel retail. However, transport contributes enormously to climate change and emissions of air pollutants, which have a negative impact on both global and local environment. As a result, the environmental impact of omnichannel trade is unclear. This knowledge is needed to facilitate sustainable decision-making process by relevant stakeholders (i.e., consumers, retailers, and logistics providers) and is key in determining which retail model is most sustainable (Buldeo Rai, 2019). Omnichannel retail means that online channels, such as online stores, and offline channels, like physical stores, are integrated. For consumers, this means that they can use different channels when shopping flexibly, conveniently, and seamlessly, according to their needs and requirements (Buldeo Rai et al., 2019a). However, it is currently unclear how omnichannel retailers can create an offer that is both economically and environmentally attractive and sustainable (Buldeo Rai, 2019).

Based on international and Hungarian literature, this study determines what omnichannel retail means, what its characteristics are, and what trends can be observed in Hungary and in European countries in relation to omnichannel retail. The work also defines what sustainability means in academic literature and how it relates to omnichannel retail. The aim of the current research is to explore the relationship between consumers, omnichannel retail, and sustainability, and to examine the relationship between sustainability and omnichannel retail according to consumers. The goal of the study is to explore what sustainable omnichannel options are, how willing consumers are to accept these options, and how these options could be made more attractive. The aim of the research is also to examine the attitudes related to general online ordering, for example: how important it is for consumers whether the given goods come from abroad, the decision is influenced whether the products are delivered by car/van, they are considering the shipping/delivery costs, or they would be willing to pay more for a more sustainable solution/delivery method? Although there are numerous academic articles on the omnichannel retail, marketing and consumer journey, the sustainable side of this topic is unexplored both in Hungarian and international academic journals, especially from consumers' point of view.

After the literature review, secondary data were also processed. Secondary research provides a comprehensive picture of sustainability, omnichannel behaviour, and sustainable omnichannel behaviour. It is important to examine current trends in sustainable omnichannel purchasing and the impact of COVID-19 on consumption. Since this is a less researched area, a small amount of secondary data was available, and the research covered several different countries and aspects instead of focusing on one area.

The main findings of the study are revealed through qualitative and quantitative research methods. Quantitative research was conducted through an online questionnaire survey. The three-week questionnaire research was followed by data cleansing and systematization. After the analysis and the presentation of demographic and general data, the modelling is presented in detail. In addition to descriptive analysis, the structural equation model (SEM) methodology was used. Software such as SPSS and Adanco were used to analyse the collected data. Ten hypotheses were evaluated in the study. With the help of qualitative, in-depth interview research, the motivations and attitudes behind the numerical correlations were explored to gain a deeper understanding of the topic. In addition, in-depth interview research aims to provide a deeper understanding of the hypothesized relationships. The aim of the work is to prepare exploratory research that will serve as a basis for further research in the future. Qualitative research was complementary to quantitative research. In addition to the numerical results, the aim of the study was to understand intrinsic motivation and deeper thoughts. Furthermore, the in-depth interview research examined (1) how and why consumers behave sustainably during their daily lives and shopping, (2) what customers think about the delivery and return options, and (3) what factors influence the customers to behave in a sustainable omnichannel way (individual goals; environmentally friendly behaviour; time, money, energy saving; channel preference, offered omnichannel services).

The study summarizes the main literature, previous research, secondary research, and data related to the topic, and the results of the own quantitative and qualitative research. At the end of the work, the practical applicability, the limitations of the research, and the future research development proposals are also presented. The work provides a comprehensive and in-depth picture of current knowledge on sustainable omnichannel behaviour, which is definitely recommended for further research in the future. The curiosity of the study is that no such research has been conducted in Hungary yet which increases the novelty of the work.

2. Theoretical background of the topic

2.1. The definition of omnichannel retail

The retail landscape has been transformed thanks to the new phenomenon called omnichannel retailing. To understand how omnichannel retail works, it is important to distinguish multichannel, cross-channel, and omnichannel concepts. *“A „channel” is defined in this environment as a customer contact point or a medium through which the company and the customer interact”* (Nagy et al., 2021, p. 43.).

Multichannel retail means that the company offers products and services but through more than one channel. Those channels are existing beside each other, and the customers do not mix or integrate them (Nagy, 2020). Consumers have the opportunity to use different types of channels such as traditional stores, catalogues and e-commerce, it is parallel usage of multiple channels in retail (Stojković, Lovreta and Bogetić, 2016). So, the company can use more than one selling channel or medium (e. g., Internet, television, and retail outlets) (Frazer and Stiehler, 2021). A multichannel customer is defined as those who initiate an interaction with the company through multiple channels for the purpose of purchasing. Studies have shown that a multichannel customer generates more traffic: on average, customers who buy regularly through more sales channels spend 20-30% more than they usually do using only one channel. The multichannel customer offers higher revenue and a higher share of customer costs; a multichannel buyer is a more frequent, multi-item, and higher value buyer than its single-channel counterpart (Gyulavári, 2010). This strategy became more popular in food retailing, and many online stores are opened by grocery retailers besides their traditional stores (Stojković, Lovreta and Bogetić, 2016). An example for a multichannel retail, when the customer orders and picks up the product in-store or orders online or by phone and gets the product by delivery, we are talking about multichannel retail (Chatterjee, 2010). So, there is more than one channel, but the customer uses only one during the shopping process.

The concept of cross-channel retail is a bit different from multichannel retail, it means an improvement (Nagy et al., 2021). It already expresses the integration of different channels, the synergies between them. According to Chatterjee (2010), cross-channel retailers integrate multiple channels that allow cross-channel movements of products, money, and information. *“Integrated cross-channel retailing is a set of integrated processes and decisions that support a unified view of a brand from the perspective of a product purchase, return and exchange, regardless of the channel (in-store, online, mobile, call centre, or social).”* (Cao, 2014, p.

71.). For example, the customer orders a product online but picks it up in-store or orders it in-store and gets it by delivery (Chatterjee, 2010).

“Omni” is a Latin word that means “all”, “universal” (Lazaris and Vrechopoulos, 2014), so in this context, it means „all channels together” (Nagy et al. 2021). “*The omnichannel concept is perceived as an evolution of multichannel retailing*” (Nagy et al. 2021, p. 44). Omnichannel retail goes beyond tools such as brand management, information management, logistics management or channel integration consumer management (Nagy, 2020). The main point of it is to focus on integrated activities within and across channels to correspond to how customers shop. In this way, consumers can shop across channels anywhere and anytime. Causes a unique and complete customer experience and removes barriers between channels (Sousa et al., 2021). Omnichannel retail integrates online (e.g., webshop, mobile shop) and offline channels (e. g. physical stores) (Buldeo Rai, 2019), which mixes the “*physical store with the information-rich digital environment, with the aim of providing excellent shopper experiences across all touchpoints*” (Frazer and Stiehler, 2021, p. 655.). The concept integrates numerous channels to satisfy customers in a customized fashion through their channel of choice (Frazer and Stiehler, 2021). Omnichannel retail enables highly personal shopping routes that require diverse, personalized, and dynamic delivery options to deliver purchases to consumers and increase logistics complexity (Buldeo Rai, 2019).

An example of omnichannel retail: The customer buys the product online and collects it in the store or retail outlet. Therefore, the company implied an integrated offline and online shopping experience in its omnichannel strategy (Frazer and Stiehler, 2021). Juaneda-Ayensa, Mosquera and Sierra Murillo (2016) specified this example. An Omnishopper can search for the characteristics of a product using a mobile app, compare prices on several websites from their laptop, and finally buy the product in a physical store. This phenomenon is called consumer 3.0, which uses new technology to search for information, offer opinions, explain experiences, make purchases, and talk to the brand. In this way, consumers can create a flexible, convenient, and dynamic purchase path that fits their preferences and needs. The omnichannel purchase pathway has five phases, reflecting the different activities that consumers carry out: researching, testing, purchasing, and receiving products and potentially returning them. (Buldeo Rai et al., 2019a). Table 1 summarizes the main similarities and differences between multi-, cross-, and omnichannel retail.

Table 1: Similarities and differences between multi-, cross-, and omnichannel retail (Source: Own editing based on Buldeo Rai, 2019; Chatterjee, 2010; Stojković, Lovreta and Bogetić, 2016)

	Multichannel retail	Cross-channel retail	Omnichannel retail
Common features	More than one channel for online and offline sales.		
Different features	Operates multiple channels as independent entities, Focuses on information.	Integrates multiple channels allowing cross-channel movements, The channels are complementary.	Integrated approach between multiple channels, Focuses on the customer, High personal purchase journeys.

Since it became a significant competitive advantage, many companies adopted omnichannel retail; however, in the eyes of the customers, it is beginning to be seen as a standard feature. This forces companies to implement it most effectively (Sousa et al., 2021).

As mentioned above, according to Buldeo Rai et al. (2019a), there are five phases in the omnichannel purchase path today and customers act differently in each phase: research, testing, purchasing, receiving, and returning. These phases can be seen in Figure 1. Arrows in solid lines represent fixed phases (significant for all purchases), arrows in dotted lines represent flexible phases (can be neglected or carried out many times). In the omnichannel environment, many channels can be used during each activity.

Consumers can collect information about a product in-store or online using their smartphones, tablets, or computers, e.g., reading product reviews, user testimonials, looking up for location details, or pricing information. Customers usually test products in physical stores, but new solutions were found to carry out testing activities at home (e.g., the feel of a shirt, the look of a pair of glasses): test at home or home sampling programs. A more technologically advanced solution with the help of augmented reality is a virtual try-on (Buldeo Rai et al. 2019a).

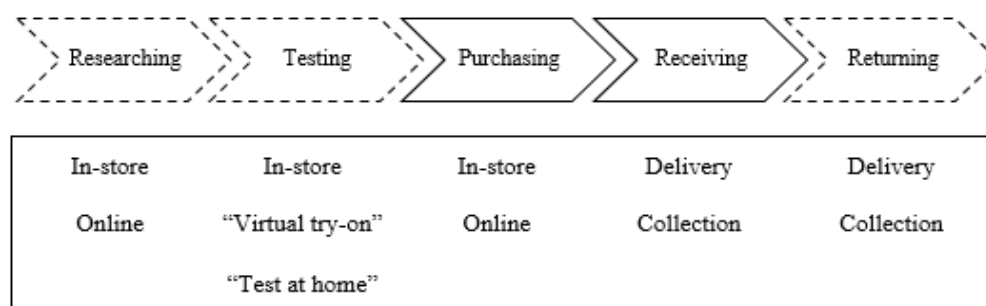


Figure 1: Five phases of the omnichannel path-to-purchase (Source: Buldeo Rai et al. 2019a, p. 4.)

In their work, Buldeo Rai et al. (2019a) distinguish six shopping behaviour profiles based on the actions made in each phase (presented in Figure 2). The matrix shows two dimensions the channel, which can be either single or omnichannel, and the purchasing which can be online and offline. The customer who uses a single channel, but online purchasing is called the online shopper while the single-channel user and offline purchaser is called the traditional shopper.

Regarding the omnichannel part of the matrix, Buldeo Rai et al. (2019a) differentiate four other profiles: showroomer, click-and-collect shopper, research-shopper/webroomer, and ship-from-store shopper. Research shopping is when the customer does research about a product and tests it in one channel and then buys it in another. This phenomenon has two subtypes: showrooming and webrooming. Showroomers buy the product online but before buying, they look for information and test it offline e.g., trying on shoes in-store and buying them on the internet. Consumers do this because they expect higher prices in the shops, but they want to test the product before paying for it (e.g., buying furniture). In opposition, webroomers do online research and offline in-store purchases (e.g., buying a smartphone). This profile is more common than showrooming. Flavián, Gurrea and Orús (2016) define showrooming and webrooming as cross-channel behaviours. Many customers search for information before purchasing the product at the physical store, so the webrooming behaviour is more popular among the consumers. Flavián, Gurrea and Orús (2016) also mentioned the most important advantage of webrooming and showrooming in their work. The combination of online and offline channels can improve the customers' search experiences and decisions.

Customers can order products online and take them over in-stores. Stores can serve as collection points for online purchases. This method is called click-and-collect or BOPS (buy-online-and-pickup-in-store). Omnichannel retailers can either use site-to-store or immediate pick-up in-store as store network as collection points (e.g., Decathlon, Sinsay, and Orsay offer online order pick-up in their stores). Site-to-store means when the online order is coming from the distribution centre and sent to the store. The immediate pick-up in-store is when the order is picked from the store's shelves or stock. Ship-from-store shopper is who buys the product in-store but instead of take-away, the customer asks for delivery at home (Buldeo Rai et al., 2019a) (e.g., buying a washing machine in Media Markt and ask for delivery). When customers buy products online, they prefer them to be delivered to home or work. This means that the last mile transport is a significant part of the shopping journey. The source location of the delivery can be retailers' distribution centre, retailers' supplier by means of drop-shipping

a retailers' store. There are some logistics service providers (such as GLS, OneExpress, DHL) that carry out these deliveries to home, work, or collection points

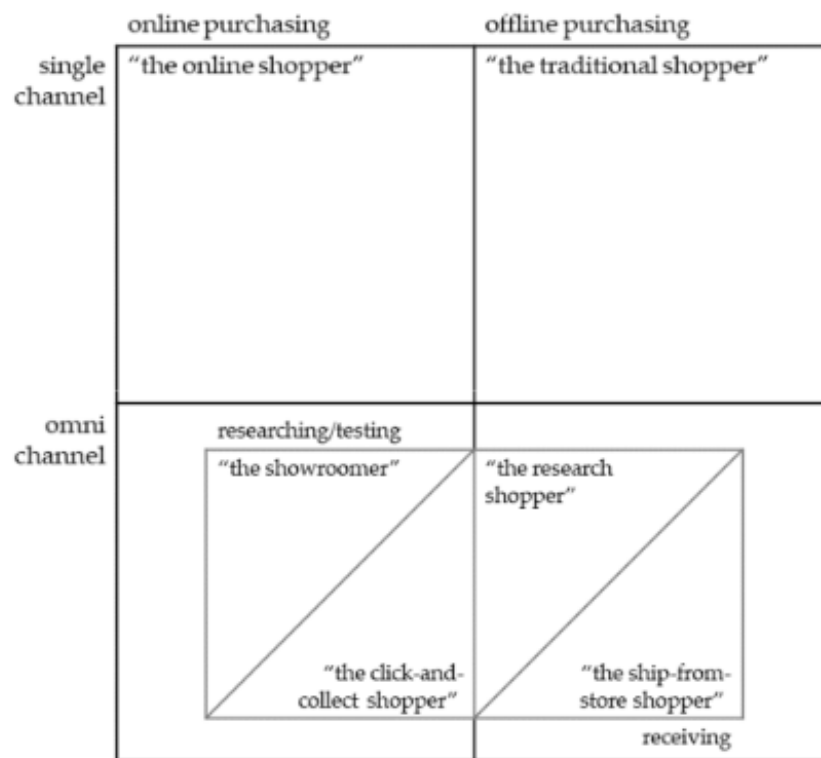


Figure 2: Six omnichannel shopping behaviour profiles (Source: Buldeo et al., 2019a, p. 8.)

Omnichannel retail is a complex term, Nagy et al. (2021, p. 49.) mentions six categories of an omnichannel service customer journey:

1. BORIS: Buy online, return in-store,
2. BOPIS: Buy online, pick-up in-store (shipped to store for pick-up),
3. Buy in-store, ship from warehouse,
4. Click-and-collect (same day pick-up at the store),
5. Curb side pick-up
6. Buy in-store, pick-up in another store.

Table 2 below compiles the advantages and the disadvantages of omnichannel retail from retailers' and consumers' perspectives. Regarding the benefits of omnichannel development from a retailer's perspective, it contributes to reducing costs and expenses at points of sale, increasing sales associated with business profitability and it results in greater purchasing convenience (Sousa et al., 2021). For omnichannel retailers, this results in a competitive advantage and loyal and profitable customers. Using their in-store network can reduce the number of expensive home deliveries and increase the overall efficiency of the supply chain (Buldeo Rai, Verlinde and Macharis, 2019b). Another benefit of omnichannel a retail from

retailer point of view is the efficient resource allocation and the combination of existing distribution channels parallelly (Ryu, Cho and Lee, 2019).

Besides the benefits, there are a few disadvantages in omnichannel retail which can cause problems for retailers: complex marketing strategy, demanding communication between teams, software requirements, expensive transitioning, significant time and effort is needed, and showrooming behaviour of consumers. According to Aleksic (2020), an omnichannel strategy is not as straightforward as standard marketing strategies. It is important to understand customers' touchpoints and what they want. Useful solutions need to be provided to customers at each stage of the customer journey, which is not always an easy task. Regarding communication, addressing customer needs is not only one team's responsibility. Questions and issues often need input from several teams like marketing, sales, product engineering, etc. which requires helpful, proper, and open communication. Last but not least, the right technology is required to enable retailers to execute orders very effectively (Aleksic, 2020). When a company would like to change its model to omnichannel, besides the high expenses, it can be also time-consuming and strenuous since the process requires well-detailed planning and good communication flow (Sourabh, 2020). Quach et al. (2020) highlighted an important drawback of showrooming activity. They call it customer misbehaviour since the customers take advantage of the retailer's multiple channels while at the same time it is a value co-destruction behaviour for retailers which has a negative impact on performance and profitability. As a result of this, showrooming in omnichannel can weaken the relationship between service integration and customer experience.

Besides the benefit of showrooming, consumers can experience more advantages of omnichannel retail. The major advantage of omnichannel retail is that consumers can overcome online channels' drawbacks by using an offline store. In omnichannel retail, customers also have the opportunity to select the preferred channel during each stage of information seeking, acquisition, comparison, and purchasing. Consumers want to use a variety of media during the shopping process and appreciate the potential of online channels, that is why complementary properties of channels are a benefit for them (Ryu, Cho and Lee, 2019).

A downside of omnichannel retailing from consumers' perspective is that it requires access to private information which can arise privacy concerns (Quach et al., 2020). When consumers use omnichannel, they know the uncertainty of product value and availability in online and offline channels, and they understand if the actual outcome does not coincide with their

previous expectations after choosing each channel. When consumers buy products online, they give up on the physical inspection of the product, because of this, they might be dissatisfied and send back the products or maybe they find them unsuitable and return them. Many consumers choose online channels because they would like to experience the advantage of online shopping's delivery convenience but in case of dissatisfaction, they might spend more money and time to send the products back to the retailers. While regarding the offline channel, consumers who visit the store, might find the product unavailable and end up switching to an online channel. These online and offline disadvantages can result in a deterioration of the customer experience (Du, Wang and Hu, 2019).

From the advantages highlighted before, we can draw conclusions that unique customer experiences are beneficial for both retailers and consumers which is the biggest benefit of omnichannel retail. Since omnichannel merges online and offline channels, customers can use numerous channels throughout their shopping journey which makes the purchase process more flexible, convenient, and seamless (Sousa et al., 2021) which results in greater customer satisfaction. Another advantage is that the two dimensions of service integration in omnichannel are service consistency and transparency which can increase both shopping pleasure and flow (Quach et al., 2020).

According to the examined theoretical frameworks, just a few downsides exist which affect both parties. This drawback is called location-based service. Location-based marketing is significant for retailers but the mitigating effect of service consistency on perceived privacy risk can be reduced by the usage of location-based services (Quach et al. 2020). If a company does not pay attention to logistics challenges and unreliable order fulfilments are common, it needs to face lost sales and dilution of brand value. This can be bad for both the retailers and the consumers because the shipping delays, bad customer journey experiences, and the disappointment of consumers will lead to a decrease in customer turnover (Krug, n.d.). Besides these downsides many studies talk about the environmental impact and concerns of omnichannel retailing (e.g., Giuffrida et al., 2019; Buldeo Rai, Verlinde and Macharis, 2019b; Buldeo Rai, 2019). Environmental impacts and sustainability issues will be discussed in more details later in the study.

Table 2: The advantages and disadvantages of omnichannel retail in both retailers' and consumers' perspectives
(Source: Own editing based on Buldeo Rai, Verlinde and Macharis, 2019b; Du et al. 2019; Quach et al., 2020; Ryu, Cho and Lee, 2019 and Sousa et al, 2021)

Perspective	Advantages	Disadvantages
Retailers	• Reduction of operational costs and expenses, • Increasing sales, • Greater purchasing convenience, • Competitive advantage, • More loyal and profitable customers, • Reduction of expensive home deliveries and increase efficiency, • Efficient resource allocation and combination of existing distribution channels parallelly.	• Complex marketing strategy, • Demanding communication between teams, • Software requirements, • Expensive transitioning, • Significant time and effort are needed, • Consumers' showrooming behaviour.
Consumers	• Possibility of showrooming behaviour, • Increased shopping pleasure and flow, • Supplementation of the online distribution channel's downsides, • Complementary properties of channels.	• Privacy concerns, • Different online and offline offers causing disappointment, • Uncertainty of product value • Online risk: dissatisfaction, money, and time consuming • Offline risk: risk of product availability.
Both	• Unique customer experiences, • Increasing the quality of services, • Greater customer satisfaction, • Flexible, convenient, and seamless shopping journey, • Service consistency and transparency.	• Location-based service, • Logistics and delivery challenges, • Unreliable order fulfilment processes, • Sustainability issues and concerns.

It can be seen from the table that omnichannel has many benefits and drawbacks. Despite of the several disadvantages, the advantages can ensure both retailer and consumers that omnichannel has an important role in retailing.

2.2. The role and effect of COVID-19 on omnichannel retail

A global pandemic, combined with civil unrest and widespread instability, has reshaped the lives of customers, employees, retailers, demands on businesses and brands, and the operating landscape (Gartner, 2020). Today's retail environment has been promptly changed by the

COVID-19 lockdown regulations in many countries. The pandemic caused supply chain issues which resulted that many products were not available in stores (Rodríguez-Torrico, Apadula and Cabezudo, 2020). After the COVID-19 the number of shoppers decreased in stores and shopping centres since shopping in-store became strange for the consumers (Avşar, 2021). Shopping in physical stores was impacted by the closure of non-vital stores and it had to comply with social distance policies in the basic stores that remained open. Many retailers had to reduce the number of consumers allowed in the stores (Rodríguez-Torrico, Apadula and Cabezudo, 2020). Zhuang, Fang and Cai (2020) also pointed to the fact that customers' shopping behaviour changed rapidly due to the pandemic. As a result of social distancing and lockdown regulations, customers started to look for an advantageous and more secure spot to purchase a product and started to avoid physical retailers and buy products online and use delivery services instead of going to the store (Avşar, 2021; Rodríguez-Torrico, Apadula and Cabezudo, 2020). This dramatic change resulted that many companies moving to omnichannel retail from offline operation to make sure they survive the crisis. In this way, they can cope with the expanded online traffic while they maintain offline business (Zhuang, Fang and Cai, 2020).

The number of purchases made online seriously increased by more than 115% and it is expected to grow by 160% in the future. However online retail sales used to be very small compared to offline retail sales in many countries such as the United States, United Kingdom, Germany, France, Canada, and Latin America. Worldwide online retail sales used to be less than 30% of total retail sales while retail sales in actual stores were over 70% of total retail sales. After the pandemic, this situation has changed, and currently online retail sales are more than 35% of the total retail sales since the customers feared the market interruptions due to the worldwide COVID-19 pandemic (Avşar, 2021). The research results of Hwang, Nageswaran and Cho (2020) also confirm that the online channel became of paramount importance during the pandemic. The online revenue of the investigated retailer increased its profit after the announcement of the emergency and quarantine due to the fact that the retailer reached new customers and existing customers spent more online.

Hwang, Nageswaran and Cho (2020) highlighted that channel shift happened since consumers started to use online channels more frequently. Moreover, channel combination or omnichannel behaviour was also greatly affected by the coronavirus (Rodríguez-Torrico, Apadula and Cabezudo, 2020). The coronavirus confirmed to retailers that advancements in technologies, services, and science are necessary to survive (Avşar, 2021). The customer

demands increased for more digital, contactless, individual, helpful, and more secure shopping. Consumers have increased their use of digitally supported services (e.g., contactless payment, home delivery, curbside pick-up/click-and-pick) and it is expected that this behaviour will continue in the future (Rodríguez-Torrico, Apadula and Cabezudo, 2020). Hwang, Nageswaran and Cho (2020) also agree that online capabilities need to be developed because it helps retailers to survive when offline channels are operating at a reduced level but also helps to reach new customers. Zhuang, Fang and Cai (2020) mentioned some examples in their studies, e.g., Chili's, Home Depot, or Walmart. These businesses promoted their apps and services where customers could order and pick up the order curbside ensuring social distancing.

Thanks to these changes, the shopping behaviour will change because customers realize the benefits of other services such as safety and benefits of home deliveries, store pick-up, and cashless payment (Rodríguez-Torrico, Apadula and Cabezudo, 2020). An omnichannel strategy can help control the pandemic's spread since long lines and crow in shops can be avoided (Avşar, 2021). Avşar (2021) suggests that retailers should use suitable omnichannel capabilities (order management system, inventory management system, enterprise data interface, and warehouse management system) as the key supply chain strategies. The failure to use a multichannel system has led to the replacement of the key supply chain with an omnichannel strategy that is the most proficient and resilient. Although online shopping and e-commerce are expanding, Avşar (2021) suggests that omnichannel retailers should consider that the physical store environment has a strong effect on consumers. The most important outcome is a good customer experience which should be provided through customized experience and cutting-edge applications with regards to omnichannel retailing.

Regarding COVID-19 Avşar (2021) distinguish four omnichannel trends which were significant in 2021: accelerated digital transformation; shoppable social media; merging online and offline experiences in stores and driving traffic into stores with “*On-The-Go*” promotions via mobile devices. It is important to highlight that the epidemic did not affect all retail sectors equally. For example, people buy fewer clothes. Apparel managers expect that consumers will move from offline to an online channel which will result in the redefinition of the physical stores, and it will accelerate in-store omnichannel integration (Rodríguez-Torrico, Apadula and Cabezudo, 2020). Zhuang, Fang and Cai (2020) introduced online-to-offline (O2O) coupons in their work as a tool to help businesses that lost many consumers due to the epidemic. These O2O coupons can be adapted by brick-and-mortar stores (traditional

businesses which have physical stores). These coupons can be spread online and redeemed offline. They highlighted two reasons why this tool would be suitable for offline businesses: *“They capture the increased flow of online consumer traffic, and they leverage existing offline operations for cash flow and consumer engagement.”* (Zhuang, Fang and Cai, 2020, p. 3.).

As we can see the COVID-19 accelerated the omnichannel retail. Online channels became more and more important and obvious for customers which result in the increased number of deliveries. The several deliveries and the popularity of omnichannel may arise some sustainability issues as well. These concerns will be further discussed in the next chapter.

2.3. The definition of retail sustainability

Before linking omnichannel retail and sustainability, it is important to understand the general concepts of sustainability and their role in retailing. But before talking about retail sustainability, it is important to explain what sustainability means in itself. Many definitions exist in both the international and Hungarian literature. Perhaps the most common of all is the Brundtland definition: *“development that meets the needs of the present without compromising the ability of future generations to meet their own needs”*. It means that *“the only truly sustainable form of progress is that which simultaneously addresses the interlinked aspects of economy, environment and social well-being”* (Johnston et al., 2007, p. 60.).

The model of the triple bottom line (illustrated in Figure 3) can help to explain sustainability. The model implies that businesses need to measure their social, environmental, and economic performance, so it is not a single financial indicator that matters, but a combination of the three factors (Fleischer, 2014). This model is also referred to as the 3P concept: people, planet, profit Udén and Andersson (2021) defined each dimension in their work. Economic sustainability means how companies stay in business by making a profit and benefiting the economic systems around them. Environmental sustainability is usually based on international standards. These standards help organizations and companies to set objectives in the interest of the reduction of environmental impacts. To define social sustainability is the most difficult among the three dimensions due to the fact that it connects to the definition of culture and society. Social sustainability includes the legal and ethical responsibilities of organizations.

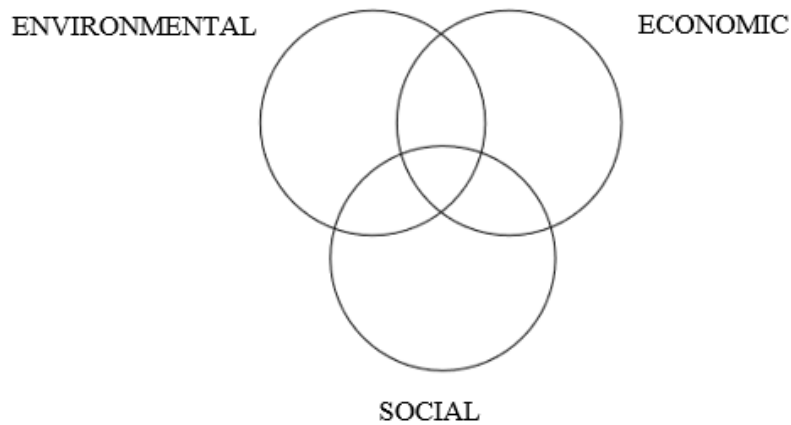


Figure 3: Figure showing the equal importance of the components of Triple Bottom Line (Source: Fleischer, 2014, p. 18.)

Environmental awareness is included in the topic of interest besides social awareness, ethical consumption, responsible consumption, sustainable consumption, and voluntary simplicity. According to Dudás (2011), sustainable consumption can be interpreted as the use of products and services that ensures the satisfaction of basic needs, ensures an adequate quality of life, but requires the minimal use of natural resources and the emission of toxic, hazardous substances, waste, and pollutants. Dudás (2011) also define the model of unsustainable consumption that harms the environment and, through it, on consumers themselves: on the one hand, on specific consumers of a given product and service, and the other, on other consumers who are distant from them in time or space.

Dörnyei et al. (2014) highlighted in their work that environmentally conscious behaviour while the consumer also considers the interests of others belongs to the dimension of responsible consumption in consumer awareness. The environmentally conscious or eco-friendly consumer takes into account the impact of products on the environment when making purchasing decisions. According to Dudás (2011), environmentally conscious consumption is a purchase that meets the needs at least as much as traditional consumer behaviour but can contribute to reducing waste and lowering the burden on the environment. Based on these definitions, environmentally conscious behaviour corresponds to the sub-area of sustainable consumption. Environmentally conscious behaviour is a complex phenomenon that includes activities for the benefit of the environment and developing environmentally conscious consumer behaviour is the first step in creating sustainable consumption (Dörnyei et al., 2014). Consumer environmental awareness is about achieving ecological consistency in purchasing habits and decisions, being aware that the development, production, distribution, consumption, and use of a product, and even the subsequent stage, have environmental

impacts and additional costs, striving to minimize adverse effects and additional costs (Dudás, 2011).

Dudás (2011) determined three environmentally conscious activities that aim the reduction of environmental usage:

- eco-purchases (organic products, organic products, articles made from recycled materials, preference for returnable packaging, free in-store nylon bags, rejection of disposable products),
- reducing environmental use in other ways (e.g., reducing car use, separate waste collection, energy saving),
- active search for information, orientation, environmental protection activities related to the environment, environmental problems, and solutions.

Based on the definition of TBL and the theoretical framework mentioned above present study deals mostly with the environmental aspect and uses the following definition for sustainability: A type of behaviour that incorporates sustainable and environmentally friendly considerations into its day-to-day decision-making so as not to endanger the health, environment, and well-being of itself or others.

There are many reasons for engaging in sustainable retailing due to the fact that the retail sector depends on governments, global institutions, and consumers. Many businesses cases focus on the topic of why companies should engage in sustainability practices (e.g., Carroll and Shabana, 2010); Lawrence et al., 2006; Kemper, Ballantine and Hall, 2019; Williams and Schaefer, 2013) including connections to value-creation, competitiveness, resources, risk reduction and legitimizing company operations. For instance, improved competitiveness can be achieved because customers want more sustainable companies, so they try to be more responsible. Within retail industry, many companies communicate their sustainability efforts in different ways as a response to changing consumer demands and other external pressure (Udén and Andersson, 2021).

In addition to the responsibility of companies, public regulations, and consumers themselves have a key role to play in creating sustainability. Citizens are the ones who, as consumers, investors, voters, or employees, can make a difference on a day-to-day basis to make a difference (Hofmeister Tóth, 2016). Lehner (2015) also highlighted the fact that the view of sustainable consumption became important for customers. They try to act sustainably during their decision-making process. Green marketing is supposed to be a bridge between consumers' current lifestyles and sustainable consumption. If a company understands the

insights of the customers, it is more likely to be sustainable and make more profit and gain a competitive advantage. Lehner (2015) in his work investigated the role of retail in sustainability. In his research in Sweden, he made 22 interviews with retail representatives and 13 store observations. Eventually, he found out during his research that sustainability is dealt with on multiple levels in retail organisations. Retailers consider sustainable consumption to be pragmatic and they try to look for options that satisfy their customers. Interestingly, Swedish retailers seem to forget short-term benefits to achieve long-term results. However, Lehner (2015) states in his work that retailers never engage with all aspects of the sustainability discourse, they choose a subset of possible focus areas, which fit their customer base and their business model.

Changes in consumer behaviour, increased interest in social responsibility, and intensifying product and supply chain competition have brought increasing relevance and research interest to the topic of sustainability. Consumers' sustainable choices influence purchase decisions (Adivar, Hüseyinoğlu and Christopher, 2019). Wiese et al. (2012) also emphasised in their work that competitive advantages can be gained from incorporating sustainability issues. The role of the retailers became significant since they are the intermediaries between the customers and the producers in the supply chain, thanks to this significance, they often have a high level of control in supply chains. So, retailers need to be involved in sustainability project to maintain it as a long-term strategy (Adivar, Hüseyinoğlu and Christopher, 2019).

Due to the fast development of the digital environment and the growing role of the internet, customers order more and more products online that can erase some sustainable questions and issues as these products are often delivered to consumers' houses (Buldeo Rai, Verlinde and Macharis, 2019b). *"The key environmental issues for sustainable retailing are the adaption of a fundamental environmental attitude, use of energy, use of input material, product, packaging, transport, consumption, and waste."* (Adivar, Hüseyinoğlu and Christopher, 2019, p. 261.). Transport has the most consequential impact on sustainability (Buldeo Rai, Verlinde and Macharis, 2019b).

According to Sousa et al. (2021), many companies can expect enormous pressure from stakeholders regarding green practices. This pressure stimulates companies to adopt green management practices which can result in the improvement of competitiveness by differentiating their products and enhancing their reputation and image. The consumers want green practices to be adopted such as carbon emissions reduction and recycling. *"One of the ways of achieving this competitive advantage is by using technological innovations like*

digitalization and automation especially when adopted in logistics, transport and purchasing processes, since logistics activities have a prominent environmental impact on both in-store and online purchasing processes, accounting for more than 75% in these two processes.” (Sousa et al., 2019, p. 2.). Adapting more sustainable processes can be another way to gain competitive advantages. In this way, sustainably conscious customers’ attention can be raised. From a consumer perspective, the current study based on the theoretical literature defines retail sustainability – with the focus on environmental aspect – as any individual activity to reduce a purchase’s environmental impact., e.g., choice of alternative delivery methods, usage of sustainable packaging, reduction of waste, acquisition of pre-purchase information, etc. Based on the classification of environmentally friendly activities and the definition of retail sustainability written above, sustainable retail and the environmentally friendly transportation connected to retail can be classified into three groups. Consumers can take into account the package of the ordered product; they can choose how the ordered product should be delivered (to collection points or the address of choice but by eco-friendly vehicle) or they can look for alternative solutions how to buy the product with the least environmental damage.

2.4. The relationship between omnichannel retail and sustainability

The awareness of environmentally sustainable processes has been increased worldwide, and the environmental impact of the online order fulfilment process is becoming a key issue for logistics managers. Channel integration can be a tool to pursue an eco-efficiency strategy since it could simultaneously improve the environmental and economic impact of the logistics process to deliver online orders (Melacini and Tappia, 2018). According to the article of Sousa et al. (2021, p. 3.), *“adoption of an omnichannel model meets the sustainable demands of various stakeholders (e.g., consumers, government, and partners)”* since climate changes’ and air pollution emissions’ primary contributor is transportation.

Thanks to the growth and changes of the e-commerce market, major problems within the last part of the supply chain have arisen during direct-to-consumer delivery. This last mile is known as one of the most expensive, inefficient, and polluting part of the supply chain (Gevaers, Van de Voorde and Vanelander, 2009). Buldeo Rai (2019) also introduces the definition of “last mile” in her work, although it is not clear how *“last mile”* materialises in omnichannel retail to customers. This study uses the definition mentioned by Gevaers, Van de Voorde and Vanelander (2009, p. 2.) *“The last mile is the last stretch of a business-to-consumer (B2C) parcel delivery to the final consignee who has to take reception of the goods at home or at a cluster/collection point.”*. The concept focuses on how products reach their

destination in the consumer market; however, it is currently unclear how omnichannel retailers can create a last mile delivery offer that is both attractive to customers and environmentally sustainable. According to national and international reports, free and fast delivery and consumers' acceptance of more sustainable last mile transport options have to be investigated. The investigation is quite difficult because the consumers are not willing to give up on quality, cost, and convenience while making sustainable decisions (Buldeo Rai, Verlinde and Macharis, 2019b).

Due to the problem mentioned above that more and more customers order online, concerns on last mile sustainability are rising (Buldeo Rai, Verlinde and Macharis, 2019b). The 'last mile' of e-fulfilment is recognized as one of the most costly and polluting parts of the supply chain (Melacini and Tappia, 2018). *"As transport is a major contributor to climate change and air polluting emissions that negatively affect our global and local environment, the environmental impact of omnichannel retail is unclear as well"* (Buldeo Rai, 2019, p. 15.). For sustainable decision making, this knowledge is essential for stakeholders who are involved such as consumers, retailers, and logistics service providers and it needs to be determined which retail model is sustainable.

Buldeo Rai, Verlinde and Macharis (2019b) mentioned in their work that since last mile delivery is the most significant transport activity, there are few differences between online and conventional shopping for most of the other transport activities involved. The last mile is often called a *"problem"* or *"challenge"* which materialises in two ways: high cost and high environmental impact. In spite of the fact that the last mile is only a fraction of total transport, it is extremely responsible for transport-induced environmental damages (Buldeo Rai, 2019). Therefore, last mile transport is the biggest challenge for B2C e-commerce.

Besides environmental issues, last mile transport is also important in terms of costs. Its organization is very pricey for logistics service providers that carry out these deliveries. For retailers, a product's last mile delivery is between five and twenty-three times more expensive than product purchases in-store (Buldeo Rai, 2019). According to Gevaers, Van de Voorde and Vanelander (2009), the last mile makes 13-75% of the total supply chain costs, depending on many factors. These high costs result many inefficiencies in the last mile and poor environmental performance. Buldeo Rai, Verlinde and Macharis (2019b) also mentioned that 50% of total costs are attributed to the last mile. These high costs are caused mainly by the companies that promise to serve their customers within two days, the next day or even the day of purchase (e.g., GymBeam). As the result of the high costs, the low delivery location

density and logistics facilities remote from the consumer market, a product's last mile delivery is between 5 and 23 times more expensive for retailers than product purchases in-store and customers do not want to pay for delivery services. The efficiency and sustainability issues are getting larger and larger because many retailers move towards instant and on-demand deliveries (Buldeo Rai, Verlinde and Macharis, 2019b).

The omnichannel retail sector can contribute to sustainable consumption and production through fewer physical stores, fewer distributed inventories, raising awareness and educating customers about sustainability (Adivar, Hüseyinoğlu and Christopher, 2019). If retailers want to implement sustainable omnichannel retailing, first they should integrate sustainability initiatives across all channels and all steps in consumers' paths to purchase. Adivar, Hüseyinoğlu and Christopher (2019, p. 261) determined the most urging sustainability issues in omnichannel retailing such as *"volume of packaging, on-site vs. off-site recycling, smart consumption, sourcing of local produce and products"*. Environmentally friendly solutions should be considered such as sustainable vehicles (electric vehicles or cargo-bicycles) and consolidation. Consolidation can be a helpful solution because more drops per trip can reduce the kilometres per delivery, therefore it makes the process more efficient. Longer delivery terms, use of alternative delivery addresses (e.g., parcel pick-up points and lockers like GLS package point or FoxPost lockers) both promote consolidation. In the recently developed omnichannel retail model, retail stores also serve as a package pick-up point (Buldeo Rai, Verlinde and Macharis, 2019b).

Two last mile transport options can differ when the customer purchases a product online: delivery at home (or to the address of choice) or delivery at a pick-up point or locker. Home delivery is considered the least environmentally friendly option due to the fact that many sustainability issues occur (Buldeo Rai, Verlinde and Macharis, 2019b). Gevaers, Van de Voorde and Vanelander (2009) identified the main problems of last mile:

- For home deliveries, many failed deliveries can happen due to not-at-home effect and delivery is organised during working hours, this results extra costs, kilometres, and emissions,
- In case of door-to-door deliver, empty running can be an issue meaning that many vans or trucks are running almost or completely empty,
- Security issues can arise due to the fact that a signature is needed during taking over delivery,

- For some regions, due to the small amount of goods, profitable and efficient routing plan cannot be generated,
- Most deliveries are done by small vans which means that the carbon footprint per kg is higher than that of transport by a bigger truck.

Many innovations appeared to improve sustainability in last mile transport, but the actual implementation is still not in practice in many areas which have a lot of reasons. First of all, retailers do not offer sustainable delivery options for customers. Customers pick the so-called green opportunity if they have plenty of options are offered. Second of all, many customers cannot make environmentally friendly decisions even if they have a wide range of options because they do not want to give up on good quality, low costs, and convenience (Buldeo Rai, 2019). In 2013, the DHL Logistics Trend Radar speculated that within 5 years, consumers can customize their deliveries not only in terms of price, time, and location but also in terms of greenness and fairness. Other research also highlighted consumers' considerations about environmental and social dimensions of their deliveries. According to an e-commerce study, 27% of the respondents were considered as Conscientious Shoppers because they were aware of the societal and environmental impact of deliveries (Ignat and Chankov, 2020).

As mentioned before, omnichannel retail is more flexible in terms of customers' shopping journeys. As a result of this, more than one last mile option is offered to the consumers. A one-size-fits-all strategy is not able to serve a heterogeneous consumer market so it should be exceeded due to the fact that customers and their purchases differ thanks to the variations that influence the delivery needs. Consumers need to be led towards a sustainable last mile option, e.g., Buldeo Rai, Verlinde and Macharis (2019b, p. 50.) suggest that *“a strategy which is a combination of free order collection in-store or a small charge for delivery to an address of choice, or slow delivery free of charge to an address of choice and fast but paid delivery to an address of choice”*. According to Ignat and Chankoc (2020) there are two ways to reduce the carbon emissions: to take operational measures (e.g., retailers use more energy efficient transportation) or to influence customers to have a more sustainable behaviour e.g., a longer delivery window results in more environmentally sustainable delivery, so customers need to be encouraged to accept longer delivery windows.

The last mile option preferred by consumers is the delivery to an address of choice and there are some trade-offs: when there is free delivery and free return, customers are willing to wait longer for their order. In terms of sustainability, collection points are most beneficial from an environmental perspective, but only when consumers walk, bike, or are on the route of a

multi-purpose trip. Deliveries at home have the second-lowest environmental impact but it depends on if the customers travel for pre-purchases activities like product research or testing. *“It also depends on the party executing the deliveries. In this respect, crowdsourced deliveries are unfavourable. As the crowd makes dedicated trips, the environmental impact of deliveries multiplies as compared to deliveries by logistics service providers.”* (Buldeo Rai, 2019, p. 12.).

2.5. International research examples on the topic of sustainable omnichannel retail and sustainable omnichannel retail attitudes

There are some studies investigated the needs of customers about last mile transport, but this territory is still unknown and uncharted. Usually, customers would like free and fast delivery at home. However environmental sustainability is gaining more and more significance in their purchase decisions, though the topic has less attention concerning customers' last mile transport decisions. Therefore, environmental issues play less role currently (Buldeo Rai, Verlinde and Macharis, 2019b). This chapter summarizes the most important surveys and research in connection with omnichannel retail and sustainability. Many studies are focusing on sustainability communication (e.g., Gonzalez-Lafaysse and Lapassouse-Madrid, 2016) and the relationship between supply chain management and sustainability (e.g., Bask et al., 2013; Quarshie, Salmi and Leuschner, 2016) but only a limited number of research focus on the topic of sustainable omnichannel. This section presents three studies which have a focus on the connection between omnichannel and sustainability both from customers' and retailers' point of view.

Sousa et al. (2021) investigated the topic of omnichannel retail from companies' points of view and they conducted focus group research with top executives of three Brazilian retailers regarding their omnichannel strategies. All three companies considered sustainability in their strategy and principles. Executives highlighted the benefits of the omnichannel model concerning sustainability. All participants mentioned the reduction of CO₂ emissions in transportation and distribution activities for many reasons. According to the respondents, omnichannel logistics became important for reducing emissions during transportation and distribution for three reasons. Firstly, they introduced new service modalities and customers got used to them very quickly. It resulted in more efficient shipping since it takes advantage of the natural supply route from the store to provide the service and improve vehicle occupancy. Secondly, the retailer can become a digital marketplace platform and start to offer its logistical services to sellers who sell on the platform. Efficiency and reductions in

transportation emissions were observed. And thirdly, due to the fact that better service is needed, retailers had to bring stock closer to the customers and avoid fragmented home delivery. Moving closer to the consumers and fulfilling orders from that location made the use of logistical capacities more efficient and it was possible to schedule deliveries better and fill the vans.

In today's omnichannel retail environment, retailers are constantly looking for ways to make the last mile more cost-effective, sustainable, and enjoyable for customers. Buldeo Rai, Verlinde and Macharis (2021) highlighted in their work that crowdsourced logistics or crowd logistics can be an innovation in this respect. They set up a representative online survey among a sample of one-thousand consumers. The sample was representative for the Belgian population according to age, gender, degree, language, family composition and social class. Regarding the online shopping activity, most respondents (58.5%) order at least every three months a product online, one fifth (21.5%) monthly and a minority (5.4%) weekly and only 6% of the customers mentioned that they use the internet less than once a year to make a purchase. Their research also revealed a link between purchase frequency and customer age, younger consumers are using the internet for purchases more frequently. The most popular products ordered online were clothing, shoes, and accessories (23.4%), electronics (12.1%) and beauty and healthcare products (12%) while alcoholic beverages (1.8%), food (3.7%) and furniture and decoration (3.9%) were less attractive. Regarding delivery, 67% of the respondents ordered product with home delivery, 11.5% of the customers ordered products to collection point while 5.9% of them to their workplaces. Retailers' stores (4.3%) and automated lockers (0.5%) are used the least. One fourth of consumers (24.7%) has had a negative experience with delivery at home. In case of delivery failure, 47.4% of respondents prefer to pick-up their order in collection points or 30% at someone who lives in their neighbourhood, while 15.2% prefers to get the order redelivered at home. What's clear from the analysis is that consumers' interest for crowd logistics is low, however, crowd logistics' success depends on consumers' acceptance. A crowdsourcing model that incorporates pickup at neighbours ("*neighbour relays*") and delivery by retailers' personnel has sparked the most interest. The most traditional crowd logistics strategy, which relies on non-professional drivers, generates less enthusiasm. A crowdsourced last mile can capture 19.2% of consumer interest. These customers are more likely to shop online and use home delivery services. Furthermore, in the event of a delivery failure, they prefer to rely on their neighbours. When ordering online, customers are more interested in last-mile technologies and have a more

favourable attitude toward sustainability upgrades. Many respondents (29.3%) are neutral about crowdsourcing the last mile.

Buldeo Rai, Verlinde and Macharis (2019b) made a choice-based conjoint analysis which was based on a survey that had been conducted among a sample of one-thousand consumers. The survey shows that approximately half of the people take their environment into account during their purchases, and they agree that fewer vehicle kilometres of the last mile is important. Consumers experience limited nuisances from local delivery because they think that reducing vehicle kilometres, in general, is more important than reducing kilometres in their neighbourhood. Customers are more worried about these activities' overall negative impacts. To reduce vehicle kilometres is possible by using pick-up points instead of home deliveries and by increasing delivery time. The survey also found out the customers are not willing to pay more for sustainable delivery alternatives such as electric vehicles or cargo bikes and they also resist new technologies which are unfamiliar and unproven for them. The consumers are not willing to pay more although they are not willing to wait long either. The survey showed that the customers do not have an interest in or knowledge about sustainability in last mile delivery, they know a little about the environmental impact of deliveries, although knowledge is an important factor in green decisions. Possibly, some customers can be convinced to make more sustainable decisions, and they are willing to choose environmentally friendly options when negative impacts are clear. According to the study, the most important attributes to consumers in order are delivery price, return possibility, delivery term, and delivery reception. Customers prefer free and next-day delivery to an address of choice, on regular office hours during the week, and with a free return possibility in a local pick-up point.

3. Presentation of secondary and primary research

In this chapter, in addition to the description of the secondary research, the results of the primary research are also presented. The primary research was conducted with the help of a survey programmed in Qualtrics. In order to facilitate the understanding of the numerical data revealed during the quantitative research, a small number of in-depth interview research was also conducted. The quantitative questionnaire and the qualitative guide can be found in the Appendices (6.1. and 6.2.).

3.1. Global trends in sustainability and omnichannel retail

In this paragraph recent data and research are analysed made by Statista. The aim of this section is to give an overview of the current omnichannel retail market and the relationship between the omnichannel retail and sustainability.

Secondary research is the data that has been collected for purposes other than the specific problem. Secondary data has already been collected to solve some other problems. Malhotra and Simon (2016) specified the advantages and disadvantages of secondary research in their work which is summarized in Table 3. The advantage of secondary research is that this data can be accessed quickly and cheaply. The downside of the secondary research is that the usefulness of the data for solving the present problem can be limited in several ways, especially in terms of relevance and accuracy. It might happen that for the purposes of the current situation, the previous purpose, and the method of collecting secondary data and the content of the data are not appropriate. Secondary data may be inaccurate or not completely up-to-date and unreliable. Before accessing secondary data, these factors need to be evaluated but a prerequisite for collecting primary data is to examine the secondary data available.

Table 3: The advantages and disadvantages of secondary research (own editing based on Malhotra and Simon, 2016)

Advantages	Disadvantages
• Helps in identifying the problem, • Better definition of the problem, • Helps to approach the problem, • Easier to design the research plan (e.g.: identifying key variables), • Answers certain research questions and testing hypotheses, • More accurate presentation of the primary data.	• Limited solution for the present problem, • Problems with relevance and accuracy, • Not appropriate data for current research in terms of purpose and method of collecting data or the content of the data, • Inaccuracy, question of up-to-date or reliability can be an issue.

3.1.1. Recent omnichannel retail trends in the era of COVID-19

The first part of the chapter summarizes the general omnichannel trends before and under the current epidemic period and trends in relation to last mile delivery are also observed. The rest of the chapter presents current data and research on sustainability in e-commerce and omnichannel retail. Data are taken from the last five years. The chapter aims to provide a comprehensive picture of current sustainable omnichannel trends both from retailer and customer perspective.

General omnichannel trends

The importance of having an omnichannel strategy worldwide is represented in Figure 4. According to a survey made from August to September in 2017 and based on 352 respondents representing many of the largest retailers and brands worldwide, 67% of retailer and brand

respondents expressed that having an omnichannel strategy was either critical or important to their company (Sabanoglu, 2020a).

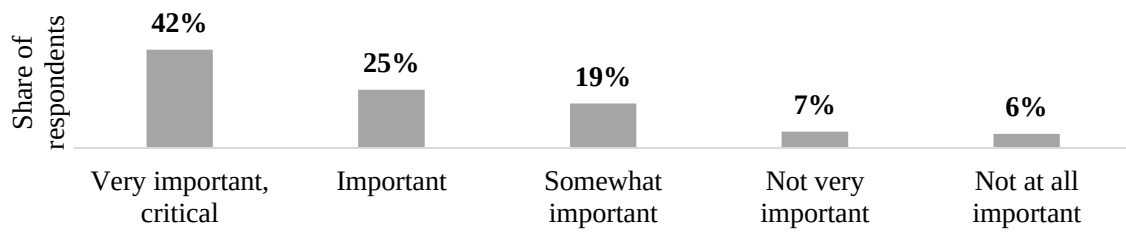


Figure 4: Importance of having an omnichannel strategy worldwide as of 2017 (Sabanoglu, 2020a)

Figure 5 shows that 100-e-commerce decision-makers were inquired how vital the omnichannel strategy will be for the company in 2021. The study made in October 2020 uncovered that nearly one in two e-commerce decision-makers in Europe and North America accepted that omnichannel techniques will be exceptionally critical in 2021. Moreover, 20% of the respondents specified that omnichannel retail will be very imperative in trade in 2021 (Chevalier, 2021).



Figure 5: Level of importance attributed to an omnichannel strategy for e-commerce companies in North America and Europe in 2021 (Chevalier, 2021)

So, it can be seen from the two figures shown above that omnichannel strategy gained importance not just under the COVID-19, but decision-makers also thought that it is and will be significant in the next years as well.

Staying at the retail sector and its representatives, in 2017, 352 respondents representing many of the largest retailers and brands in the world were asked what omnichannel means to them (Figure 6). Two-thirds of the respondents highlighted that omnichannel could be a complex concept and it alludes to working in several sales channels; offering a smooth customer experience across all sales channels used; and having marketing strategies which are focused on driving sales in any channel (Sabanoglu, 2020b).

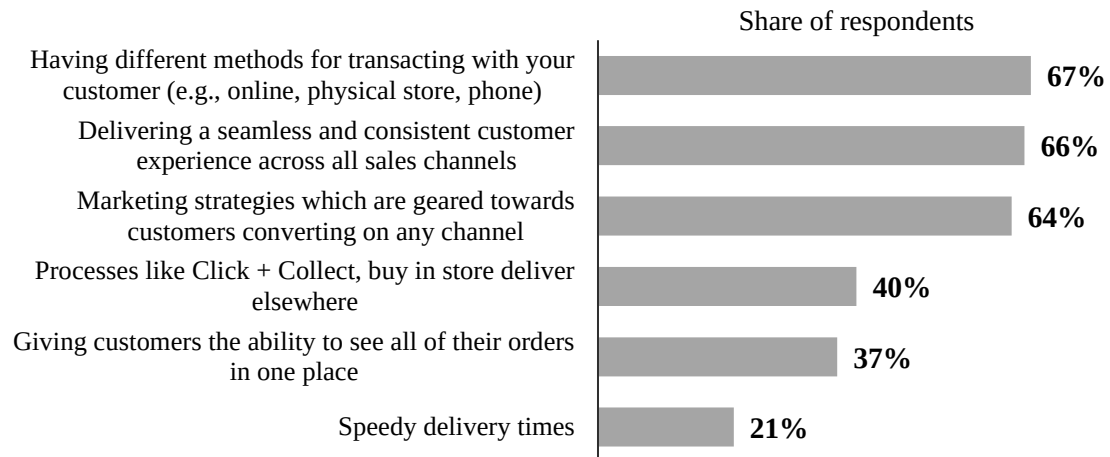


Figure 6: Meaning of omnichannel to retailers and brands worldwide as of 2017 (Sabanoglu, 2020b)

Recent trends in connection with last mile delivery

Regarding the size of the global last mile delivery market, by 2027, the global last mile delivery market is expected to grow to more than 200 billion U.S. dollars from nearly 110 billion U.S. dollars in 2020 (shown in Figure 7). The growth of the last mile delivery market is led by the increased number of online orders (Placek, 2022a).

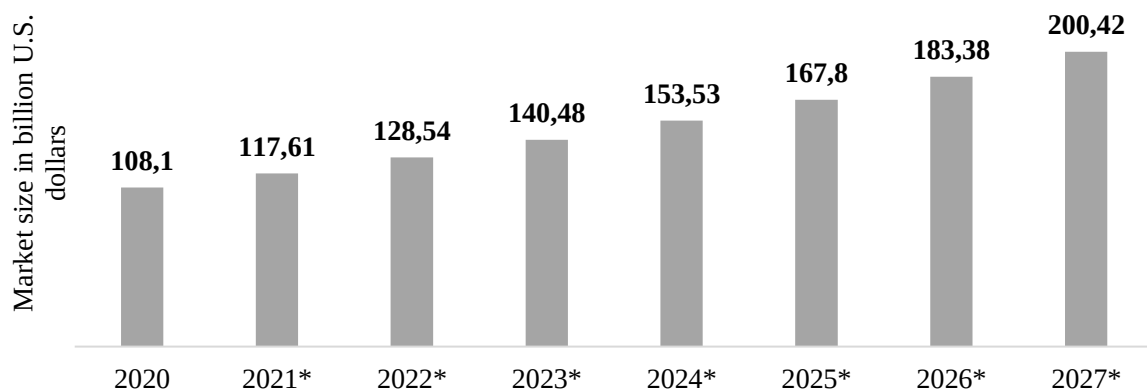


Figure 7: Last mile delivery market size worldwide 2020-2027 (Placek, 2022a)

Figure 8 and Figure 9 shows two survey which were conducted in the U.S. and in the U.K. in February 2021. 1,028 U.S. and 1,044 U.K. citizens took part in the survey. 48% of the U.S. respondents and 68% of the U.K. respondents answered that they order online more due to the COVID-19 pandemic. 40% of the U.K. respondents mentioned the packing waste coming from deliveries is bothering them while this number is lower among the U.S. respondents (22%) (Kunst, 2022a and Kunst, 2022b).

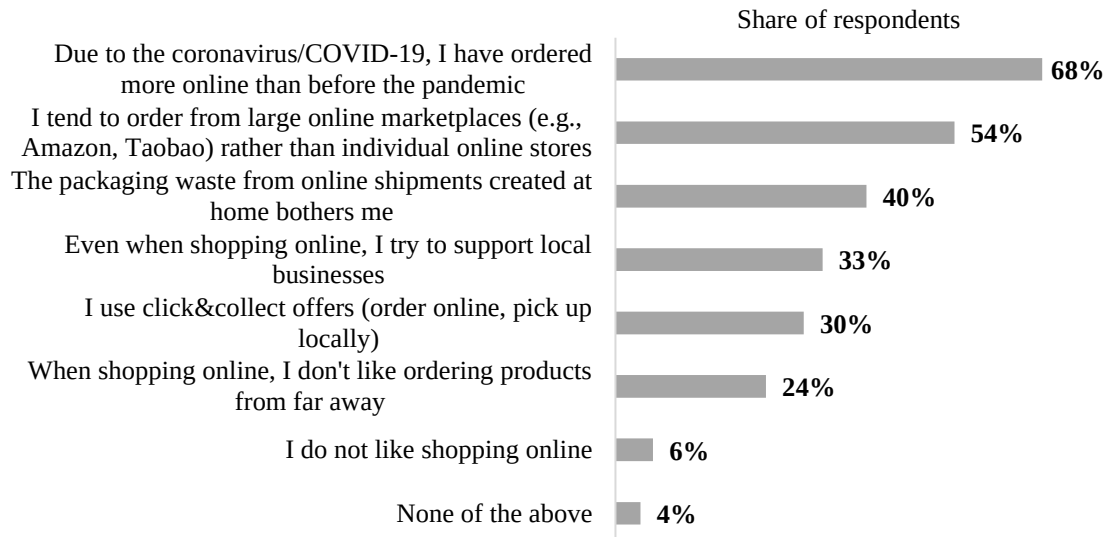


Figure 8: Attitudes towards eCommerce in the U.K. in 2021 (Kunst, 2022a)

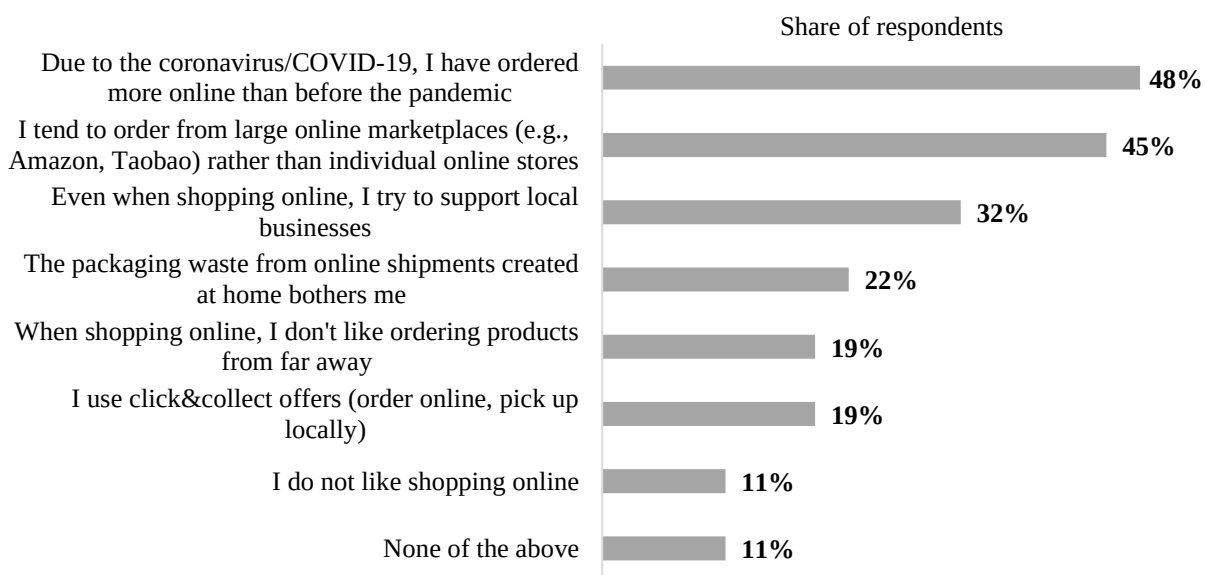


Figure 9: Attitudes towards eCommerce in the U.S. in 2021 (Kunst, 2022b)

According to Mazareanu's research (2021), last mile delivery costs comprised the highest share of supply chain costs in 2018. A survey conducted from October to November in 2018 found that they comprised 41% of the overall supply chain costs for the businesses overviewed. This compares to 13% for warehousing presented in Figure 10. Last mile delivery includes journey of goods from a transportation hub to a final delivery point, usually a personal residence. 500 grocery retailers and consumer product firms participated in the survey from Netherlands, Germany, France, United Kingdom, and United States (Mazareanu, 2021).



Figure 10: Share of total supply costs worldwide in 2018, by type of cost (Mazareanu, 2021)

Regarding the most used package delivery methods around the world, 61% of respondents chose home delivery, either at their door or in their mailbox, as their delivery method (shown in Figure 11). Pick-up points (like Post office, Postal service point or Parcel lockers etc.) were less popular among the researched people (Placek, 2022b). However, another global survey (Figure 12) shows that parcel lockers and pick-up and drop-off (PUDOs) will grow the fastest among the main last mile delivery methods. Besides parcel lockers and PUDOs, there are other delivery methods like in-car delivery or in-home delivery (Placek, 2022c). The global survey about the most use delivery methods took place in October 2021 and 33,179 respondents took part in the research (Placek, 2022b), while the while the fastest growing delivery method research took place from January to February in 2020 and 200 respondents took part in it (Placek, 2022c).

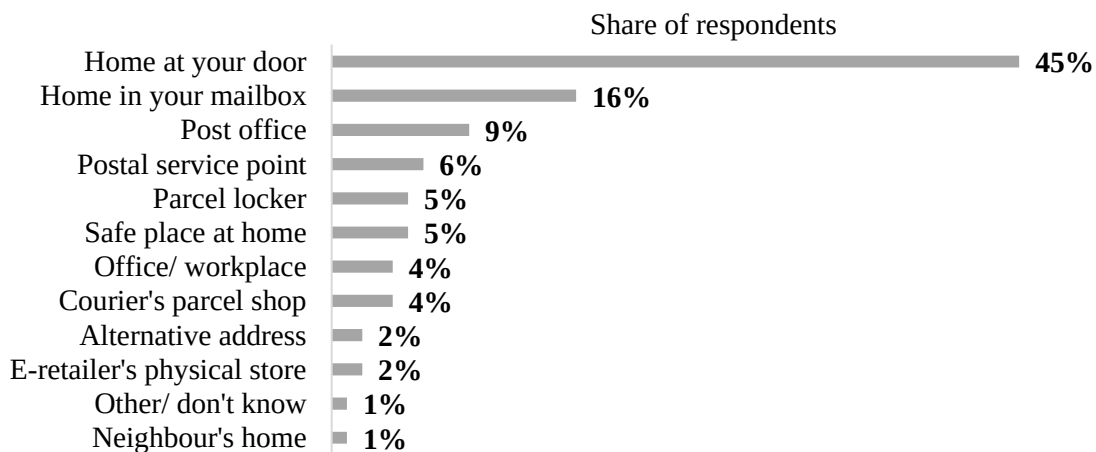


Figure 11: Package delivery methods used around the world 2021 (Placek, 2022b)

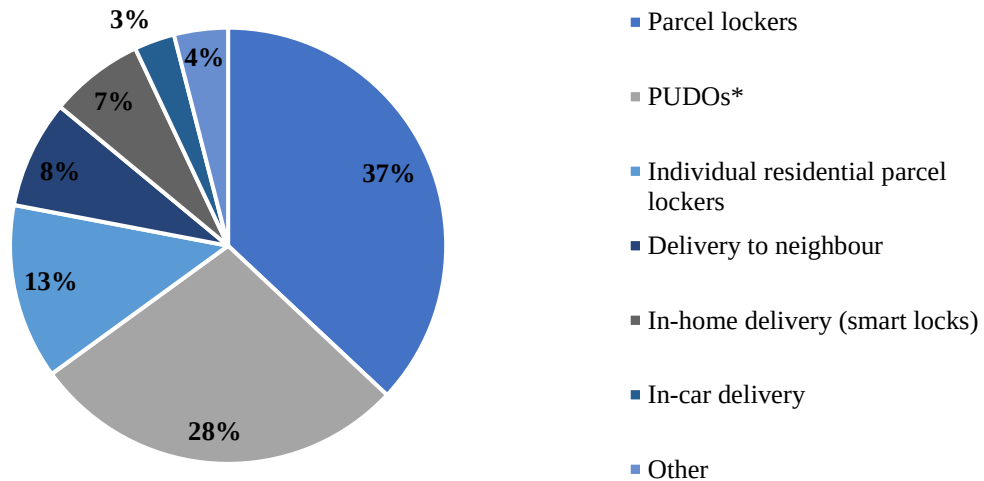


Figure 12: Last mile delivery methods that will grow fastest 2020 (Placek, 2022c)

3.1.2. Sustainability trends in e-commerce and omnichannel retail

The first thing what we can think of if we are talking about sustainability in connection with e-commerce and omnichannel that the biggest problem is the CO₂ emissions. But besides that, many other issues can arise e.g.: ethical considerations, packaging waste etc. In this chapter, data and figures are shown about these challenges and the relevance of the sustainable delivery from the customer perspective.

The global transportation segment may be a major polluter and in 2020 produced roughly 7.3 billion metric tons of carbon dioxide (CO₂) emissions (Figure 13). Passenger cars were the greatest source of emissions that year, accounting for 41% of worldwide transportation emissions. In recent decades, worldwide CO₂ emissions from passenger cars have expanded and topped at 3.2 billion metric tons in 2019. Car emissions fell in 2020, but this was because of the epidemics. Medium and heavy trucks are the second-largest polluters, accounting for 22% of transportation emissions. Despite that this was half the emissions of passenger cars, there are significantly less trucks on the street. In 2020, heavy-duty truck CO₂ emissions reaches nearly two billion metric tons. The United States is producing the most transportation related emissions around the world. Between 1975 and 2007, U.S. transportation sector CO₂ emissions expanded 56% to over two billion metric tons. In spite of the fact that emissions started to decrease, they expanded once more to reach 1.9 billion metric tons in 2019. COVID-19 also affected U.S. emissions, causing them to fall to nearly 300 million metric tons in 2020 (Tiseo, 2021a).

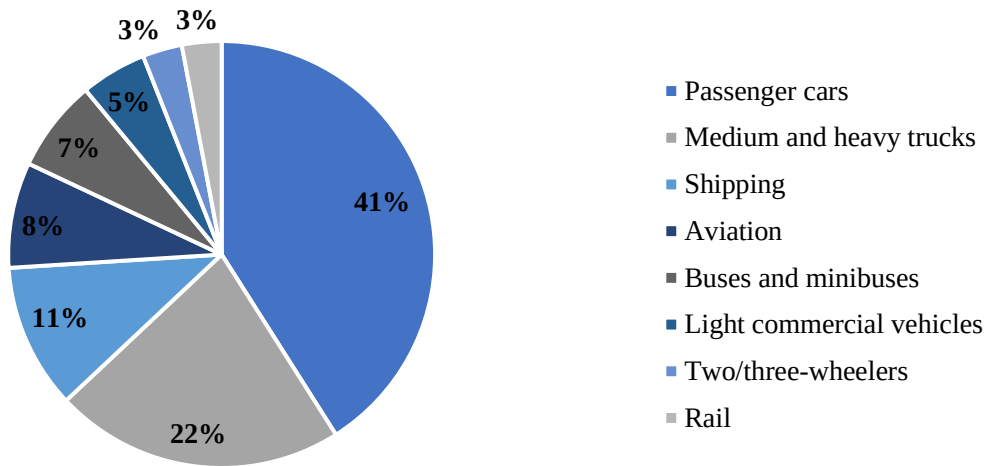


Figure 13: Distribution of carbon dioxide emissions produced by the transportation sector worldwide in 2020, by subsector (Tiseo, 2021a)

The packaging of goods accounts for the majority of greenhouse gas emissions generated by the e-commerce business, accounting for around 45% of total estimated emissions. Package returns account for nearly a fourth of total e-commerce emissions, according to simulations. The worldwide research, which was made in 2020, builds on earlier findings to develop hypotheses regarding consumer behaviour, the logistics ecosystem, and consumer transportation (Coppola, 2022). The e-commerce emissions breakdown can be seen in Figure 14.

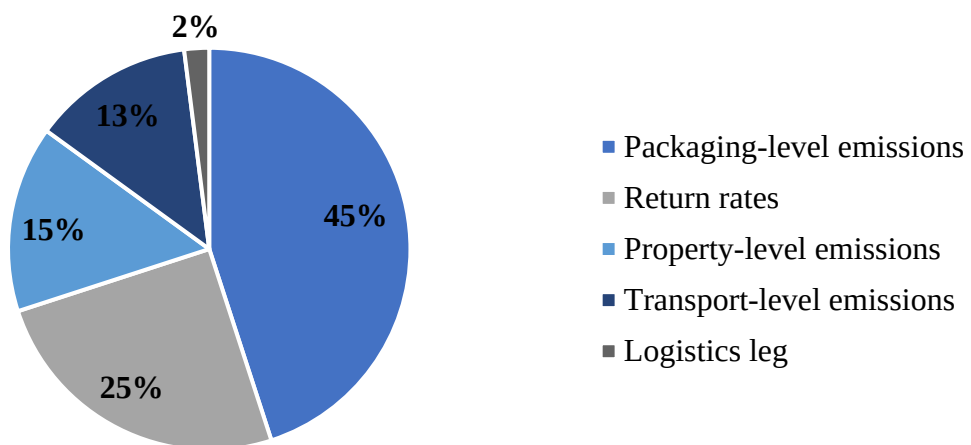


Figure 14: E-commerce emissions breakdown 2020, by source (Coppola, 2022)

The last-mile delivery of online orders is included in the carbon footprint of e-commerce operations. The emissions generated by the delivery of a typical non-food product in selected European nations were examined in Figure 15. In various product categories, the United

Kingdom has the highest emissions per last mile delivery of those listed. A fashion product for example generated an average of 264 grams of CO₂ emissions (Coppola, 2021a).

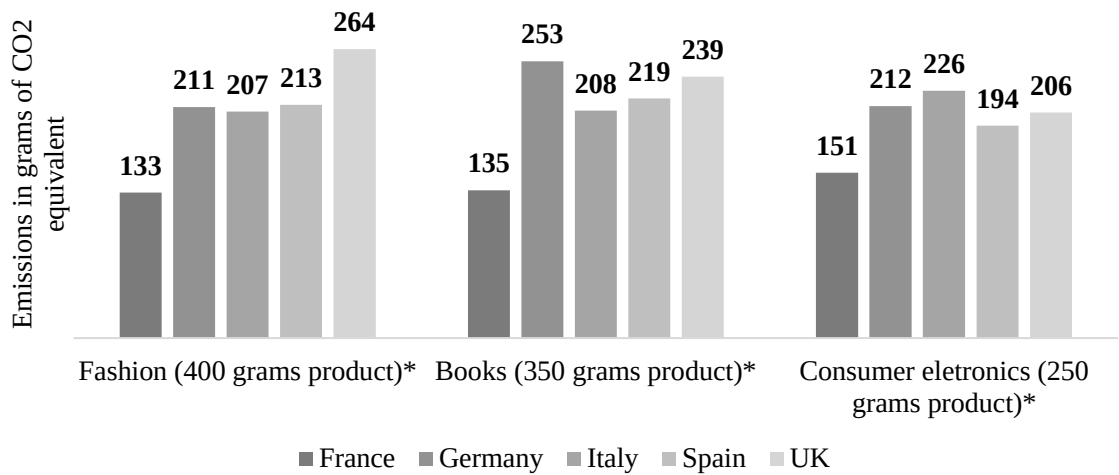


Figure 15: Emissions from last mile delivery of non-food online purchases in Europe 2019 (Coppola, 2021a)

Figure 16 concludes why it is very important to look at the greenhouse gas emission of e-commerce companies. By 2030, the predicted environmental effect of e-commerce logistics in the world's top 100 cities would be significantly higher. By the end of this decade, the delivery car fleet might number 7.2 million cars, with total CO₂ emissions from parcel and freight shipping expected to reach 25 million tons. In addition, from 53 minutes in 2019 to 64 minutes in 2030, the average commuting time, including last-mile deliveries, is predicted to grow (Coppola, 2021b).

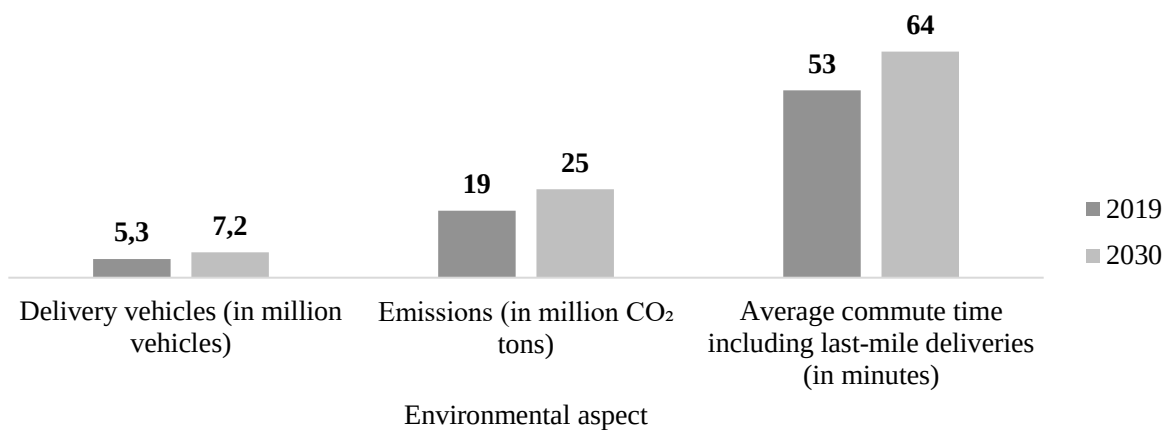


Figure 16: E-commerce environmental impact worldwide 2019-2030, by type (Coppola, 2021b)

Regarding packaging waste, according to Tiseo (2021b), the main e-commerce polluters were China and the United States in terms of plastic packaging (shown in Figure 17). China produced 221,5 million kilograms of plastic packaging while the US produced 2017.5 million

kilograms. In 2019, the amount of plastic packaging waste generated by e-commerce activity was estimated to be 942 million kilograms worldwide.

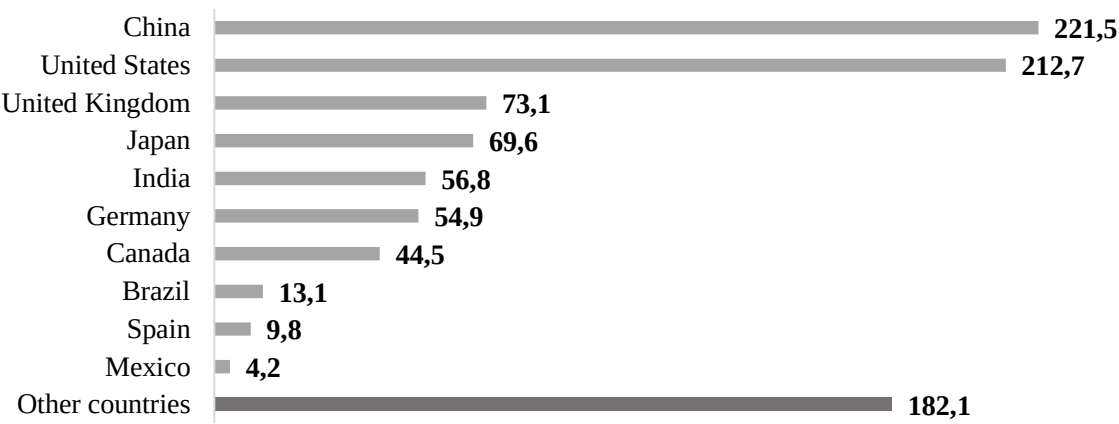


Figure 17: E-commerce plastic packaging waste 2019, by country (Tiseo, 2021b)

An online survey made in the US in March 2021 with 1137 respondents, stated that sustainable packaging is a critical factor affecting customers' online shopping decisions in the United States (Figure 18). Sustainable packaging made at least four out of ten online buyers desire to shop from firms online, according to the poll. Free samples, on the other hand, were welcomed by 34% of respondents, while personal messages in the package were preferred by 5% (Coppola, 2021c).

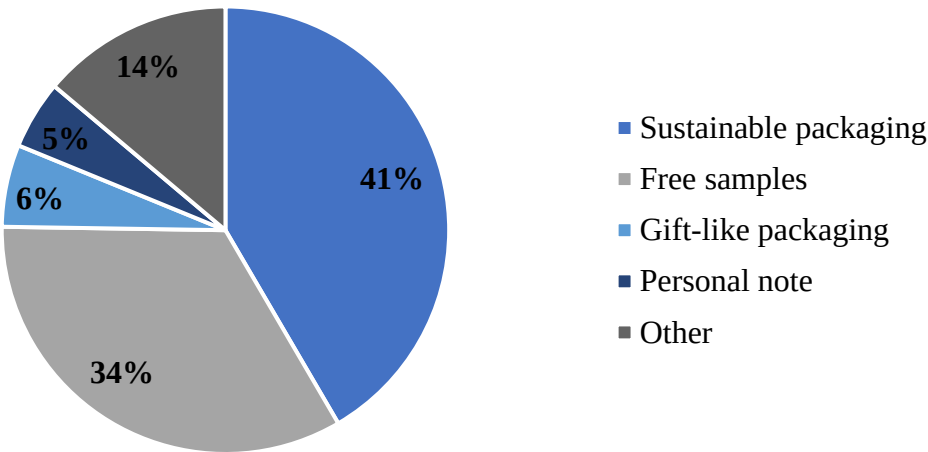


Figure 18: Packaging impact on digital shopping behaviour in the U.S. 2021 (Coppola, 2021c)

The conclusions of a 2020 industry professionals survey on the most desired last mile services from retailers are depicted in Figure 19. According to the survey, 48% of the respondents think that the customers want to choose the delivery slots and 42% of them believe that their

clients would prefer free delivery and real-time updates. Only 14% thinks that their customers would like to have an eco-efficient delivery option. The survey was filled in by 314 respondents from which 152 were solutions providers, 84 were logistics providers and 78 were retailers and respondents were able to choose 3 answers (Mazareanu, 2022).

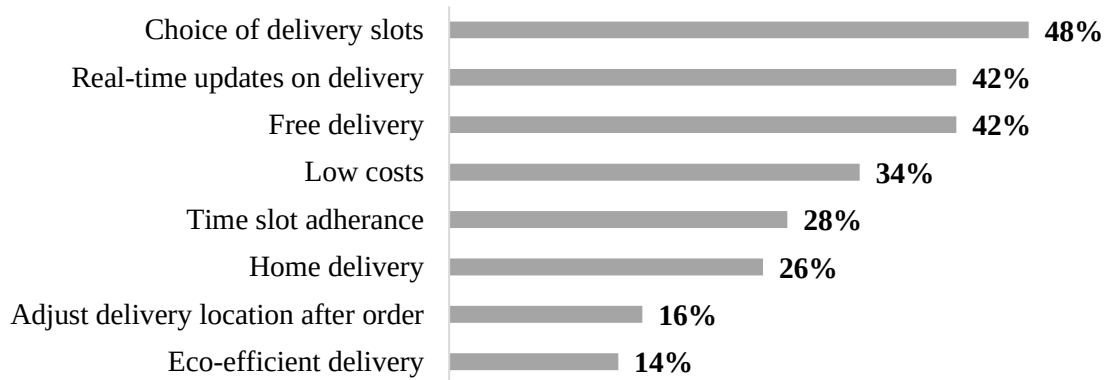


Figure 19: Customers' wishes on last mile services from retailers 2020 (Mazareanu, 2022)

963 US citizens who made online purchases were asked about the most important delivery criteria in February 2021. The displayed data in Figure 20 and Figure 21 shows that in the U.K. where 1,028 respondents with the same characteristics were asked, free shipping is the most important criterium but the second most relevant is free return shipping. Regarding the environmental criteria, little packing waste (38%) and environmentally friendly packing (32%) are quite important to citizens, but CO₂ neutral shipping (12%) was also more important for consumers living in the U.K (Kunst, 2022c). Regarding the U.S, 72% of respondents answered that free shipping was the most important criterium. Environmental criteria such as environmentally friendly packaging (25%), little packing waste (22%) and CO₂ neutral shipping (9%) were less significant for U.S. respondents (Kunst, 2022d).



Figure 20: Important delivery criteria in the U.K. in 2021 (Kunst, 2022c)



Figure 21: Important delivery criteria in the U. S. in 2021 (Kunst, 2022d)

Secondary trends have supported the fact that omnichannel retail and shopping and its sustainability aspects are of paramount importance to both retailer and consumer. As it can be seen in the last four charts, free shipping is the most attractive to consumers regarding delivery features. However, it is important to emphasize that in all four cases the issue of sustainability arises, e.g., in the form of sustainable packaging, eco-efficient delivery or CO₂ neutral shipping. So, there is a growing demand from consumers for sustainable delivery and packaging alternatives. Secondary research confirms that it is worth addressing this topic, as its practical significance holds great potential for the future.

However, a major disadvantage of secondary data is that they are not representative and not all are globally focused or have little local focus. For this reason, not all results can be generalized. The other disadvantage of secondary that the data collection and analysis was that there was no general data set at the Hungarian or even European level.

3.2. Defining and justifying the research methodology, describing its advantages and disadvantages

The present research can be divided into two parts. In the first part, the data and secondary information required for the analysis were systematized, and the research process was planned and prepared, on the basis of which the research framework concept was developed. Building on this, the second phase includes a quantitative research phase providing generalizable results and an in-depth interview research. The next chapters present the used qualitative and quantitative methods and their advantages and disadvantages.

3.2.1. Quantitative research and PLS-SEM

Quantitative research is a research methodology that quantifies data and generally uses statistical analysis. The advantage of the online questionnaire is that the respondent does not

answer the questions in an unusual or possibly uncomfortable interview situation but fills in the questionnaire in his / her usual environment, at his / her own pace. It can lead to honesty, bolder acceptance of opinions, the respondent feels less that he or she should meet perceived or real social expectations. It shortens the time of fieldwork and reduces its cost, but at the same time reduces the willingness to respond (Malhotra and Simon, 2016).

Since the main aim of the research was to understand consumer behaviour, an online questionnaire was sent to customers. The questionnaire data collection took place between 04/02/2022 and 26/02/2022. The questions are included in 6.1. Appendix. During the convenience sampling, 427 people opened and started the questionnaire but only 203 respondents was relevant for the research. The population of the research consisted of those consumers who have purchased clothing, cosmetics, or entertainment electronics in the past one year. Only fully completed questionnaires were analysed because modelling is sensitive to missing values. The questionnaire was shared in different Facebook groups focusing on the topic of environment or sustainability or general topics. The questionnaire can be divided into 8 groups. The first part included the screening question the target group of the research were people who bought clothes, cosmetics, or consumer electronics in the past year. The aim of the screening question was focusing and narrowing. The categories were chosen based on Buldeo Rai, Verlinde and Macharis (2021) research since these three categories were the most popular in terms of online shopping. The second category was focusing on general shopping behaviour regarding the three categories mentioned above. The third and the fourth section was focusing on the delivery and returning preferences while the fifth, the sixth and the seventh groups were focusing on sustainability behaviour (sustainable shopping behaviour, sustainable omnichannel behaviour and sustainable behaviour in general). The last section was focusing on demographical questions.

Due to the fact that the used method for analysing the collected data was PLS-SEM, the collected data was analysed with the help of Adanco software. The Structural Equation Method (SEM) is a popular multivariate analysis tool in the field of marketing research. It allows the exploration of latent variables and the relationships between them (Kemény, Kulhavi and Kun, 2022). Simultaneous factor and regression analysis can be performed with the model of structural equations. SEM implements both the generation of latent variables from indicators and the examination of relationships between latent variables (Kazár, 2014). The two main directions of the method are variance-based (PLS) and covariance-based (CB). The two methodologies differ in a number of areas, but the literature often distinguishes

between the two methods in that covariance-based modelling is typically used to validate a well-founded theory, while the variance-based model is primarily used for predictions by researchers. The correlations between the theoretical constructions can be estimated with it, it also allows the testing of theories and also provides a graphical representation as a tool, the interpretation of which is possible even for those who do not know the deeper contexts of the methodology (Kemény, Kulhavi and Kun, 2022).

3.2.2. Qualitative research with the help of in-depth interviews

Another research method chosen in addition to the questionnaire survey is the in-depth interview. This is a qualitative research method, which helps to understand what respondents think, what their motivations are and gives answers to questions such as “*how?*” and “*why?*”. The qualitative approach focuses on understanding the problems (Gyulavári et al., 2017). It is an unstructured, exploratory research method that is based on a small sample and serves to understand the problem. The in-depth interview is an unstructured, direct, personal interview in which a highly qualified interviewer talks to a single interviewee with the goal of revealing his or her motivations, views, attitudes, and feelings about a particular issue (Malhotra and Simon, 2016). The aim of the methodology is to get to know the deep-seated causes, explanations, and underlying thoughts. The in-depth interview method also provides an opportunity to understand the dynamics of opinion formation. The advantage of qualitative methods is that they are flexible, there is no single implementation, they are characterized by a high degree of research freedom, and they can be carried out in a relatively short time. However, in addition to their many advantages, they also have disadvantages, including a non-quantifiable response and a lack of representativeness. The selection of the right respondents provides a good sample, but this requires a screening questionnaire, which can be used to filter out potential interviewees with the help of demographic characteristics, brand use, and attitudes. It is important that the sample is not too specific and the reasons for exclusion should be identified at the beginning. (Gyulavári et al., 2017). Table 4 summarizes the main characteristics of the study’s quantitative and qualitative research. The questions are included in 6.2. Appendix.

Table 4: Summary of research methodology (own editing)

Research method	Online questionnaire	Qualitative interviews
Description of research	The aim of the online research is to explore the relationship between sustainability and omnichannel behaviour from a consumer perspective.	The aim of the interview research is to understand the deeper motivation of the numerical correlations revealed during the quantitative analysis.
Number of respondents	427	6
Sample size	203	6
Date of data collection	04/02/2022-26/02/2022	21/03/2022-25/03/2022
Method of analysis	PLS-SEM (Adanco), descriptive statistics (SPSS)	In-depth interview analysis
Hypothesis tested/Research questions	H1, H2, H3, H4, H5, H6, H7, H8, H9, H10	R1, R2, R3

3.2.3. Research questions, hypotheses, and assumptions

With the questionnaire, the relationship between sustainability and omnichannel behaviour and consumer opinion on the topic were mapped. In addition to sustainable behaviour and shopping, delivery and return preferences were also included among the examined constructs. Based on the literature published in academic journals on the topic of omnichannel and sustainability, the model using the PLS-SEM methodology was established, which was analysed with Adanco software. The PLS-SEM methodology is excellent for evaluating such models. The application of traditional PLS-PM to reflective measurement models has its limitations: the factor weights between the observed and latent variables are overestimated, and the paths between the latent variables are skewed (Gefen, Rigdon and Straub, 2011). The present research uses PLSc, also known as consistent PLS, which, like CB-SEM, reduces the likelihood of first and second type error. An additional advantage of this method is that it does not give an unreasonable amount of false positive results even for non-normally distributed data. Prior to the creation of the PLSc algorithm, experts suggested the use of covariance-based methods in analyses based solely on reflective measurement models, but today several simulations prove that the use of PLSc is acceptable in such cases (Kemény, Kulhavi and Kun, 2022). The conceptual model used during the research can be seen in Figure 22.

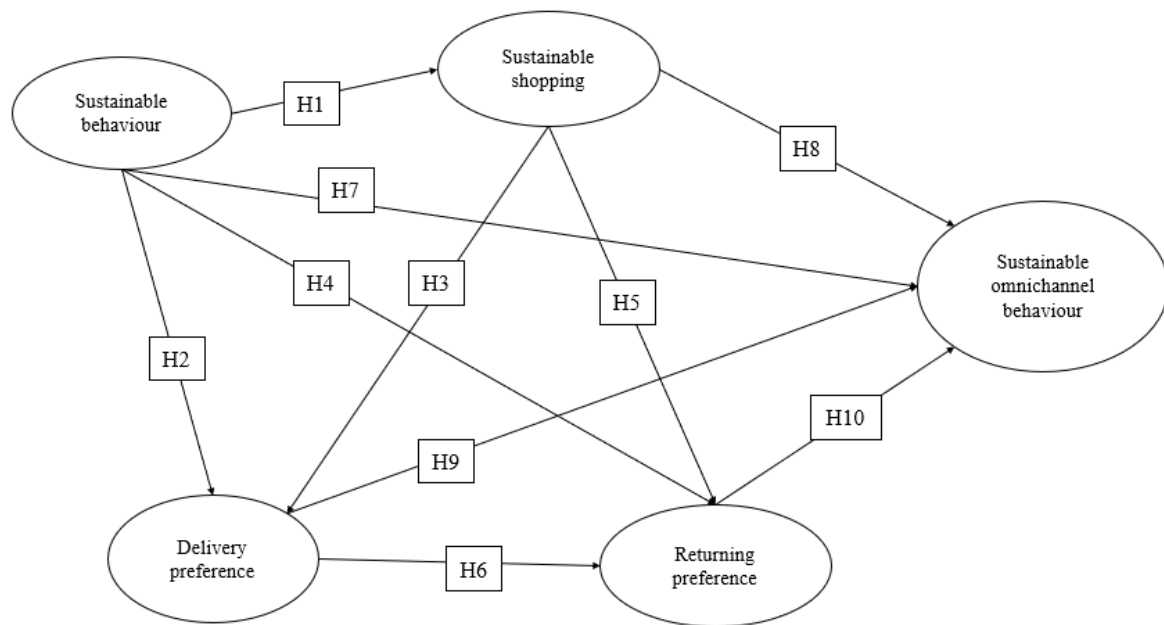


Figure 22: The conceptual model (own editing)

The sustainable shopping construct measures the extent to which consumers behave sustainably during each purchase (whether online or offline). Part of the scale includes validated questions used in Riley and Kohlbacher's (2016) research, although the validated scale was supplemented with six more general statements. Sustainable omnichannel behaviour measures the extent to which consumers are willing to make more sustainable purchases during their omnichannel shopping. The construct was built on the basis of a validated scale set up by Buldeo Rai, Verlinde and Macharis (2019b). In the model, these two variables are the main elements, so it is worth addressing them together because all statements included in the constructs are connected to the central question.

However, the other variables were determined individually during the research. Sustainable behaviour variable contains four indicators that are focusing on general aspects of sustainability and sustainable behaviour. Delivery preference variable contains seven indicators which are directly related to sustainable aspects. While returning preference variable includes one item because it is specifically focusing on sustainability. It is important to point out that including all variables would have covers too many different dimensions in the model, so only those aspects were included that were relevant to sustainability.

The description of the constructs of the model is summarized in Table 5.

Table 5: Concepts used in the research and their operationalization (own editing)

Construction	Source	Number of indicators
Sustainable omnichannel behaviour	Buldeo Rai, Verlinde and Macharis (2019b)	10 indicators
Sustainable shopping	Sudbury-Riley and Kohlbacher (2016) and 6 own indicators	16 indicators
Sustainable behaviour	Own construct based on the literature review	4 indicators
Delivery preference	Own construct based on the literature review	7 indicators
Returning preference	Own construct based on the literature review	1 indicator

Based on the model presented in Figure 22, the following hypotheses were formulated:

H1: *Sustainable behaviour has a positive effect on sustainable shopping.*

Environmentally conscious behaviour is a complex phenomenon that includes activities for the benefit of the environment and developing environmentally conscious consumer behaviour is the first step in creating sustainable consumption (Dörnyei et al., 2014). According to them, the environmentally conscious consumer when make purchasing decisions he/she considers the impact of products on the environment. Dudás (2011) also mentioned that environmentally conscious consumption is a purchase that meets the needs at least as much as traditional consumer behaviour but can contribute to reducing waste and lowering the burden on the environment. The view of sustainable consumption became important for customers. They try to act sustainably during their decision-making process (Lehner, 2015) and consumers' sustainable choices influence purchase decisions (Adivar, Hüseyinoğlu and Christopher, 2019). As the result of these academic article, the first hypothesis is that the sustainable behaviour effects positively the customers' sustainable purchases.

H2: *Sustainable behaviour has a positive effect on delivery preference.*

H3: *Sustainable shopping has a positive effect on delivery preference.*

As mentioned earlier, the survey of Buldeo Rai, Verlinde and Macharis (2019b) shows that approximately half of the respondents take their environment into account during their purchases and say that fewer vehicle kilometres of the last mile are important. Customers are more worried about the deliveries' overall negative impact and to reduce vehicle kilometres is possible by using pick-up points instead of home deliveries and by increasing delivery time. Although customers have little knowledge about last mile, but they can be convinced to make

green decisions when the negative impact is clear. Based on this survey two hypotheses were set. Sustainable shopping has a positive effect on delivery since the consumers know the negative impact, they decide sustainably. And own assumption based on previous literature, that if the customer acts sustainably in everyday life, then it has a positive impact on the delivery preference.

H4: *Sustainable behaviour positively influences return preference.*

H5: *Sustainable shopping has a positive effect on return preference.*

H6: *Delivery preference has a positive effect on return preference.*

According to the study of Buldeo Rai, Verlinde and Macharis (2019b), the most important attributes to consumers in order are delivery price, return possibility, delivery term, and delivery reception. Customers prefer free and next-day delivery to an address of choice, on regular office hours during the week, and with a free return possibility in a local pick-up point. So, it can be seen that the returning preference is really important to the customers. Sustainably conscious consumers' choices influence purchase decisions (Adivar, Hüseyinoğlu and Christopher, 2019) and these customers try to contribute to reducing waste and lowering the burden on the environment (Dudás, 2011). Consumer environmental awareness is about achieving ecological consistency in purchasing habits and decisions, being aware that the development, production, distribution, consumption, and use of a product, and even the subsequent stage, have environmental impacts and additional costs, striving to minimize adverse effects and additional costs (Dudás, 2011). So, since the returning option has a strong connection to delivery, I assume that sustainable behaviour has a positive effect on returning preference since these consumers consider the environmental effect of returning a product. Since sustainable behaviour might have a positive effect on sustainable shopping, sustainable shopping can also have a positive effect on returning preference. And since delivery and return possibilities have strong connection, the delivery preference effects positively the returning preference.

H7: *Sustainable behaviour has a positive influence on sustainable omnichannel behaviour.*

H8: *Sustainable shopping has a positive effect on sustainable omnichannel behaviour.*

H9: *Delivery preference positively influences sustainable omnichannel behaviour.*

H10: *Return preference has a positive effect on sustainable omnichannel behaviour.*

According to Sousa et al. (2021, p. 3.), “*adoption of an omnichannel model meets the sustainable demands of various stakeholders (e.g., consumers, government, and partners)*”

since climate changes' and air pollution emissions' primary contributor is transportation. Gevaers, Van de Voorde and Vanelslender (2009) mentioned that the last mile is one of the most expensive, inefficient, and polluting part of the supply chain but it is unclear how omnichannel retailers can create a last mile delivery offer that is both attractive to customers and environmentally sustainable (Buldeo Rai, Verlinde and Macharis, 2019b). As the result of this free and fast delivery and consumers' acceptance of more sustainable last mile transport options have to be investigated. However, the investigation is challenging due to the fact that the consumers prefer good quality, low cost, and convenience while making sustainable decisions. As the result of the literature review, four hypotheses were set. Since sustainable conscious consumers would like to decrease air pollution and the CO₂ emissions during their regular shopping, online shopping, and delivery take-overs, I assume that sustainable behaviour, sustainable shopping, delivery, and returning preferences have a positive effect on sustainable omnichannel behaviour.

3.3. Analysis of the quantitative research and the presentation of results

3.3.1. Demography

A total of 427 people started completing the questionnaire, of which 203 were relevant to the research. 85.2% of the respondents were women so women are overrepresented, but not surprisingly, since experience has shown that they are more likely to fill in questionnaires. 27.1% of respondents were under 25 years of age, 22.2% were between 26 and 35 years of age, 20.7% were between 36 and 45 years of age, and 30% were over 46 years of age. 34.5% of the respondents live in Budapest, 11.8% in county seat or in city with county status, 31% in town, 19.7% in villages and 3% in other residence. 34.5% of the respondents filled in the questionnaire from Budapest, 23.6% of the respondents came from Nógrád county, while 14.3% were from Pest county. A negligible number of submissions were received from the other counties. In terms of education, the majority of respondents, 41.4%, have a bachelor's degree, while 24.1% have master's degree. The majority of those who completed the questionnaire (51.7%) were full-time employees and 20.7% were students. Key demographic information can be found in Table 6.

Table 6: Key demographic information, N=203 (own editing based on own research)

Gender		
	Frequency	Percent
Male	30	14.8

Female	173	85.2
Age group		
	Frequency	Percent
Between 18 and 25 years old	55	27.1
Between 26 and 35 years old	45	22.2
Between 36 and 45 years old	42	20.7
Between 46 and 69 years old	61	30.0
Residence		
	Frequency	Percent
Capital	70	34.5
County seat, city with county status	24	11.8
Town	63	31.0
Large village	8	3.9
Village	32	15.8
Other	6	3.0
Educational attainment		
	Frequency	Percent
Primary School	4	2.0
Secondary School	24	11.8
Vocational high school	20	9.9
OKJ training	18	8.9
Bachelor's degree	84	41.4
Master's degree	49	24.1
PhD	4	2.0
Profession		
	Frequency	Percent
Student	42	20.7
Full-time employee	105	51.7
Part-time worker	12	5.9
Self-employed	14	6.9
Do not work	12	5.9
Other	18	8.9

3.3.2. General shopping habits and omnichannel behaviour

In the multiple response type question (which product was last purchased in the past year), the majority of respondents (89%, 180 people) indicated clothing products, 143 people (70%) purchased cosmetics, and 87 people (43%) purchased consumer electronics products. Figure 23 shows the distribution of respondents.

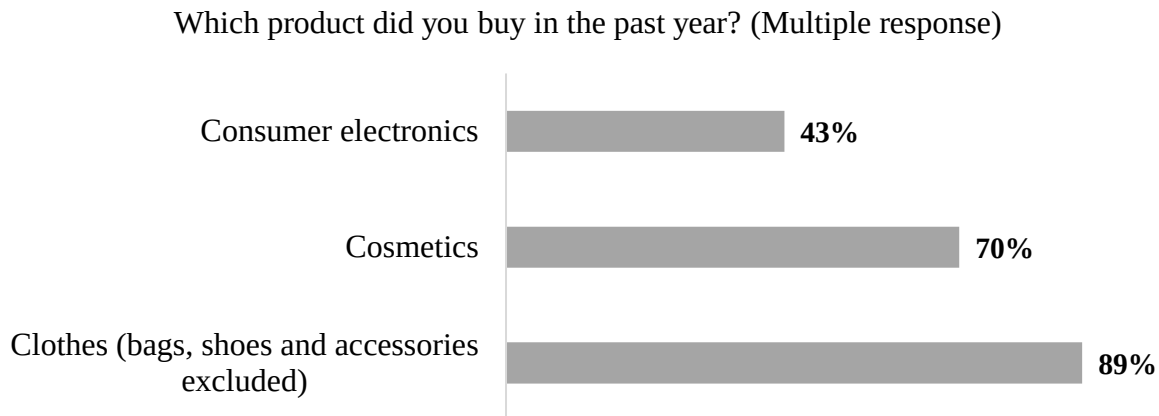


Figure 23: Which product did you buy in the past years? Multiple response, N=203 (own editing based on own research)

More than half (54%) of the respondents bought clothes recently, while 28% of the people purchased cosmetic products and consumer electronics was the least popular among the respondents, only 18% obtained product from that category. Figure 24 summarizes the distribution of the answers.

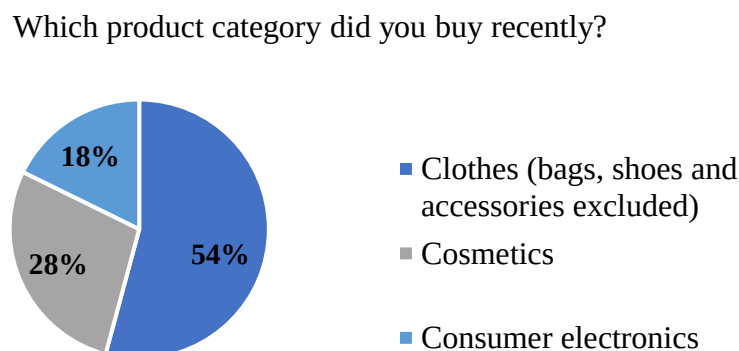


Figure 24: Which category did you buy recently? N=203 (own editing based on own research)

Regarding the last online shopping some differences can be seen compared to the distribution in the previous figure. Most of the respondents (51%) purchased clothes but 25% of the respondents bought consumer electronics and 24% of the bought cosmetics online during their last online purchase. Figure 25 shows the distribution of respondents.

Which product categories did you buy online recently?

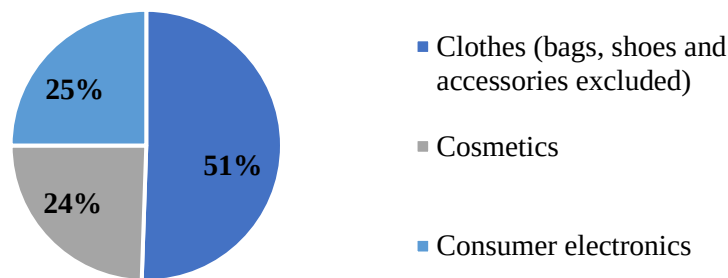


Figure 25: Which product categories did you buy online recently? N=201 (own editing based on own research) 68% of the respondents never met with an environmentally friendly delivery during their purchases. 32% of them encountered some sustainably product offer, 7% of them said they met these opportunities often while 25% sees this option rarely. Figure 26 summarizes the distribution of the answers.

Those who have met an environmentally friendly product offer listed some companies which have sustainable delivery options. Table 7 summarizes the answers from the respondents. For ease of understanding, the data is organized into groups by category. The four main categories that were mentioned by the respondents were food, cosmetics clothes and other. In the three main categories (food, cosmetics and clothes) include small Hungarian enterprises like Raw Foods, Szappanfalu or This is Redy. Other includes delivery companies such as DHL or FedEx, furniture companies like IKEA and XXXLutz but pet food shop (Zooplus), vintage flower bouquet shop (Arbonika) and a big eco-shop are also listed in the other category. In general, it can be said that most of the listed shops are eco-shops and besides the green products they offer green delivery as well.

Have you ever met during your purchases a product offer that has been marked in some way as environmentally friendly (delivery, in-store pick-up, parcel / vending machine pick-up, etc.)?



Figure 26: Have you ever met during your purchases a product offer that has been marked in some way as environmentally friendly (delivery, in-store pick-up, parcel / vending machine pick-up, etc.)? N=203 (own

Table 7: Environmentally friendly collection options (own editing based on own research)

Food	Drugstores and cosmetics stores	Clothes	Other
Kifli Ligeti shop (shop without packaging) Lidl HelloFresh Raw Foods Tesco	Ecco-verde LUSH DM Rossmann Pom-pom Humanity shop Szappanfalu	H&M Aboutyou Dedoles OrganicBasics Decathlon Sellpy Zöld gardrób This is Redy	FedEx DHL MargaréTalány Arbonika IKEA XXXLutz Zöldbolt Emag LEGO Zooplus

Regarding shopping behaviour, people who took part in the survey could evaluate their shopping behaviour on a scale from 1 (not typical at all) to 7 (very typical). The respondents prefer pure online shopping over pure offline shopping, webrooming and showrooming with an average score of 4.63 (standard deviation 1.77). The most frequently mentioned value (mode) was 5, so pure offline shopping is slightly typical among the participants. Pure online shopping is neutral or slightly typical among the respondents since the mean is 4.12 (standard deviation: 1.82) and the mode is 4. Table 8 presents that Showrooming is the least preferred behaviour according to the respondents as the most frequently mentioned value was 1 (not typical at all) and the mean is 2.77 (standard deviation: 1.65) which means Showrooming is not typical or rather not typical. Webrooming's mode also took the value of 1 but its mean is 3.6 with 1.94 standard deviation so it's rather not typical among respondents.

Table 8: Distribution of omnichannel behaviour, N=203 (own editing based on own research)

	Pure offline	Pure online	Webrooming	Showrooming
Mean	4.63	4.12	3.36	2.77
Standard deviation	1.77	1.82	1.94	1.65
Median	5	4	3	3
Mode	5	4	1	1

Regarding click-and-collect behaviour, respondents would be willing to travel an average of 23 minutes if the ordered product is not requested to the selected address (standard deviation: 14 minutes). 7 respondents mentioned that they would be willing to travel up to 60 minutes to

receive the product, while 12 respondents mentioned that they would not be willing to travel. The most mentioned value was 30 minutes.

3.3.3. Evaluation of the outlined model

The key descriptive characteristics of the constructs used in the research model is summarized in Table 22 which is provided in the 6.3. Appendix. Regarding the analysis of the model, when applying PLS-SEM, in addition to the evaluation of the structural (inner) model, the evaluation of the measurement (outer) model is also important (e.g., the constructs of the manifest variables). The outer model, which is the measurement model for latent variables should be examined according to the following aspects (Kemény, Kulhavi and Kun, 2022):

- Goodness of model fit – Saturated model,
- Composite reliability,
- Convergent validity,
- Discriminant validity,
- Indicator reliability,
- Content validity.

The analysis begins with an examination of the fit of the saturated model, which shows the validity of the measurement model. For models with only latent variables, confirmatory factor analysis (CFA) should be performed. When examining the model fit, the differences between the empirical and the estimated correlation matrix should be measured. This can be evaluated by following heuristic rules when evaluating the model based on a predefined threshold (Kemény, Kulhavi and Kun, 2022). For PLS-SEM, the standardized root mean squared residual (SRMR), with a value of 0 means a perfect fit and a value between 0 and 0.06 means a suitable fit, but most studies use a threshold of 0.08 (Dijkstra and Henseler, 2015). This study also uses the threshold of 0.08. So, the evaluation of the models started with the evaluation of the saturated model (Goodness of model fit). The model fit indicators obtained from the confirmatory factor analysis are adequate. Although all three indicators (SRMR, d_{ULS} , and d_G) are above the 95th and 99th percentile values calculated from the bootstrap sample, the value of the SRMR is less than 0.08, so the empirical and the estimated correlation matrix show a suitable fit (see Table 9).

Table 9: Goodness of model fit – Saturated model (own editing based on own research)

Indicator name	Value	HI95	HI99
SRMR	0.0694	0.0506	0.0534
d_{ULS}	3.5702	1.8950	2.1154
d_G	1.8895	1.2547	1.3830

The reliability of the constructs in PLS-SEM was previously measured with Cronbach- α and Jöreskog- ρ . Today, it is still worth considering Cronbach's α as a kind of lower limit, but it is recommended to use Dijkstra-Henseler ρ_A . The threshold value of Dijkstra-Henseler ρ_A is 0.707 (Benitez et al., 2020). The concepts used in the model were estimated with reflectively measured latent variables using the PLSc ModeA version. Based on the Dijkstra-Henseler ρ_A and Cronbach- α indices, the constructs prove to be reliable.

Convergence validity measures the level/similarity of the correlation between the values of indicators belonging to a latent variable. The average of variance extracted (AVE) shows the proportion of the variance explained by the latent variable of the indicators. Recommended value is at least 0.5; then the given latent variable explains 50% or more of the variance of the indicators and a lower percentage of all other latent variables. So, the expectation is that a factor is one-dimensional. If the first created factor explains at least 50% of the set of variables, then a possible second factor can no longer be more significant (Kemény, Kulhavi and Kun, 2022). Most of the AVE values are over 0.5, the other cases where the AVE is below but close to 0.5 are accepted to ensure that the model works properly. Although it can be seen that AVE values are below 0.5 for two latent variables, the convergence validity is still accepted. Based on the results of Lam (2012), if the reliability of the construct is high but the AVE is between 0.4 and 0.5, the convergence validity is still supported. The AVE values are presented in Table 10.

When examining discriminant validity, it needs to be checked whether two latent variables that represent two different theoretical concepts are sufficiently statistically different from each other. The condition for this is that one latent variable explains the variance of its own indicators better than the other latent variable, e.g., it correlates more strongly with them than with the indicators of other constructs. The heterotrait-monotrait ratio of correlations (HTMT) is used to measure this (Henseler, Ringle and Sarstedt, 2015). The HTMT can be assessed in two ways (Kemény, Kulhavi and Kun, 2022):

- based on a predetermined threshold (0.90 indicates conceptually very similar construction pairs, while 0.85 indicates more different ones) and / or
- based on a confidence interval (whether the HTMT is significantly lower at a specified limit value, such as 1.00, 0.90, or 0.85).

In the model, the HTMT values support discriminant validity which is shown in

Table 11.

The reliability of the indicators, e.g., the observed variables, can be measured by the estimated value of the load weights and the corresponding significance level. In PLS-SEM, the estimation of factor weights is standardized, so the estimated square factor value is equal to the estimated reliability of the indicator. More than 50% of the variance of an indicator is expected to be explained by the relevant latent variable, so the expected threshold for a standardized factor weight is less than 0.707 and the significance level calculated from the t-value is less than 5% (Benitez et al., 2020). The reliability of most indicators used to measure latent variables also meets most expectations. In this case there are some factor loadings where the values are below 0.707 but it is acceptable due to the fact that the model would not show all relevant correlations by adding fewer indicators, but the values are significant based on the t-test, so the loadings are acceptable (see 6.4. in Appendix). The reliability of the indicators is presented in Table 10.

Table 10: Reliability of construction indicators (own editing based on own research)

Construct's indicator	Source of measurement model	Dijkstra-Henseler's ρ_A	Cronbach's α	Ave	Loadings	Weights
Sustainable omnichannel behaviour						
Sust_omch_behav_1	Buldeo Rai, Verlinde and Macharis (2019b)	0.9207	0.9008	0.5004	0.8410	0.1613
Sust_omch_behav_2					0.8222	0.1577
Sust_omch_behav_3					0.7675	0.1472
Sust_omch_behav_4					0.8024	0.1539
Sust_omch_behav_5					0.4978	0.0955
Sust_omch_behav_6					0.6921	0.1327
Sust_omch_behav_7					0.3458	0.0663
Sust_omch_behav_8					0.6083	0.1166
Sust_omch_behav_9					0.7556	0.1449
Sust_omch_behav_10					0.7750	0.1486

Sustainable shopping						
Sust_shop_1	Own construct	0.9386	0.9276	0.4593	0.5971	0.0787
Sust_shop_2					0.5198	0.0685
Sust_shop_3					0.4533	0.0598
Sust_shop_4					0.6188	0.0816
Sust_shop_5					0.6054	0.0798
Sust_shop_6					0.4653	0.0613
Sust_shop_7	Sudbury-Riley and Kohlbacher (2016)				0.7826	0.1032
Sust_shop_8					0.7638	0.1007
Sust_shop_9					0.7619	0.1005
Sust_shop_10					0.6793	0.0896
Sust_shop_11					0.8666	0.1143
Sust_shop_12					0.7566	0.0998
Sust_shop_13					0.5880	0.0775
Sust_shop_14					0.5812	0.0766
Sust_shop_15					0.8376	0.1104
Sust_shop_16					0.7772	0.1025
Sustainable behaviour						
Sust_behav_1	Own construct	0.8257	0.7855	0.5065	0.8132	0.3647
Sust_behav_2					0.6482	0.2907
Sust_behav_3					0.4992	0.2239
Sust_behav_4					0.8339	0.3740
Delivery preference						
Deliv_pref_1	Own construct	0.8572	0.8233	0.4247	0.7169	0.2233
Deliv_pref_2					0.8596	0.2677
Deliv_pref_3					0.6209	0.1934
Deliv_pref_4					0.3510	0.1093
Deliv_pref_5					0.6933	0.2159
Deliv_pref_6					0.6969	0.2170
Deliv_pref_7					0.4950	0.1542
Returning preference						
Return_pref_1	Own	1.000	-	1.000	1.000	1.000

	construct					
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Table 11: Discriminatory validity based on the HTMT indicator (own editing based on own research)

Construct	Delivery preference	Sustainable behaviour	Returning preference	Sustainable shopping
Delivery preference				
Sustainable behaviour	0.7091			
Returning preference	0.0594	0.0164		
Sustainable shopping	0.7856	0.8443	0.0506	
Sustainable omnichannel behaviour	0.8318	0.8178	0.1774	0.8758

And finally, the validity of the content. This is not measured by statistical indicators; instead, each construct and how it has been operationalized in previous research should be carefully considered and whether it is appropriate (Kemény, Kulhavi and Kun, 2022).

The fit of the developed model is appropriate based on all evaluation criteria, so the structural model can also be examined. Five of the hypotheses were confirmed, so the assumed positive effects are significant at the level of 5%. During the analysis of structural model, the following concepts are examined (Henseler, 2021):

- Goodness of model fit – Estimated model,
- Path coefficients,
- Strength of effects (Cohen's f^2),
- Coefficient of determination (R^2).

When analysing the model fit, the indicators and rules presented in the outer model should be followed, but in this case the values of the estimated model should be taken into account. If all its constructions are related, the results of the saturated and the estimated model do not differ from each other (Kemény, Kulhavi and Kun, 2022). The data of the estimated model can be seen in Table 12.

Table 12: Goodness of model fit – Estimated model (own editing based on own research)

Indicator name	Indicator value	HI95	HI99
SRMR	0.0694	0.0506	0.0534
d_{ULS}	3.5702	1.8950	2.1154

d_G	1.8895	1.2547	1.3830
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The significance of the hypothesized effects was studied during the study of the path coefficients. The path coefficient (β) between the endogenous and exogenous variables quantifies the expected increase / decrease of the dependent variable *ceteris paribus* in parallel with the unit increase of the independent variable. The direction, absolute value, and the significance of the effect of the path coefficients can also be evaluated (Kemény, Kulhavi and Kun, 2022). The direct effects' path coefficients, t-value, p-value, the percentile bootstrap quantiles, and the significance of the assumed effect is summarized in Table 13. The significant relations are marked with bold letters in the table. Of the 10 hypotheses, 5 were supported. Delivery preference has a positive effect on sustainable omnichannel behaviour. Sustainable behaviour has a positive effect on sustainable shopping. Returning preference has a positive effect on sustainable omnichannel behaviour. Sustainable shopping has a positive effect on delivery preference and sustainable shopping has a positive effect on sustainable omnichannel behaviour.

Table 13: Hypothesis test results of the model (significant effects are presented with bold letters) – Direct effects
(own editing based on own research)

Hypothesis	Direct effect	β	Standard bootstrap results		Percentile bootstrap quantiles		Significant?
			t-value	p-value (2-sided)	2.5%	97.5%	
H1	Sustainable behaviour → Sustainable shopping	0.8397	19.9285	0.0000	0.7585	0.9233	Yes
H2	Sustainable behaviour → Delivery preference	0.1651	0.9600	0.3373	- 0.1373	0.5233	No
H3	Sustainable shopping → Delivery preference	0.6452	4.0254	0.0001	0.3094	0.9098	Yes

H4	Sustainable behaviour → Returning preference	- 0.0740	-0.3229	0.7469	- 0.5754	0.3208	No
H5	Sustainable shopping → Returning preference	0.0814	0.3443	0.7307	- 0.2783	0.6500	No
H6	Delivery preference → Returning preference	0.0236	0.1547	0.8771	- 0.2939	0.2999	No
H7	Sustainable behaviour → Sustainable omnichannel behaviour	0.1831	1.5358	0.1249	- 0.0652	0.4185	No
H8	Sustainable shopping → Sustainable omnichannel behaviour	0.4501	3.7556	0.0002	0.2050	0.6942	Yes
H9	Delivery preference → Sustainable omnichannel behaviour	0.3399	3.6149	0.0003	0.1568	0.5213	Yes
H10	Returning preference → Sustainable omnichannel behaviour	0.1478	3.6297	0.0003	0.0644	0.2263	Yes

Although it was not included in the research questions, indirect effects and defined were also examined. The indirect effects are presented in Table 14 and

Table 15 shows the defined parameter effects. In the tables only the significant relations are presented. The indirect effects and defined parameters are important in terms of full and

partial mediation. Full mediation is when the independent variable does not have significant effect on the dependent variable after inclusion of the mediator variable. The partial mediation means that the independent variable has still a significant direct effect on the dependent variable. Partial mediation can be complementary (direct and indirect effect have the same sign) and competitive (direct and indirect effect have different signs) (Henseler, 2021).

The model contains two full mediations (Sustainable behaviour → Delivery preference → Sustainable Omnichannel Behaviour and Sustainable behaviour → Sustainable Shopping → Sustainable Omnichannel Behaviour) and one partial mediation (Sustainable shopping → Delivery preference → Sustainable Omnichannel Behaviour). This result demonstrates that although sustainable behaviour does not directly affect sustainable omnichannel behaviour, it has an indirect effect through sustainable shopping and delivery preference. The partial mediation is complementary. The relative size of complementary mediating effects can be determined with the VAF (Variance Accounted For). The value of VAF in this case is 0,328 which means that the strength of the effect through the mediator is 32.8% of the total effect, so the direct effect is stronger.

Table 14: Hypothesis test results and reliability of the model (only significant effects are presented) – Indirect effects (own editing based on own research)

Indirect effect	β	Standard bootstrap results		Percentile bootstrap quantiles	
		t-value	p-value (2-sided)	2.5%	97.5%
Sustainable behaviour → Delivery preference	0.5417	3.8509	0.0001	0.2672	0.8106
Sustainable behaviour → Sustainable omnichannel behaviour	0.6198	6.2009	0.0000	0.4516	0.8398

Sustainable shopping → Sustainable omnichannel behaviour	0.2336	2.4185	0.0158	0.0747	0.4461
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Table 15: Defined parameters interference (own editing based on own research)

Indirect effect (defined parameters)	β	Standard bootstrap results		Percentile bootstrap quantiles	
		t-value	p-value (2-sided)	2.5%	97.5%
Sustainable behaviour → Sustainable shopping → Sustainable omnichannel behaviour	0.3779	3.4710	0.0005	0.1834	0.6176
Sustainable shopping → Delivery preferences → Sustainable omnichannel behaviour	0.2193	2.4781	0.0134	0.0636	0.4189
Sustainable behaviour → Sustainable shopping → Delivery preference	0.5417	3.8509	0.0001	0.2672	0.8106

The strength of the effects can be quantified with Cohen's f^2 . The indicator indicates the strength and practical utility of the effects independent of the sample size (Cohen, 1988). Its value can be as follow:

- < 0.02 negligible effect,
- $0.02-0.15$ weak effect,
- $0.16-0.35$ medium effect,
- $0.35 <$ strong effect.

The R^2 quantifies the proportion of variance in each endogenous construct that is explained by exogenous constructs. This value shows the predictive power of the given model part. In the case of a new model, a low R^2 may be acceptable, as the size and the adequacy of the indicator should be evaluated in comparison with the coefficients of determination in previous

studies (Henseler, 2021). The model's path coefficient values are summarized in Table 16 and the R^2 values can be found in Table 17.

Sustainable behaviour has the strongest positive effect on sustainable shopping ($f^2 = 2.3903$), with an explained variance of 70.5%. So, the more sustainable someone is in their daily lives, the more sustainable they are in their purchases. The positive omnichannel behaviour (explained variance 84.9%) is positively influenced by sustainable shopping, which has a value of $f^2 = 0.2977$. This relationship can be considered to be of medium strength. This means that the more sustainable a consumer is, the more likely he or she is to make sustainable decisions when purchasing in an omnichannel way. It is also important to highlight the positive, medium-strength relationship of sustainable shopping to delivery preferences ($f^2 = 0.3251$). The explained variance of the delivery preferences is 62.2%. That means that the more sustainable decisions are made by the consumer during the purchasing process, the more he/she chooses sustainable delivery methods (since this variable includes sustainable delivery indicators). Delivery preferences also have a positive and medium effect on sustainable omnichannel behaviour ($f^2 = 0.2883$). However, the effect of returning preferences on sustainable omnichannel behaviour is weak ($f^2 = 0.1440$), although there is a significant positive relationship between the two variables.

Regarding indirect effects, three of them were confirmed to be significant. Sustainable shopping also has an indirect significant effect on sustainable omnichannel behaviour through delivery preferences. So, if someone is purchasing sustainably, they are more likely to choose sustainable delivery methods that will positively influence the sustainable omnichannel behaviour. Through sustainable shopping, sustainable behaviour has a significant effect on sustainable omnichannel behaviour even though it did not have a significant direct effect on it. This means if someone makes sustainable decisions in their daily lives, they are likely to behave sustainably in their purchases, resulting in sustainable omnichannel behaviour. Sustainable behaviour has a significant indirect effect on delivery preference through sustainable shopping variable although it had a not significant direct effect on it previously. This means if a customer is sustainably conscious, he/she is more likely to shop sustainable which can result in choosing sustainable delivery preferences. The final model's path coefficients and its R^2 values can be seen in Figure 27.

Table 16: Strength of effect (own editing based on own research)

Strength of effect	Cohen's f^2
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Delivery preference → Sustainable omnichannel behaviour	0.2883
Sustainable behaviour → Sustainable shopping	2.3903
Returning preference → Sustainable omnichannel behaviour	0.1440
Sustainable shopping → Delivery preference	0.3251
Sustainable shopping → Sustainable omnichannel behaviour	0.2977

Table 17: Endogenous variable (own editing based on own research)

Endogenous variable	R ²
Delivery preference	0.6223
Returning preference	0.0031
Sustainable shopping	0.7050
Sustainable omnichannel behaviour	0.8487

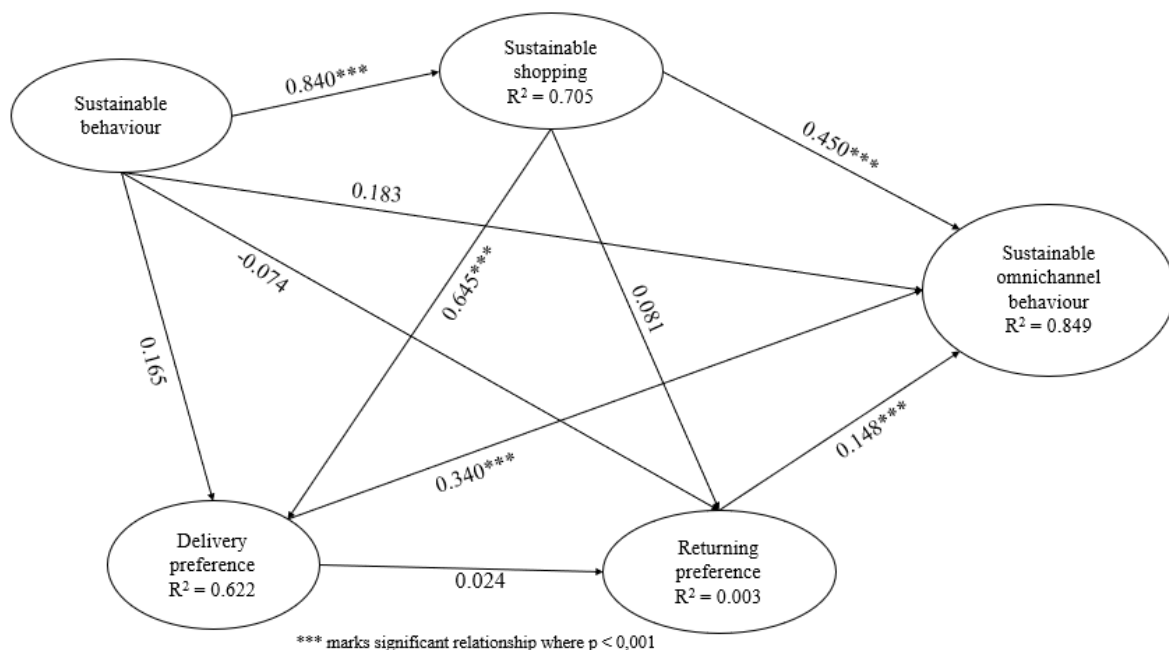


Figure 27: Relationship between the factors explaining sustainable omnichannel behaviour (own editing based on own research)

3.4. Additional research: the results of the in-depth interviews

The aim of the in-depth interviews was to understand the deeper motivation of the numerical correlations revealed during the quantitative analysis specifically on the topic of sustainable omnichannel behaviour. The main research questions were:

R1. How and why do customers behave sustainably during their everyday lives and shopping?

- a. What are their motivations?
- b. How did the COVID-19 change their shopping behaviour?

R2. What do customer think of about the delivery and returning options?

- a. Which delivery options do they prefer and why?
- b. How are they considering the environmental effects of the delivery options?
- c. Why do (not) they use companies' services that are focusing on sustainable delivery?

R3. What are the factors that influence the customers to behave in a sustainable omnichannel way? (Individual goals; environmentally friendly behaviour; time, money, energy saving; channel preference, offered omnichannel services.)

- a. What are the factors that affect them to sustainable omnichannel shopping?
- b. Is sustainability in omnichannel shopping influenced by attitude towards omnichannel services, consumer goals or attitudes towards sustainability?

The interview consisted of four big parts to investigate properly each research questions. The first part was focusing on general shopping behaviour, the second part investigated the online shopping behaviour, while the third section focused on sustainable behaviour and the final part included questions connected to sustainable omnichannel behaviour. The interview research questions can be found in the appendices. Prior to the start of the research, a pilot survey was conducted to check the availability, accuracy, and relevance of the questions. Six respondents took part in the research, the study refers anonymously to their answers and their opinions. Table 18 shows the main characteristics of the consumers who took part in the research. All of the participants were females between the age of 24 and 42. The participants were different in terms of residence, education, and occupation. Five of the participants have one, two or three children.

The population consisted of questionnaire respondents who purchased clothing, cosmetics, or entertainment electronics in the past year. The in-depth interview was preceded by a series of screening questions that were used to select the appropriate respondents. Importantly, the sample included interviewees who had previously completed the questionnaire and provided their email address, believed they were behaving sustainably, and had purchased a clothing, cosmetic, or consumer electronics product in the past 6 months.

Table 18 : Presentation of the participants (own editing based on own research)

Interviewee	Age	Gender	Residence	Educational attainment	Profession
Interviewee 1	24	Female	City	Master's degree	Student
Interviewee 2	34	Female	Village	Bachelor's degree	Maternity leave
Interviewee 3	37	Female	Farm	High school	Other
Interviewee 4	42	Female	Village	Master's degree	Entrepreneur
Interviewee 5	31	Female	Town	Vocational school	Full time employee
Interviewee 6	37	Female	City	Bachelor's degree	Full time employee

3.4.1. General shopping behaviour

Interviewees pointed out that, in general, it depends on the product category and time if they buy a product online or offline, although they all prefer to shop offline. The reason why they shop offline is that the most common purchase is grocery shopping, where they have highlighted that they like to see, touch, and select products in person.

“I’m basically more of an offline shopper type, I don’t order groceries online at all because it’s not as much of a burden for me to go to the store. I love selecting the products and it’s important for me that I choose the product.” – Interviewee 1

The most common stores mentioned by the respondents were Lid, Aldi, and Penny. Some of them mentioned drugstores like Rossmann and dm. Food is usually bought once or twice by consumers, but some have highlighted that there are certain foods that are produced at home (e.g., vegetables, fruits, grains, eggs, meat, etc.). One of the respondents lives in a farm where they produce nearly everything so *“we usually buy luxury products that we cannot produce at home like cacao, chocolate and coffee”* (Interviewee 3).

It was also pointed out that second-hand clothing stores are preferred, and they rarely go to fast fashion stores. When buying clothes in stores, it was also emphasized that it is more advantageous because they can try and touch the product.

“I ordered fast fashion clothing and shoes online a couple of times. I would be motivated to do so, but I’d rather say no to it because sustainability efforts have stopped online shopping for me. If it weren’t so fast fashion, I would probably buy more often online.” – Interviewee 1

Electronics, books, gifts, and clothes were the categories which were purchased more often online by the respondents. They all refrained from buying food online, one respondent

regularly used the shopping services of Tesco and Auchan during the pandemic, but she was not satisfied with it:

“Sometimes we ordered from Tesco or Auchan but many times they didn't delivered what we ordered for, but some other replacement product and unfortunately it was often the case that the product ordered expired the next day.” - Interviewee 2

Regarding the COVID-19 epidemic, consumers have admitted that although they went to traditional stores less, their online purchases have increased somewhat. However, there were respondents who connected the frequency of online shopping to the birth of children, as it was a more time-efficient and convenient solution.

The most important aspects of the purchase both online and offline that were mentioned by the interviewees were good value for money, sustainability, and ethical considerations (e.g., support for their local products, pursuit of non-packaging, etc.). It has also been emphasized that the high cost of shipping may be a deterrent to online shopping. Since most of the respondents had children, they highlighted the fact that they try to shop as fast as possible. All the respondents were conscious about shopping, they write lists, check the advertising newspapers and they fight against overconsumption:

“I don't like being among a lot of people and wandering aimlessly.” – Interviewee 3

“I consciously plan my purchase. I'm going to the store purposefully.” – Interviewee 4

So, it can be seen that all respondents try to shop as sustainably as possible, and they consider many things during their shopping process.

3.4.2. Online shopping behaviour

During the in-depth interviews, the six omnichannel behaviours discussed in the literature review could be identified. Some examples about the pure offline and pure online behaviour have already been explained in the previous section. Interviewees prefer traditional shopping in general, but when they are shopping online, they most often select home delivery as a delivery option. Delivery is usually requested to own address, for several reasons:

- *“If I'm already paying for it, it should come to my house.”* – Interviewee 1
- *“I ask mainly home delivery because there is no other option, we live in a small village so there is no parcel point.”* – Interviewee 2
- *“I usually choose home delivery to my own address because it's the easiest for me. I always ordered it to come when I was home. Sometimes, I had to order to my workplace because it was some kind of gift to my husband or son, and I needed to hide it.”* – Interviewee 5

- *“If delivery is free, I choose home delivery.”* – Interviewee 6

However, the other four profiles have emerged in the analysis of online shopping behaviour. Click-and-collect behaviour was identified in several cases. Respondents mentioned that if they request such delivery, they will most often pick up the product at the store or at a parcel point / parcel machine like Posta Pont or Foxpost.

“If there’s possibility to take over the product in the shop, I choose that option but it’s not available everywhere. It’s free, I don’t have to wait for the delivery man and it’s more environmentally friendly if I use public transportation.” – Interviewee 1

“I behave like this because it is cheaper. I plan my trip to the town, and I usually take the product over at a parcel point/parcel machine (Packeta, Foxpost, Posta Pont or Pick-Pack Pont) or at the gas station.” – Interviewee 3

“It rarely happens. I ordered some books on Bookline and picked it up at a bookstore or antique shop. I can pick it up during a multiple purpose trip and I can pay afterwards.” – Interviewee 6

One respondent highlighted that *“the parcel point is not a win-win situation because you have to pay for it, and you have to travel for it”* (Interviewee 1).

Webrooming behaviour was the most common behaviour among the respondents which means they research products online before buying them in a physical store. This was usual during purchasing electronics products for all six consumers, but clothing stores and baby stores were also mentioned.

“It’s common. Looking for information online is clear, I can use filters, it’s more comfortable, practical and I don’t like to spend hours in the shops. For me shopping is not a pleasure, it’s really tiring.” - Interviewee 1

“Yeah, I sometimes look at the reviews and then I buy the products in person. At most once a year, for example, I searched a lot for a sewing machine online until I found the perfect model.” – Interviewee 5

“This behaviour is typical during shopping electronic devices, but such devices don’t need to be bought often. The advantage is that you don’t have to ask the seller, I can see if the product is in stock, and I can compare it with other products.” – Interviewee 6

Ship-from-store behaviour was also typical for certain product categories, preceded by an online search for information and then a request for shipment after in-store purchase. This was

mostly mentioned due to the purchase of large household appliances and furniture, as transportation cannot be solved due to the size of the products.

“I usually shop furniture like this in IKEA. I look up for the offer on their website, but I go there to buy the product personally. If the product is too big and cannot fit in the car, I ask for delivery.” – Interviewee 2

“Since we’re moving now, we’re going to get more household appliances now. We look it up on the internet and then buy it at Media Markt and ask for delivery. We will order more things at once to reduce shipping costs.” – Interviewee 6

The least typical form of behaviour was showrooming, the practice of examining merchandise in a traditional store or and then buying it online, sometimes at a lower price. The reason for this is that respondents mentioned that if they like something in the store they would buy it right away. By the way, consumers participating in research most often choose the appropriate method of delivery based on price, time, location, approach, and sustainability.

“During online shopping, I don’t purchase products impulsively, I always think about it until they run out of the product. I don’t like online shopping because of the delivery cost. I am more conscious.” – Interviewee 1

“In general, I shop online once a week, before buying it I read the reviews, I look up for where’s the cheapest product and the delivery.” – Interviewee 2

“It also depends on the shipping cost if it’s free I ask for home delivery. But sometimes I forget the GLS is coming, so I can’t take my order over.” – Interviewee 6

3.4.3. Sustainable behaviour

All the respondents highlighted that they think to themselves as a sustainable conscious person but *“this is an area that never ends”* (Interviewee 1), *“it could be done much better”* (Interviewee 2), *“I think I am somewhat sustainable”* (Interviewee 6) but they *“like to think we manage it pretty well, we do a lot, but there is room for improvement”* (Interviewee 5).

Respondents highlighted a number of categories and areas where they behave sustainably, including food and food shopping, clothing, energy consumption, waste collection and reduction, as well as a preference for products made from natural ingredients like soaps, shampoos etc. Table 19 summarizes the areas and examples mentioned by the respondents.

The first category summarized by the table is food consumption and shopping. This was the most prominent topic that consumers mentioned from a sustainable perspective. Interviewees mentioned very different behaviours in this topic. Participants consider the production of their

own food to be the most sustainable option, but the place of residence does not always allow them to do so, so respondents try to buy Hungarian products (e.g., from the market or producer), try to avoid products that are not of a European origin (like orange, mangos, avocado etc.), always have a bag or fruit net during shopping.

“I have a preference for Hungarian produced food over foreign produced food, but I try to think of supply chains, if they are not produced Hungary, they should still come from Europe.” – Interview 1

“I always prefer the Hungarian product, even if it is more expensive. I buy fruits, vegetables, and dairy from local producers, I buy eggs from a neighbour. There are primary producers coming to our village every Thursday and there is a mini market where I usually shop.” – Interviewee 2

In the field of clothing, the boycott of fast fashion clothes was highlighted by nearly all participants. It was mentioned that in addition to ethical considerations, sustainability aspects also play a major role in the purchase of clothing. The consumers participating in the interview prefer to buy used clothes (e. g. from a romper or Facebook marketplace) and emphasized the importance of buying quality clothes, repairing clothes, selling or donating unused clothes. In addition, respondents with children mentioned that clothes are inherited in the case of several children.

“Buying clothes is an area where I pay extra attention to things. It would be much easier to shop in fast fashion, but the sustainability aspect has helped a lot. I shop minimally there, but mostly from elsewhere.” – Interview 1

“I usually buy simple pieces that are of better quality, even if they are more expensive.” Interviewee 2

Table 19: Areas of sustainability mentioned by the interviewees (own editing based on own research)

Food consumption and shopping	Clothing	Energy/water consumption	Other
• Local foods over import, • Market preference, • Import with short supply chain, • Using tote bags and fruit net, • Respect for animals, Not throwing out food,	• Fast Fashion boycott, • Second-hand shops, • Repairing clothes, • Facebook Marketplace, • Inheritance from others,	• Energy consumption monitoring, • Led bulb usage, • Water saving, reuse rainwater, • Outdoor cooking on fire, • Solar collector, • Gray water	• Avoid impulse shopping, • Selective waste collection, • Walking or public transport usage, • Sustainable, natural detergents, • Collecting other people's garbage,

• Producing food and not using chemicals, • Keeping animals.	• Reusing old clothes.	- system, • Sprinkle flowers with well water.	• Washable diaper, • Using public transport, • Alternative cleaning products, • Natural cosmetics or marking cosmetics.
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The participants were asked why they decided to act and live sustainably in everyday life and how they manage it nowadays. It can be seen that respondents with children want to leave a better planet behind for their children, while the youngest respondent put their own future first when she's making sustainable decisions.

"I don't want to exploit my environment I think people in the world have let go of the balance between nature and human." – Interviewee 1

"Because I have two kids and I want a more liveable planet. It is cheaper to buy a new one and throw the old one away than repair it." – Interviewee 2

"It developed little by little, we moved to the farm 8 years ago, but I grew up in Pest. There used to be a garden and it felt really good to eat from home. I wanted to show this to the kids, and we also wanted to keep animals. We produce nearly everything and there is no enjoyment for us in what we buy from others. We returned to the roots." – Interviewee 3

"Sustainability has always had some roots, we never threw anything away, my grandparents always composted. When we moved into a family house, we had more options, such as producing our own food, canning, etc. I was caught in personal despair and climate anxiety, I have 3 kids, what will be their future." – Interviewee 4

Some measures are taken by the respondents to highlight the importance of sustainability. The most common measure mentioned by the interviewees was education and showing example. Since five out of the six interviewees were mothers, they highlighted the importance of the education of the next generation:

"My spouse had not paid attention to sustainability but now I realized that he started to think more environmentally friendly. My friends also started to shop in second-hand shop because of me." – Interviewee 1

“I try to teach my children not to waste, eat everything or put it away, not to flower water, reuse what we can and not to litter.” – Interviewee 2

“I try to educate my children they can collect garbage selectively.” – Interviewee 3

“I raise my son and future baby not to litter, not to buy, not to waste.” – Interviewee 5

The interviewees see the solutions not just in individual level but company and government level. Even though *“they sleep peacefully in the evening”* (Interviewee 3), they don’t think these little steps will solve all the big environmental problems, company and governmental level measures needs to be done.

“It is not just an individual thing it should be raised to a social level. My generation also feels climate anxiety. I think ethical considerations are important in addition to sustainability, but I see less moral change in Zara. Many times, the aspirations of the average person cannot go through much. Although the garbage is collected separately it is dumped in a garbage truck and only a little amount of plastic is recycled.” – Interviewee 1

“If there is garbage that can’t be put in selective or communal bins, many people dump this garbage on the edge of the forest and don’t deal with it and neither the people nor the government deal with it.” – Interviewee 2

“We consume like it would not be tomorrow, if we continue like this, it won’t be. We can always say something new in a sustainable performance because no sustainable market covers everything. I see a good direction, but we always pile up, especially textiles. Initially, I volunteered and started professionally, and we founded an environmentally friendly organization.” – Interviewee 4

“I didn’t know before and I didn’t think about it, but I completely changed my habits and lifestyle because of the bad news, it is incomprehensible to me why others don’t change when they hear the same news.” – Interviewee 5

Some respondents also highlighted some companies that are boycotted by them. In the fashion industry, fast fashion brands (Zara, H&M, Primark) are neglected but Danone, FMCG companies (Henkel, Unilever, P&G) and online web shops (Alza.hu and Wish) were also mentioned by respondents. Some respondents could not recall exact brands, but they try to avoid processed food, *“use solid shampoo and soap, and changed dishwashing detergent, detergent and cleaning agent to more sustainable versions”* (Interviewee 4).

“I don’t shop in Zara, H&M or in any other fast fashion shop. I refuse plastic products. I don’t want to buy a plastic tube shower gel anymore and I also avoid mineral water as well.” – Interviewee 1

“We don’t buy Danone products because it ruined the Hungarian agricultural sector.” – Interviewee 2

“We don’t buy branded products, we rather buy pieces of fruit, we don’t buy clothes. We prefer to boycott products we don’t need and not companies.” – Interviewee 5

“I used to switch from Rama margarine to butter because I think butter is healthier. I make sure there is no palm oil in the products.” – Interviewee 6

3.4.4. The connection between shopping and sustainability

Table 20 summarizes all the online and offline sustainable behaviours and decisions that were mentioned by the interviewees. It can be seen from the table that the respondents mostly act sustainably in several way during their offline shopping. One reason of this is that customers try to avoid online shopping if it’s possible, but the other reason is when they shop online, there are no or just some possibilities to act sustainably.

Table 20: Sustainable actions during offline and online shopping (own editing based on own research)

Offline shopping	Online shopping
• Tote bag for shopping, • Package-free shopping, • Clothes container, • Local product preference, avoiding delivery by plane, • Fairtrade products (e.g., tea, coffee, chocolate), • Free of additives, • Less meat and dairy products, • Redeemable products.	• Conscious shopping, • Sustainable delivery preference, e.g., pick-up in store or at the post office • Ordering together with other people, • Asking for less package, • Sending back jars to natural cosmetic producer to reuse it, • Not ordering products from foreign countries.

Return was less important for the consumers because as mentioned above, the respondents do not shop online and they also do not buy products that should be returned (e.g., clothes or shoes). They usually purchase products that are not easily available for them (e.g., natural cosmetic raw material, washable diaper, vitamins etc.). However, they do not purchase online or return product a lot, they also strive for sustainability in the area of returning.

“I don’t really deal with this because in general, I’m looking at the product until it is sold out.” – Interviewee 1

“I don’t usually consider it because I don’t usually send it back. It was once that I took my clothes back. I ordered from Zara and took it back in person.” – Interviewee 2

“I’d rather think that if it’s not good, I’ll pass on the gift.” – Interviewee 4

“I always check if it can be sent back. There are online stores that send envelopes or boxes, the return is free of charge, I put the product back in the box and I return it.” – Interviewee 5

“I would take it back to the store in person or give it to someone. I try to pack into what it was or what is at home.” – Interviewee 6

The respondents listed some ideas how the delivery should be more sustainable, what should be done by individuals and companies. Table 21 summarizes the main ideas mentioned by the interviewees. The ideas can be divided into three groups: delivery, packaging, and return. Most of the interviewees suggested circular or collective or once a week/month delivery which can reduce the CO₂ emission and impulsive shopping. Alternative delivery methods like electric cars or bicycles were not popular among the respondents. Regarding packaging, many interviewees mentioned that reusable and recyclable packaging would be a good environmentally friendly option. While the respondents had less ideas in the case of returning. Mostly return in the same package and once a week returning was mentioned.

“I think it’s important for companies to actually deal with it because my experience is that there is or would be a sustainable alternative that is economical, but there is no one to deal with it.” – Interviewee 1

“It should be indicated that how many frogs died due to the package delivery, how much CO₂ got into the air because of it or if you don’t ask for transportation, you will save three trees. So, quantify how destructive the delivery is. If it were described which one is more environmentally friendly, I would consider it. I can’t make an environmentally friendly decision right now.” – Interviewee 2

“Once a month you can place a large order, which would be enough for three villages. It would be good if it were not only organized by organizations like ours, but also by companies.” – Interviewee 4

“It would be more sustainable if online shopping were not global but local and everyone was selling within the local areas. They would launch a truck that only takes out the packages once a week, and the next week these trucks will pick up the unwanted packages.” – Interviewee 5

Table 21: Making delivery more sustainable (own editing based on own research)

Delivery	Packaging	Returning
• Bicycle delivery, • Once a week or once a month delivery, • Just local delivery, • Collective delivery organized by companies, • Include more villages, • Circular delivery, • Quantification of the delivery destruction, • Electric car.	• Recycled or recyclable packaging, • Option for asking less package, • Reusage of packages, • Recycled filling material.	• Return in the same package, • Return to warehouse, collection point personally, • Once a week returning.

Nearly all respondents mentioned that they are willing to pay more for sustainable delivery options. They think that sustainability is really important so they can make financial efforts for it but almost all of them highlighted that being reasonable in terms of higher prices is also very prominent.

“I would be willing to pay more to some extent, but only within reasonable limits.” – Interviewee 2

“Yes, within a reasonable limit, but it depends on how much I need the thing, it is possible to buy it in person, and whether the packaging is environmentally friendly. If there is a small price difference between paper and plastic, we are willing to pay a higher price for a more sustainable product.” – Interviewee 5

“Yes, I would be willing to pay more for sustainable things, and it is important to know that I do not produce more waste with this, recycled products are also more sympathetic.” – Interviewee 6

3.4.5. Conclusion of the interviews and answering the research questions

It can be seen from the paragraphs above that the interviewees recently purchased both online and offline and they are all behaving sustainably in several ways. During purchasing decisions making, they always or in most cases take into account sustainability, especially environmental considerations, and seek to make conscious decisions in all areas of their lives.

During the in-depth interview research, it turned out that participants act sustainably both in their purchases and in their daily lives. They try to avoid products with plastic packaging, buy products without packaging and support local producers (e.g., shopping on the market). Their main motivation is to leave a more liveable planet for their children. In this respect, the sampling is a bit one-sided, as mothers with children were interviewed mainly. At the same

time, securing one's own future for the childless young respondent emerged as a motivating factor. COVID-19 did not significantly change the shopping habits of the respondents, only a few consumers mentioned that they might buy more online than before thanks to the pandemic, but all participants prefer personal shopping.

All six respondents shop and order online, but with different frequencies. Respondents say that they prefer different delivery methods, which can be linked to a different place of residence (e.g., farm, village, small town, or big city). Those who live in big cities prefer to pick the ordered product up in person at a store or collection point that can be reached by foot or by public transport, while those living further away prefer to ask for home delivery because there is no pick-up point in their area or using their car is more harmful to the environment or more expensive. So, it can be seen that consumers who took part in the research consider environmental considerations when shopping online. It has been mentioned that during the ordering process, they try to order from sustainable shops where it is indicated whether the product is made of natural material or delivered unpackaged / in recycled package. Respondents would be happy to order from sustainable web shops if they had the opportunity, but there are few online stores that have the option to do so. It was also mentioned that they would be willing to pay more for more sustainable options (e.g., eco-friendly packaging and stuffing, eco-friendly mode of transport, etc.) within reasonable limits. At the same time, all respondents emphasized that return options are not important to them because they always buy consciously or, if something is not right, they prefer to give away the product.

Regarding omnichannel behaviour, pure online or pure offline behaviour was more common between the asked consumers. Pure online shopping is usually preceded by an online search for information, and pure offline shopping is always conscious, with consumers trying to avoid impulsive shopping in a variety of ways (e.g., looking at promotions, writing a list, purposefully searching for what they need). Some of the consumers were characterized by webrooming, so they search for information on the internet and buy it in a traditional way, while showrooming was less common among the respondents. Click-and-collect behaviour was more popular among those who live in large cities, where the collection point could be reached by public transport or by foot. Ship-from-store behaviour was usual in some product categories among respondents, such as when buying furniture or household appliances.

Overall, therefore, the interviewees strive to make sustainable choices and purchases both online and offline. Of the omnichannel behavioural profiles, click-and-collect behaviour is most noticeable in addition to pure online and offline behaviour. Respondents' omnichannel

behaviour is strongly influenced by their approach to sustainability, which is also supported by the examples mentioned above.

4. Conclusion and outlook for future developments

The aim of this work is to answer the following question: (1) how omnichannel retail and purchase can be interpreted from a consumer perspective in the light of sustainability, (2) how customers choose between the alternatives, and (3) what the main influencing factors are during decision making process. The topic of the research addresses a relevant issue that affects many as the trends and aspirations for sustainability become more popular nowadays, and online shopping has become more relevant due to the Internet and the epidemic. Therefore, the relationship between omnichannel shopping and sustainable behaviour was chosen as the focus of the study.

Several studies deal separately with the concept of omnichannel retail and shopping and sustainability, but there are only a few studies that examine the relationship between the two. The present study defines and presents the concepts of omnichannel and sustainability separately and highlights the concepts that are crucial for the research. As mentioned above, omnichannel shopping focuses on integrated activities within and across channels to correspond to how customers shop and consumers can shop across channels anywhere and anytime (Sousa et al., 2021). It is important to highlight the work of Buldeo Rai et al. (2019a) in which six customer profiles were identified: pure offline, pure online, webrooming, showrooming, click-and-collect and ship-from-store. The present work mainly examined pure offline, pure online, showrooming and webrooming behaviours, but in some cases (especially during in-depth interview research) click-and-collect and ship-from-store behaviours were also mentioned, which allow us to conclude that consumers often switch and use channels together, so the omnichannel phenomenon is real. Regarding sustainable omnichannel behaviour, the present study uses the following categorization, which was also the basis and focus of the research: consumers can consider the package of the ordered product, or they can choose how the ordered product should be delivered (to collection points or the address of choice but by an eco-friendly vehicle), or they can search for information and alternative solutions on how to buy the product with the least environmental damage. The concept of the last mile was also presented in the current study, which is the most costly and polluting part of the delivery process. The relationship between omnichannel and sustainability was examined by some authors like Sousa et al. (2021), Buldeo Rai, Verlinde and Macharis (2019b), and Buldeo Rai, Verlinde and Macharis (2021), the latter two of which sought to explore

consumer perspectives and behaviour. However, no such research has been conducted in Hungary yet, which increases the novelty of the work.

Secondary trends have supported the fact that omnichannel retail and shopping and its sustainability aspects are of paramount importance to both retailers and consumers. According to secondary data, free shipping is the most attractive to consumers and is the most expected feature from companies. However, it is important to note that the sustainability aspect (sustainable packaging, eco-efficient delivery, or CO₂ neutral shipping) has already appeared in secondary research. So, it can be seen that there is a growing demand from consumers for sustainable transport alternatives and sustainable packaging. Secondary research confirms that it is worthwhile to address sustainable omnichannel behaviour in future research to gain a deeper understanding of the topic.

After reviewing the literature and processing the secondary data, own research was presented. The main part of the research was a survey, and additional in-depth interview research was also prepared. The questionnaire research sought answers to ten hypotheses, while the in-depth interview research sought answers to three main research questions (supplemented by sub-questions). During the analysis of the questionnaire data, five of the ten hypotheses were accepted: delivery preference, returning preference, and sustainable shopping have a positive significant effect on sustainable omnichannel behaviour. In addition to that, sustainable behaviour has a positive effect on sustainable shopping, and sustainable shopping has a positive effect on delivery preference.

The strongest relation was discovered between sustainable behaviour and sustainable shopping; therefore, the more sustainable someone is in their daily lives, the more sustainable they are in their purchases, which is also supported by the results of the in-depth interviews because the interviewees mentioned many sustainable behaviour patterns which is usual during their shopping journeys. Interviewees try to behave sustainably in different ways (non-packaging, buying used items, using tote bag, etc.) when shopping, in order to provide a better planet for their children and themselves. So, both quantitative and qualitative research reinforced the fact that the omnichannel behaviour of respondents is unequivocally affected by their approach to sustainability.

It can also be stated that the more sustainable a consumer is, the more sustainable decisions are made when purchasing in an omnichannel way, and the more environmentally conscious the consumer is, the more likely he/she is to demand sustainable delivery. In-depth interviews confirmed what was found in the secondary and primary research, as participants also

preferred free or cheaper modes of delivery, but at the same time the sustainability approach appeared more strongly in their responses than in the secondary or primary data because sustainable alternatives were considered more important than price in most cases. If the interviewees behave or shop sustainably, they will try to use sustainable delivery methods and less packaging. Therefore, it can be seen that the most influential factor is sustainable behaviour and sustainable shopping, which can determine omnichannel behaviour and delivery preferences. This was also confirmed by the interviewees during the qualitative research.

During the six in-depth interviews, the main forms of sustainability, omnichannel behaviour, and different motivations were explored. The most common way of shopping was traditional (non-packaging) shopping among the interviewees, but some consumers also had click-and-collect behaviour, which has reasons for both sustainability and cost savings. In terms of hypotheses, in-depth interviews tended to confirm significant hypotheses, as interviewees pursued a sustainable lifestyle, thus behaving sustainably in their purchases and omnichannel behaviours. Quantitative research has approached the issue of sustainability more in terms of emissions and packaging, which was supported by in-depth interview research, as in most cases participating consumers pay attention to that the courier should cover as few miles as possible and prefer less or recyclable packaging. Return was a less relevant factor, based on both qualitative and quantitative results. At the same time, ethical aspects emerged during the interviews, which were less covered by the questionnaire survey (e.g., fair trade, ethical aspects, etc.). Therefore, research should be expanded with this dimension in the future.

Regarding practical applicability of the research results, awareness of sustainability is growing around the world, and the environmental impact of online orders is becoming an important issue for logistics managers. Channel integration is a tool to pursue eco-efficiency strategies because it can simultaneously improve the environmental and economic impact of the logistics process to deliver online orders (Melacini and Tappia, 2018). As mentioned above, the last mile is the most polluting and costly part of the delivery. Therefore, with sustainable delivery solutions, companies cannot only reduce their CO₂ emissions but also reduce their costs. There are two ways to reduce the carbon emissions: to take operational measures (e.g., retailers use more energy efficient transportation) or to influence customers to have a more sustainable behaviour, e.g., a longer delivery window results in more environmentally sustainable delivery, so customers need to be encouraged to accept longer delivery windows (Ignat and Chankoc, 2020).

Qualitative and partially quantitative research revealed that customers consider three main factors during online purchases: comfort, sustainability, and price. In-depth interviews highlighted that the customers prefer cheaper delivery options, but they would be willing to pay more for sustainable options. Therefore, sustainability is more important to them than money and comfort. From this, it can be concluded that companies might earn more income with sustainable offers while reducing costs. Environmentally friendly actions can also increase the company's image and consumer loyalty, but they can also educate their consumers and encourage them to be more sustainable.

Regarding limitations and outlook, one of the possibilities for further development of the research is to include more ethical aspects in the model in addition to the mainly environmental aspects (e.g., fair working conditions and wages, etc.). Considerations of this nature may be worthwhile for both online and offline shopping. Regarding the omnichannel profiles, this research was focusing on pure offline, pure online, webrooming, and showrooming behaviour, so, in future research it would be worth to expand the topic to all six profiles in the light of sustainability.

The main limitation of the study was the lack of validation of the variables included in the model, which may have violated the validity criterion of the content, and the sample was not representative, so conclusions for the population could not be drawn in. At the same time, it also provides an opportunity to further develop the research, as the qualitative research part, supplemented by in-depth interviews, can provide a basis for the development of scales for sustainable omnichannel behaviour, after which appropriate validation can be performed.

It may be worthwhile to examine a larger sample with a larger number of items by factor analysis and cluster analysis, and a conjoint analysis of Buldeo Rai's sample, which would examine the purchasing habits and omnichannel behaviour of Hungarian consumers. This would provide a much more comprehensive and informative picture of consumers' sustainable omnichannel habits.

With respect to in-depth interview research, it provided an opportunity to learn about individuals and their motivations, but it is important to highlight the limitations of sample selection and methodology as the limitation of the research. The validity and generalizability of the research results are affected by both the number of respondents in the sample and the characteristics of the respondents, as the number of respondents in the sample does not represent the total population. It is recommended to extend the number of respondents to a

wider range (e.g., more age groups, men, people living in another residence, etc.), which may reveal new thoughts, motivations, and behaviours.

All in all, it is important to highlight that in the future, emphasis should be placed on extending the topic and the model with other factors and variables (e.g., ethical aspects, six profiles) and on representativeness, in order to draw detailed conclusions for the Hungarian population.

Overall, this is an extremely important and interesting topic, so it is worthwhile for both consumers and companies to keep an eye on changes in sustainable omnichannel behaviour, as the dynamic development and spread of technology and the Internet have made online shopping a priority and the alternation between channels has also become popular. The topic is therefore recommended for further research so that up-to-date knowledge is available in the future.

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6. Appendices

6.1. Questionnaire

Kedves Kitöltő!

Kulhavi Nikoletta vagyok, a Budapesti Corvinus Egyetem marketing mesterszakos hallgatója. A TDK-m, illetve szakdolgozatom során a többszatsatrnás értékesítés és fenntarthatóság kapcsolatát vizsgálom fogyasztói szemszögből, amelynek része az alábbi kérdőíves felmérés. A kutatásban való részvétel anonim és önkéntes, a kitöltés bármikor megszakítható. A szerzett információkat és a kutatás során kapott eredményeket bizalmasan kezelem, a TDK dolgozatom, a szakdolgozatom, valamint publikációim keretei között használok fel. A kérdőív kitöltése körülbelül 15 percet vesz igénybe.

Három szerencsés kitöltő között kisorsolok 3 darab 2000-forint értékű ajándécsomagot! (Amennyiben részt vennél a játékban a kérdőív kitöltés végén add meg email címedet.)

Köszönöm szépen mindenkinek, aki hozzájárul a sikeres TDK és szakdolgozatom megírásához!

I. Szűrő kérdés

1. Az elmúlt egy évben vásároltál ruházati (cipő, táska és kiegészítő nem tartozik ebbe a kategóriába), kozmetikai vagy szórakoztató elektronikai (pl.: mobiltelefon, kamera, e-book stb.) termékeket?
 - a) Igen
 - b) Nem -> kérdőív vége

II. Általános vásárlási szokások 3 termékkategóriát tekintve: Ruházat, kozmetikumok, szórakoztató elektronika.

2. Mely terméket/termékeket vásároltad az alábbiak közül az elmúlt egy évben? Több választ is megjelölhetsz!
 - a) Ruházati termék (cipő, táska és kiegészítő nem tartozik ebbe a kategóriába)
 - b) Kozmetikum
 - c) Szórakoztató elektronika (pl.: mobiltelefon, kamera, e-book stb.)
3. Válassz ki egyet az alábbi kategóriák közül, amelyet a legutóbb vásároltál! (A további kérdések erre a kategóriára fognak vonatkozni.)
 - a) Ruházati termék (cipő, táska és kiegészítő nem tartozik ebbe a kategóriába)
 - b) Kozmetikum
 - c) Szórakoztató elektronika (pl.: mobiltelefon, kamera, e-book stb.)
4. Gondolj az előző kérdésben megnevezett kategóriára! Mennyire jellemzőek rád a következő tevékenységek az előző kérdésben megjelölt kategória vásárlása során? Kérlek értékeld 1-től 7-ig skálán, ahol az 1 jelenti, hogy egyáltalán nem jellemző, a 7 pedig, hogy teljes mértékben jellemző.
 - Ha az interneten keresek, legtöbbször meg is veszem a kiválasztott terméket valamelyik webáruházban.
 - Sokszor az interneten keresem meg a terméket, amit meg akarok venni, de utána mindig elmegyek egy boltba és ott vásárlom meg.
 - Ha a boltban keresek, majd meglátok egy nekem tetsző terméket, ott helyben meg is veszem.
 - Ha a boltban keresek, majd meglátok egy nekem tetsző terméket, többnyire megkeresem az interneten és online veszem meg.

III. Kiszállítási preferencia

5. Mennyire jellemzőek rád az alábbi állítások? Kérlek értékeld 1-től 7-ig skálán, ahol az 1 jelenti, hogy egyáltalán nem jellemző, a 7 pedig, hogy teljes mértékben jellemző.

- a) A ruházati termékeket (cipő, táska és kiegészítő nem tartozik ebbe a kategóriába) online vásárolom.
- b) A kozmetikumokat online vásárolom
- c) A szórakoztató elektronikai termékeket (pl.: mobiltelefon, kamera, e-book stb.) online vásárolom.
6. Az alábbi termékkategóriák közül, melyiket vásároltad **online** a legutóbbi alkalommal?
- a) Ruházati termék (cipő, táska és kiegészítő nem tartozik ebbe a kategóriába)
- b) Kozmetikum
- c) Szórakoztató elektronika (pl.: mobiltelefon, kamera, e-book stb.)
- d) Még egyik termékkategóriát sem vásároltam online. -> Online-ra vonatkozó kérdések kihagyása**
7. Mennyire jellemzőek rád az alábbi állítások, amikor az általad választott termékkategóriában **ONLINE** vásárolsz? Az előző kérdésnél választott kategória legutóbbi online vásárlására gondolj! Kérlek értékeld 1-től 7-ig skálán, ahol az 1 jelenti, hogy egyáltalán nem jellemző, a 7 pedig, hogy teljes mértékben jellemző.
- A saját lakcímemre rendelem a termékeket.
 - A munkahelyem címére rendelem a termékeket.
 - Egyéb más címre rendelem a termékeket.
 - Csomagpontra kérem a termékeket.
 - Csomagautomatába kérem a termékeket.
 - Bolti átvételre kérem a termékeket
 - Nem vásárolok online az általam választott termékkategóriában.

8. Amennyiben nem kiválasztott címre kéred a rendelt terméket, legfeljebb mennyit vagy hajlandó utazni a vásárolt csomagért? Kérlek a választ egész számra kerekítve percben számítva add meg (pl.: 30 percet, 60 percet, 70 percet stb.).

Saját válasz

9. Mennyire jellemzőek rád az alábbi állítások, amikor az általad választott termékkategóriában **ONLINE** vásárolsz? Kérlek értékeld 1-től 7-ig skálán, ahol az 1 jelenti, hogy egyáltalán nem jellemző, a 7 pedig, hogy teljes mértékben jellemző.
- A kiszállítás módjának kiválasztásánál mindig az olcsóbb alternatívát választom.

- A kiszállítás módjának kiválasztásánál mindig a leggyorsabb alternatívát választom.
- A kiszállítás módjának kiválasztásánál mindig a legfenntarthatóbb (pl.: kevesebb legyen a szállítás következtében termelt károsanyagkibocsátás, kevesebb csomagolóanyagot használjanak, újrahasznosított csomagolóanyagot használjanak stb.) alternatívát választom.
- A kiszállítás módjának kiválasztásánál mindig a kilométerben legközelebbi alternatívát választom.
- A házhoz (vagy választott címre való) szállítás kiszámíthatatlansága miatt választok más alternatívákat.
- Az aznapi vagy legfeljebb a másnapi kiszállítást preferálok.
- Az ingyenes kiszállítási opciókat preferálok.
- Pénzspórolás céljából inkább a boltba vagy csomagpontra kérem a megrendelt terméket.
- Hajlandó vagyok tovább várni a termék kiszállítására, ha cserébe ingyenes a termék kiszállítása.
- Szeretnék több információt kapni az online vásárolt termékek fenntartható (pl.: alacsonyabb károsanyag kibocsátás, elektromos járművel való kiszállítás) kiszállításáról.
- Szeretnék több információt kapni az online vásárolt termékek fenntartható (pl.: kevesebb csomagolóanyag, újrahasznosított csomagolás stb.) csomagolásáról.
- Szeretném csökkenteni a külföldről rendelt termékek mennyiségét.
- Találkoztam már olyan online felülettel, amely biztosította a fenntartható (pl.: alacsonyabb károsanyag kibocsátás, kevesebb csomagolóanyag) kiszállítást.
- Hajlandó lennék többet fizetni a fenntartható termékátvételért (pl.: szállítás elektromos járművel, teherbírásos biciklivel, tömegközlekedéssel beutazni az átvevő pontra stb.).
- Hajlandó lennék többet fizetni a fenntartható kiszállítási csomagolásért (pl.: kevesebb csomagolás, környezetbarát csomagolóanyag, újrahasznosított csomagolóanyag stb.).
- Hajlandó lennék többet fizetni a termék kiszállításáért/átvételért, hogy ha a termék nem külföldről jön.

IV. Visszaküldési preferencia

10. Mennyire jellemzőek rád az alábbi állítások, amikor az általad választott termék kategóriában **ONLINE** vásárolsz? Kérlek értékeld 1-től 7-ig skálán, ahol az 1 jelenti, hogy egyáltalán nem jellemző, a 7 pedig, hogy teljes mértékben jellemző.

- Számomra nagyon fontos a termék visszaküldési lehetősége abban az esetben, ha termék nem megfelelő a számomra.
- Inkább a boltban veszem át a terméket, mert tudom, hogy ott biztosított a termék azonnali és ingyenes visszaküldése.
- Hajlandó vagyok többet fizetni a termék kiszállításáért, ha cserébe fennáll az ingyenes visszaküldés lehetősége.
- Hajlandó vagyok tovább várni a termék kiszállítására, ha cserébe fennáll az ingyenes visszaküldés lehetősége.
- Általában egyáltalán nem érdekel, hogy milyen visszaküldési lehetőségek állnak a rendelkezésemre.

V. Fenntartható/Környezettudatos vásárlás

11. Mennyire jellemzőek rád az alábbi állítások, amikor vásárolsz? Kérlek értékeld 1-től 7-ig skálán, ahol az 1 jelenti, hogy egyáltalán nem jellemző, a 7 pedig, hogy teljes mértékben jellemző.

- Minden esetben megnézem a termékek előállításának körülményeit.
- Kozmetikumok esetén, minden esetben megnézem a termékek összetételét.
- Nem vásárolok fast fashion termékeket.
- Csomagolásmentesen vásárolok.
- Nem vásárolok olyan kozmetikumokat, amelyeket állatokon teszteltek.
- Nem kérek kiszállítást, inkább a boltban veszem át a termékeket, hogy ezzel is csökkentsem a károsanyag kibocsátást.
- Ha van választási lehetőség, mindig azt a terméket választom, amely a legkisebb mértékben járul hozzá a környezeti ártalmakhoz.
- Vannak olyan termékek, amelyeket környezetvédelmi okokból lecseréltem.
- Ha megértem, hogy egyes termékek milyen potenciális károkat okozhatnak a környezetben, akkor nem vásárolom meg ezeket a termékeket.
- Nem veszek olyan háztartási termékeket, amelyek károsak a környezetre.

- Lehetőség szerint újrahasznosítható vagy újrahasznosítható edénybe csomagolt termékeket vásárolok.
- Mindent megteszek, hogy újrahasznosított papírból készült papírtermékeket (vécépapír, zsebkendő stb.) vásároljak.
- Nem veszek meg egy terméket, ha tudom, hogy az árusító cég társadalmilag felelőtlen.
- Nem vásárolok termékeket olyan cégektől, amelyekről tudom, hogy munkavégzést, gyermekmunkát vagy más rossz munkakörülményeket használnak.
- Hajlandó vagyok többet fizetni a környezetbarát termékekért akkor is, ha van olcsóbb alternatíva.
- Hajlandó vagyok többet fizetni a társadalmilag felelős termékekért akkor is, ha van olcsóbb alternatíva.

12. Találkoztál-e már a vásárlásaid során olyan termékkel, amelyen valamilyen formában feltüntették a kézhez vétel (kiszállítás, bolti átvétel, csomagponti/csomagautomatás átvétel stb.) környezetbarát jellegét?

- Igen, viszonylag gyakran.
- Ritkán.
- Nem, még soha.
- Egyéb.
- Nem válaszolt.

13. Amennyiben találkoztál már ilyen lehetőséggel a vásárlásaid során, kérlek nevezd meg, hogy hol!

Saját válasz

VI. Fenntartható/környezettudatos omnichannel viselkedés

14. Mennyire jellemzőek rád az alábbi állítások, amikor az általad választott termékkategóriában vásárolsz? Kérlek értékeld 1-től 7-ig skálán, ahol az 1 jelenti, hogy egyáltalán nem jellemző, a 7 pedig, hogy teljes mértékben jellemző.

- Amennyire lehetséges, figyelembe veszem a környezeti hatásokat (pl.: kevesebb csomagolás, kevesebb károsanyag kibocsátás stb.) a hagyományos (bolti) vásárlásom során.

- Amennyire lehetséges, figyelembe veszem a környezeti hatásokat (pl.: kevesebb csomagolás, kevesebb károsanyag kibocsátás stb.) az online vásárlásom során.
- Számomra fontos, hogy a futárok teherautóikkal kevesebb kilométert tegyenek meg a csomagjaim kiszállítása közben.
- Fontos számomra, hogy a futárok teherautóikkal a lakóhelyem környezetében kevesebb kilométert tegyenek meg a csomagjaim kiszállítása közben.
- Csomagomat kész vagyok csomagpontban átvenni, ha a futároknak kevesebb kilométert megtennie ennek köszönhetően.
- Hajlandó vagyok tovább várni a csomagjaimmal, ha a futárok így kevesebb kilométert tesznek meg.
- Számomra fontos, hogy az általam egyszerre megrendelt termékeket egyben szállítsák ki.
- Együttes kézbesítés esetén hajlandó vagyok tovább várni a csomagjaimmal.
- Hajlandó vagyok többet fizetni a fenntartható elektromos járművel történő kiszállításért.
- Hajlandó vagyok többet fizetni a fenntartható teherbiciklivel való kiszállításért.

VII. Általános fenntartható/környezettudatos magatartás

15. Mennyire jellemzőek rád az alábbi állítások? Kérlek értékeld 1-től 7-ig skálán, ahol az 1 jelenti, hogy egyáltalán nem jellemző, a 7 pedig, hogy teljes mértékben jellemző.

- Számomra fontosak a fenntarthatósági (pl.: környezetvédelem, társadalmi felelősségvállalás, tisztességes munkakörülmények biztosítása) szempontok.
- Véleményem szerint az emberek fogyasztási (vásárlási) szokásai szerepet játszanak a fenntarthatósági (pl.: klímaváltozás, felmelegedés tisztességtelen munkakörülmények, elszegényedés) problémák fokozódásában.
- Szelektíven gyűjtöm a szemetet.
- Turkálóban vásárolok.
- Vegetáriánus vagy vegán életmódot folytatok.

- Igyekszem a közvetlen környezetem (pl.: szülők, család, barátok stb.) körében is népszerűsíteni a fenntarthatósági (pl.: környezetvédelem, társadalmi felelősségvállalás, tisztességes munkakörülmények biztosítása) szempontokat.
- Energiatakarékosan főzöm/készítem el az ételeimet.
- Nem dobom ki a maradékot, a következő étkezésnél megeszem.
- Harapnivalókat, italokat eldobható csomagolásban vásárolok (elvitelre, gyorsétterem, kávé elvitelre stb.).
- Előfordul, hogy kidobom az élelmiszereket.
- Tejtermékeket eszek (vaj, sajt, joghurt stb.).
- Elajándékozom vagy elcserélem a nem kívánt ruhadarabokat, amelyeket már nem hordok.
- Ahelyett, hogy új ruhadarabot vásárolnék egy különleges alkalomra, inkább kölcsönkérek valamit.
- Magam készítek ruhadarabokat (pl. varrás, kötés).
- Kidobom azokat a ruhadarabokat, amiket már nem hordok.

VIII. Demográfia

16. Nemed?

- Nő
- Férfi

17. Hány éves vagy?

Legördülő lista

18. Hol laksz?

- Főváros
- Nagyváros
- Kisváros
- Falu
- Egyéb

19. Mi a legmagasabb iskolai végzettséged?

- Általános iskola
- Gimnázium
- Szakközépiskola
- OKJ képzés

- e. Főiskola/alapszak
- f. Egyetem/mesterszak

20. Mi a foglalkozásod?

- a. Tanuló
- b. Teljes munkaidős munkavállaló
- c. Részmunkaidős munkavállaló
- d. Egyéni vállalkozó
- e. Nem dolgozom
- f. Doktori/PhD
- g. Egyéb

21. Mi az irányítószámod?

22. A kutatásom további részeként szeretnék mélyinterjúkat szervezni. Amennyiben érdekel a kutatásom témája, szívesen beszélgetnél velem a fenntartható vásárlásról, illetve szeretnéd tovább segíteni a kutatásomat, akkor írd ide az email címedet:

Saját válasz

23. Amennyiben szeretnél részt venni az ajándécsomag sorsolásán, kérlek add meg az email címedet:

Saját válasz

6.2. In-depth interview guide

Szűrőkérdések

1. Kitöltötte a kérdőívet?
 - a. Igen
 - b. Nem – **Nem megfelelő alany**
2. Saját véleményed szerint fenntarthatóan viselkedsz a mindennapjaid és vásárlásaid során?
 - a. Igen
 - b. Nem – **Nem megfelelő alany**
3. Az elmúlt 6 hónapban vásároltál ruházati, kozmetikai vagy szórakoztató elektronikai terméket?
 - a. Igen
 - b. Nem – **Nem megfelelő alany**

Szia!

Kulhavi Nikoletta vagyok a Budapesti Corvinus Egyetem hallgatója. Jelenleg marketing mesterszakon tanulok és most írom a TDK dolgozatomat. A dolgozatomban a fogyasztók többszámú vásárlását vizsgálom, illetve ezen tevékenység fenntarthatósági vonatkozását. Tehát azt, hogy a fogyasztók mennyire veszik figyelembe a fenntarthatósági szempontokat a hagyományos, bolti, valamint az online vásárlás során. A beszélgetésről hangfelvételt készítek. A beszélgetés körülbelül 30-45 percet vesz igénybe. Az említett témákat, válaszokat csak a TDK dolgozatomban, szakdolgozatomban, illetve az ehhez kapcsolódó publikációimban használom fel és névtelenül, anonim módon hivatkozok a beszélgetésben elhangzottakra. Az elmondottak ismeretében beleegyezel az interjú elkészítésébe?

- Igen – ok
- Nem – elköszönés

I. Általános vásárlási szokások

1. Általában hogyan? Milyen körülmények között vásárolsz? Hol? Kivel? Mikor? Milyen napszakban?
2. Az offline vagy az online vásárlást preferálsz inkább? Miért?
3. A COVID-19 változtatott a vásárlási szokásaidon? Ha igen, miben?

II. Online vásárlási szokások

4. Szoktál online vásárolni? Miért? Mi jellemzi az online vásárlásodat? Miket szoktál online vásárolni? Milyen gyakran vásárolsz online?
5. Milyen átvételi módokat preferálsz és miért? Házhoz szállítás, csomagpont, csomagautomata, bolti átvétel? Ha házhoz szállítás, akkor milyen címre?
6. Mi alapján választod ki az átvételi módokat?
7. Mennyire jellemző, hogy online veszed meg az árut és a boltban veszed át? Miért?
8. Mennyire jellemző, hogy online utána nézel a vásárolni kívánt terméknek és a boltban veszed meg inkább? Miért?

III. Fenntartható életmód

9. A mindennapokban fenntarthatónak/környezetbarátnak gondolod magad és a viselkedésedet? Miért? Miben nyilvánul meg?
10. Az életed mely területén viselsz fenntarthatóan (pl.: étkezés, ruházkodás, élelmiszer vásárlás stb.) és hogyan?

11. Milyen motivációid vannak a fenntartható életmód iránt? Miért élsz fenntartható életet?
12. Szerinted az emberek fogyasztási (vásárlási) szokásai szerepet játszanak a fenntarthatósági (pl.: klímaváltozás, felmelegedés tisztességtelen munkakörülmények, elszegényedés) problémák fokozódásában?
13. Milyen lépéseket teszel azért, hogy fenntarthatóbb világban éljünk?
14. Van olyan termék/vállalat, amelyet a fenntarthatósági szempontok miatt hagytál el? Melyek ezek és miért?

IV. Vásárlási szokások és fenntarthatóság kapcsolata

15. Hagyományos vásárlások során fenntarthatóan viselkedsz? Miért? Miben nyilvánul meg?
16. Online vásárlások során fenntarthatóan viselkedsz? Miért? Miben nyilvánul meg?
17. Figyelembe veszed hagyományos vásárlásnál a környezeti hatásokat? Mely hatásokat veszed figyelembe?
18. Figyelembe veszed online vásárlásnál a környezeti hatásokat? Mely hatásokat veszed figyelembe?
19. Online vásárlásnál hogyan mérlegeled a visszaküldési lehetőségeket? Milyen visszaküldési módokat preferálsz? Fontos ez a lehetőség számodra? Mérlegeled ilyenkor a környezeti hatásokat (pl.: extra csomagolás, futár kétszer jön ki érte stb.)?
20. Szoktál külföldről rendelni? Milyen sűrűn? Ha nem, akkor miért nem?
21. Szerinted hogyan lehetne fenntarthatóbbá tenni az online vásárlást, kiszállítást vagy a visszaküldést?
22. Ismersz olyan vállalatot, céget, amely hangsúlyozza a kiszállítás fenntarthatóságát akár csomagolás, akár kiszállítás esetében? Ha igen kik és ők hogyan teszik ezt meg? Honnan hallottál róluk?
23. Ha nem, akkor példák: Kifli.hu (megjelölheted, hogy melyik nap kéred, de látod azt is, hogy mikor jár arra futár, ezzel csökkentheted a károsanyag kibocsátást), DHL (újrahasznosított csomagolóanyag), MargaréTalány (újrahasznosított tömőanyag) stb. Mi a véleményed ezekről a lehetőségekről? Melyik tetszik? Melyik nem? Igénybe vennél ilyen szolgáltatásokat? Melyiket? Ha nem, miért nem? Hajlandó lennél ezekért a szolgáltatásokért többet fizetni?

6.3. Descriptive characteristics of indicators

Likert scale 1–7; 1 – not typical at all; 7 – very typical; N = 203

Table 22: Key descriptive characteristics of the constructs (own editing based on own research)

Construct, indicator	Question	Sample	
		Mean	Standard deviation
Sustainable omnichannel behaviour			
Sust_omch_behav_1	As much as possible, I consider environmental impacts (e.g., less packaging, less emissions, etc.) when making my traditional (in-store) purchase.	4.64	1.9
Sust_omch_behav_2	As much as possible, I consider environmental impacts (e.g., less packaging, less emissions, etc.) when shopping online.	4.25	1.98
Sust_omch_behav_3	It's important to me that couriers travel less miles with their trucks while delivering my luggage.	3.77	2
Sust_omch_behav_4	It's important to me that couriers travel less miles with their trucks around my place of residence while delivering my luggage.	3.79	2.45
Sust_omch_behav_5	I am ready to pick up my package at the parcel point if the couriers have to travel less miles due to this.	4	2.19
Sust_omch_behav_6	I'm willing to wait any longer with my luggage if the couriers do less miles this way.	4.59	2.09
Sust_omch_behav_7	It is important to me that the products I have ordered at the same time are delivered at the same time.	5.44	1.8
Sust_omch_behav_8	In case of joint delivery, I am willing to wait any longer with my packages	5.24	1.81
Sust_omch_behav_9	I am willing to pay more for shipping with a sustainable electric vehicle.	3.49	2
Sust_omch_behav_10	I am willing to pay more for delivery on a sustainable truck.	3.44	1.91
Sustainable shopping			
Sust_shop_1	In each case, I look at the conditions under which the products are manufactured.	3.06	1.29
Sust_shop_2	In the case of cosmetics, I always look at the composition of the products.	4.76	2.18
Sust_shop_3	I don't buy fast fashion products.	3.91	2.09
Sust_shop_4	I buy products without packaging.	3.57	1.82
Sust_shop_5	I don't buy cosmetics that have been tested on animals.	4.97	2.11
Sust_shop_6	I don't ask for delivery; I prefer to pick up the products in the store to reduce emissions.	3.34	1.94
Sust_shop_7	If there is a choice, I always choose the product that contributes the least to the environmental damage.	4.83	1.98

Sust_shop_8	There are products that I have replaced for environmental reasons.	4.64	2.28
Sust_shop_9	If I understand the potential damage that certain products can cause to the environment, I will not purchase these products.	4.87	1.79
Sust_shop_10	I do not buy household products that are harmful to the environment.	4.26	1.89
Sust_shop_11	If possible, I buy products packaged in recyclable or reusable containers.	4.47	2
Sust_shop_12	I do my best to buy paper products made from recycled paper (toilet paper, handkerchiefs, etc.).	3.95	1.86
Sust_shop_13	I don't buy a product if I know the company selling it is socially irresponsible.	4.49	2.06
Sust_shop_14	I don't buy products from companies that I know use child labour, or other poor working conditions.	5.01	1.96
Sust_shop_15	I am willing to pay more for eco-friendly products even if there is a cheaper alternative.	4.47	1.88
Sust_shop_16	I am willing to pay more for socially responsible products even if there is a cheaper alternative.	4.33	1.83
Sustainable behaviour			
Sust_behav_1	Sustainability aspects (e.g., environmental protection, social responsibility, ensuring decent working conditions) are important to me.	5.31	1.6
Sust_behav_2	In my opinion, people's consumption (buying) habits play a role in increasing sustainability problems (e.g., climate change, warming, unfair working conditions, impoverishment).	5.7	1.45
Sust_behav_3	I collect garbage selectively.	5.66	1.9
Sust_behav_4	I also try to promote sustainability aspects (e.g., environmental protection, social responsibility, ensuring fair working conditions) in my close environment (e.g., parents, family, friends, etc.).	4.68	1.88
Delivery preference			
Deliv_pref_1	I would like to receive more information about the sustainable (e.g., lower emissions, delivery by electric vehicle).	4.32	2.09
Deliv_pref_2	I would like more information on sustainable packaging for products purchased online (e.g., less packaging, recycled packaging, etc.).	4.74	2.04
Deliv_pref_3	I would like to reduce the number of products ordered from abroad.	4.63	2.12
Deliv_pref_4	I have already come across an online interface that has ensured sustainable (e.g., lower emissions, less packaging) delivery.	2.84	2.24
Deliv_pref_5	I would be willing to pay more for a sustainable take-over of goods (e.g., transport by electric vehicle, heavy duty bicycle, travel by public transport to the receiving point, etc.).	3.45	1.77

Deliv_pref_6	I would be willing to pay more for sustainable shipping packaging (e.g., less packaging, eco-friendly packaging, recycled packaging, etc.).	4.25	1.95
Deliv_pref_7	I would be willing to pay more for shipping / receiving the product if the product does not come from abroad.	3.47	1.89
Returning preference			
Return_pref_1	I prefer to pick up the product at the store because I know that the product will be returned immediately and free of charge there.	3.33	2.1

6.4. Loadings T-values

Table 23: Loadings T-values (own editing based on own reserach)

Indicator	Returning preference	Sustainable shopping	Sustainable omnichannel behaviour	Sustainable behaviour	Delivery preference
Deliv_pref_1					13.6820
Deliv_pref_2					16.9327
Deliv_pref_3					8.6406
Deliv_pref_4					4.4879
Deliv_pref_5					13.3285
Deliv_pref_6					11.6369
Deliv_pref_7					7.2452
Return_pref_1					
Sust_shop_1		9.3651			
Sust_shop_2		7.9545			
Sust_shop_3		6.5538			
Sust_shop_4		11.7506			
Sust_shop_5		9.4025			
Sust_shop_6		6.2936			
Sust_shop_7		18.4246			
Sust_shop_8		18.9425			
Sust_shop_9		19.2247			
Sust_shop_10		13.0266			
Sust_shop_11		22.9144			
Sust_shop_12		18.0917			
Sust_shop_13		9.9524			
Sust_shop_14		10.0743			
Sust_shop_15		22.4482			
Sust_shop_16		15.4259			
Sust_omch_behav_1			18.8597		
Sust_omch_behav_2			23.0490		
Sust_omch_behav_3			21.9795		
Sust_omch_behav_4			23.9144		
Sust_omch_behav_5			6.4658		
Sust_omch_behav_6			11.8285		
Sust_omch_behav_7			4.3385		

Sust_omch_behav_8			10.4256		
Sust_omch_behav_9			17.2701		
Sust_omch_behav_10			23.1130		
Sust_behav_1				18.4395	
Sust_behav_2				12.7790	
Sust_behav_3				6.7315	
Sust_behav_4				20.8228	