QUANTITATIVE ANALYSIS OF CONSUMER PREFERENCES

Deliverable 2.5

Version number: Final version

Date for release: 31/05/2025

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This project has received funding from the European union's Horizon Europe research and innovation programme under grant agreement Nr. 101146909.

Deliverable administrative information

Deliverable Administration						
Project number	101146909	**Project acronym**	CodeZERO			
Deliverable no.	2.5	**Name**	Co-Design Of E-Commerce Last-Mile Delivery and Return Options With Zero Emissions			
Status	Draft	**Due**	31/05/2025	**Date**	31/05/2025	
Author(s)	Kathleen Cauwelier, Heleen Buldeo Rai, Janin Fauth, Philippe Lebeau (Mobilise, VUB)					
Status	**To be approved by the European Commission**					
Dissemination levels	PU					

Document history	Version	Date	Submitted	Reviewed	Status	Dissemination level
	V1	12/05/2025	Kathleen Cauwelier (VUB)	Delphine Pernot & Ross O. Phillips (TOI)	Draft	PU
	V2	16/05/2025	Kathleen Cauwelier (VUB)	Claudia de Stasio (TRT)	Draft	PU
	V3	22/05/2025	Kathleen Cauwelier (VUB)	Claudia de Stasio (TRT)	Draft	PU
	V4	28/05/2025	Kathleen Cauwelier (VUB)	Claudia de Stasio (TRT)	Final	PU

List of abbreviations and acronyms

Acronym	Meaning
BAU	Business-as-usual
BE	Belgium
CBC	Choice-based conjoint
DE	Germany
FR	France
GR	Greece
HB	Hierarchical Bayesian
HB-MNL	Hierarchical Bayesian Multinomial Logit
ISCED	International Standard Classification of Education
IT	Italy
LC-MNL	Latent class Multinomial Logit
NL	The Netherlands
NO	Norway
SE	Sweden
SP	Spain

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Copyright Statement

Abstract

This deliverable explores how online consumers across ten European countries make trade-offs between cost, convenience, and sustainability when selecting delivery and return options. The study aims to better understand consumer behaviour in e-commerce contexts to support the development of more sustainable last-mile delivery and return solutions.

The research is based on a large-scale online survey (10,092 respondents) and a choice-based conjoint experiment designed to simulate realistic decision-making scenarios. Six key delivery attributes were examined: price, delivery partner & ethics, speed, tracking information, location, and packaging. A separate set of attitudinal items captured how consumers perceive and engage with returns.

Two main objectives guided the study: (1) identifying the conditions under which consumers are willing to choose more sustainable delivery options, and (2) understanding how consumer attitudes toward returns contribute to national differences in return behaviour.

Findings show that delivery price is the most influential factor, with a non-linear response pattern. Consumers strongly prefer free or low-cost delivery and willingness to pay drops sharply as prices increase. Beyond price, consumers also value ethical and convenience-related attributes, showing moderate but consistent preferences for eco-friendly delivery options and home delivery. Segmentation analysis revealed four distinct consumer profiles, i.e. price-sensitive, home-delivery-focused, service-oriented, and sustainability-driven, each with different priorities and thresholds for adopting sustainable alternatives. Preferences were broadly consistent across product types and countries but revealed clear local variations in delivery habits.

In terms of returns, four attitudinal profiles emerged, ranging from convenience-focused to return-avoidant consumers. These attitudes significantly influenced return frequency and helped explain cross-country differences. The findings highlight that return behaviour is shaped not just by policy or logistics, but also by personal norms, emotions, and cultural context.

Overall, the study offers a broader understanding of consumer behaviour and provides a strong empirical foundation for designing communication strategies and behaviour change interventions.

This deliverable is to be approved by the European Commission

Executive summary

Given the rapidly growing e-commerce sector and the growing number of studies on sustainable last-mile distribution, there is a growing recognition that consumer behaviour is a critical component of last-mile delivery operations. And while consumers are becoming increasingly aware of sustainability, many continue to prioritise convenience and cost over more sustainable delivery options. As a result, there is little evidence to suggest that sustainable delivery choices are gaining significant traction. This poses a challenge, as active consumer engagement is essential for implementing solutions such as using out-of-home delivery options, like parcel lockers, or flexibility with delivery timeframes to improve route optimization. Understanding these behaviours not oly provides insights into individuals' choices and preferences, but it also provides a basis for designing targeted interventions to encourage sustainable supply choices. Therefore, the design of sustainable delivery solutions should not only focus on retailers and logistics providers, but also critically examine the role of consumers, who are important players in advancing the sustainability agenda.

These are precisely the challenge that CodeZERO is addressing by working with retailers, logistics service providers, local authorities and consumers to create a sustainable and emission-free solutions for e-commerce delivery and return. The aim is thus to match consumer preferences with options that are sustainable for retailers, logistics providers and local authorities and to develop communication guidelines to engage and help consumers choosing sustainable delivery and return options.

This report contributes to this ambition by providing in-depth and empirical insights into the way consumers make decisions regarding delivery and return options when ordering online. More specifically, it examines what trade-offs consumers make and under what conditions consumers are willing to opt for more sustainable forms of delivery. It also examines how their attitudes towards returns may contribute to differences in return behaviour. A better understanding of these factors is crucial for designing behavioural change strategies that are not only effective but also consider the trade-offs consumers have to make in practice.

To achieve this, a large-scale online survey (10,092 respondents) was conducted with a choice-based conjoint exercise in ten European countries: Belgium, the Netherlands, Italy, France, Spain, Norway, Sweden, Poland, Greece and Germany. The experiment focused on six delivery attributes, i.e., price, delivery partner & ethics, speed, flexibility, location and packaging, to simulate realistic decision situations and assess how consumers make their trade-offs. A separate set of attitudinal statements explored how consumers view and interact with product returns. The study is guided by two key objectives:

- **Objective 1**: Understanding consumers' willingness to trade fast and free deliveries for more sustainable alternatives (Trade-offs in delivery choices). This includes five research questions on how preferences vary across attributes, segments, product types, and national contexts.
- **Objective 2**: Understanding consumers' attitudes in relation to returns as a reason behind varying return rates, and whether these attitudes help explain variation in return rates across Europe.

Trade-offs in delivery choices

The findings show that delivery price is the most decisive factor shaping consumer preferences. Moreover, the utilities scores of price reveal a non-linear relationship which indicates that consumer show a very strong preference for free delivery, remain moderately open to low-cost options (e.g., €2.99), but demonstrate a sharp drop in preference once prices exceed €3.99. Beyond price, consumers also respond to ethical and convenience-related attributes. There is a moderate but consistent preference for eco-friendly or socially responsible delivery partners, particularly when these options do not compromise convenience. Home delivery remains the most popular option overall, although some openness exists toward alternative formats such as parcel lockers and pick-up points under the right conditions. Packaging, speed, and tracking features also influence decisions but tend to play a secondary role.

A segmentation analysis was conducted to further examine whether any differences in preferences could be identified. Results identified four distinct consumer groups in which the trade-offs and preferences in delivery attribute are different:

1. Price-sensitive consumers
2. Home delivery-focused consumers
3. Service-oriented consumers
4. Sustainability-driven consumers.

This demonstrate that consumer decision-making is not uniform and preferences vary significantly by segment, with each group making trade-offs based on its own priorities. There is no universal sustainable delivery solution that will appeal to all consumers. As such, targeted interventions are required to match specific consumer expectations and overcome group-specific barriers.

Although the structure of decision-making is similar across the ten countries, national differences do emerge. For instance, home delivery dominates in Belgium and the Netherlands, while parcel lockers are more common in Germany and Poland. Free delivery is particularly important in Italy and Norway, while preferences for delivery partners and packaging options vary by local context. Finally, product type plays a modest but measurable role. Circular and food-related purchases tend to prompt slightly greater openness to more sustainable delivery formats. However, the underlying hierarchy of preferences, price first, followed by convenience and then sustainability, remains largely consistent.

Return attitudes and behaviours

The study also explored how consumers perceive and manage product returns, revealing that return behaviour is not purely rational, it is shaped by attitudes, emotions, and norms. Across the ten countries, four distinct return mindsets were identified: some consumers view returns as a routine convenience, while others find them stressful, burdensome, or even ethically questionable. These differences help explain why return rates vary so widely across Europe. For example, consumers in Germany are more likely to treat returns as a normal part of shopping, while those in Southern Europe, such as Spain and Italy, tend to avoid returning products unless necessary. Nordic consumers, on the other hand, often approach returns with more caution, influenced by environmental concerns or a desire to limit waste.

Additionally, these attitudes matter because they strongly correlate with actual behaviour. Those who view returns as easy and acceptable return more frequently, while those who associate them with guilt or hassle return much less. This suggests that improving the sustainability impact of returns requires more than optimising logistics, it also means addressing the psychological and cultural context behind return choices. Strategies to reduce unnecessary returns will be most effective when they acknowledge these underlying attitudes and adapt communication accordingly.

These insights will support CodeZERO's next steps in aligning consumer behaviour with more sustainable delivery and return systems.

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1 Introduction

1.1 About CodeZERO

CodeZERO is a three-year Horizon Europe research project aiming to co-create **sustainable and zero-emission last-mile delivery and return solutions for ecommerce** that align with **consumers'** preferences while being sustainable for **retailers, logistics operators** and **local authorities**. Additionally, the project is focused on providing clear, consumer-friendly communication and developing tools for local authorities to promote eco-friendly behaviour.

CodeZERO is articulated in four phases:

- An **ANALYSIS** phase which provides (1) an analysis of existing delivery and return options and an understanding of how they are shaped by the needs and constraints of all involved stakeholders; (2) an in-depth intersectional analysis of various groups of on-line consumers to understand what are the features of delivery and return options making them attractive, with the aim to identify mechanisms to incentivize behaviour changes; and (3) an assessment framework to measure the impacts in the environmental, economic and social domains of new solutions.
- A **DESIGN** phase, in which CodeZERO engages in a co-design process involving retailers, transport operators, consumers and local authorities in developing (1) guidelines for retailers to raise awareness among consumers; (2) a set of zero-emission and sustainable delivery and return options for retailers and transport operators; and (3) a toolset for local authorities to accelerate the transition towards sustainable solutions in last mile consignments in e-commerce.
- A **TEST** phase running four pilots in four different European cities in Italy, Netherlands, Belgium, and Norway to test a set of sustainable solutions identified in the previous phase with the aim to prove their feasibility, to fine-tune their design and to assess their impacts from the perspective of all stakeholders.
- A **CONSOLIDATION** phase where (1) CodeZERO outcomes are fine-tuned based on the lessons learned from real life applications, (2) requirements for up-scaling of solutions at European level are discussed (3) recommendations are formulated and (4) directions for future research are outlined.

Engagement with consumers and retailers' associations, industry stakeholders, cities and researchers contributes to shaping project results.

Running from June 2024 to May 2027, CodeZERO is organized along eight WPs:

- WP1 Analysis of current delivery models
- WP2 Analysis of consumers' behaviour
- WP3 CodeZERO assessment framework
- WP4 Design of CodeZERO solutions
- WP5 Testing solutions: CodeZERO living labs
- WP6 Conclusions and recommendations
- WP7 Dissemination, communication and exploitation
- WP8 Project management.

1.2 Aim of this document

This document outlines the work carried out in task 2.4, which explores how online consumers make choices about delivery and return options, especially when they involve trade-offs between price, convenience and sustainability. The main goals are to understand under which conditions consumers are open to more sustainable delivery options and to examine the role that return attitudes play in shaping their behaviour.

To do this, a choice-based conjoint experiment was set up, supported by a large-scale online survey (N = 10,092) in ten European countries (Belgium, the Netherlands, Italy, France, Spain, Norway, Sweden, Poland, Greece and Germany). The design focuses on key delivery attributes, such as price, speed, reliability, flexibility, location, and packaging, and looks at how consumers make trade-offs between all

of them. It also considers how these trade-offs vary depending on the type of product (non-food, food, circular), consumer characteristics, and country context.

The selection of attributes was directly informed by the framework developed in CodeZERO deliverable 1.1 (Fiorello et al., 2024), which identified key delivery and return features from a multi-stakeholder perspective, including consumers, retailers, logistics providers, and local authorities. This was further refined using insights from qualitative work in deliverables 2.2 (Pernot et al., 2025) and 2.3 (Phillips & Pernot, 2025). From a methodological standpoint, the final design aligns with best practices in conjoint analysis, which recommend limiting complexity, typically to no more than six attributes and up to eight levels, to maintain data quality and avoid respondent fatigue (Orme, 2010; Hair et al., 2010).

Building on both the results from deliverable 1.1 (Fiorello et al., 2024), 2.2 (Pernot et al., 2025) and 2.3 (Phillips & Pernot, 2025), and the above-mentioned methodological guidelines, return conditions were not included in the choice experiment. Including them would have increased the complexity of the design beyond recommended limits, potentially reducing data quality. Yet being able to return products is an inherent part of the online shopping experience. Consequently, returns management has become an efficiency and sustainability issue in its own right. Currently, consumers send back almost one fifth of their online purchases (Ecommerce News, 2025). Return rates depend on the product category and vary between countries. This is also the case in Europe, despite a common legal framework, including the Right of Withdrawal (European Union, 2025), and a dominance of multinational webshops and marketplaces (e.g., Zalando, Amazon). Return rates in Europe from 2022 for fashion purchases only, shows that Western European countries (e.g., Switzerland (45%), Germany (44%)) return more and Southern European countries (e.g., Italy (17%), Spain (19%)) return less (Statista, 2024). Relatively little research has been done on the reasons behind these differences, although some researchers point to attitudes (Mun et al., 2014; Wachter et al., 2012), values (Hjort et al., 2013), perceptions (Wachter et al., 2012), and norms (Lv & Liu, 2022; Mun et al., 2014; Wachter et al., 2012). Hjort et al. (2013) call to explore in future research why consumers behave differently and Mun et al. (2014) advocate to include individuals from different cultures. More recently, Phau et al. (2022) highlight that cultural differences play a fundamental role in returns and are relevant to investigate from a practical and managerial perspective. Therefore, return-related preferences and attitudes were captured through a separate set of 20 attitudinal statements. This approach allowed for a more focused and interpretable experiment, while also enabling a more comprehensive investigation of return attitudes and behaviour, particularly relevant given that return conditions are relatively similar across Europe, whereas return rates vary considerably.

The study is guided by two central research objectives and a corresponding set of research questions:

Objective 1: Understanding consumers' willingness to trade fast and free deliveries for more sustainable alternatives (Trade-offs in delivery choices)

- **RQ1a**: How do key delivery attributes (e.g., price, speed, location, reliability, flexibility, packaging) shape preferences of online consumers?
- **RQ1b**: Are these preferences consistent across all consumers, or can we identify distinct consumer segments with different preferences?
- **RQ1c**: Under which circumstances do consumers trade their preferred deliveries for more sustainable alternatives?
- **RQ1d**: How do consumer preferences for delivery options vary across product types (non-food, food, circular items)?
- **RQ1e**: Are there differences in consumer preferences for delivery options across European countries?

Objective 2: Understanding consumers' relation to returns as a reason behind varying return rates.

- **RQ2a**: Do consumers in European countries relate differently to e-commerce returns?
- **RQ2b**: Do differences in how consumers relate to e-commerce returns result in different purchase and return behaviour?

The rest of this deliverable is organised as follows: Section 2 discusses the methodology applied in the study, and section 3 dives into the results, where each of the research questions will be addressed separately. Section 4 summarizes and concludes this report.

2 Methodology

2.1 Survey implementation and design

To investigate how different consumers make other trade-offs among key delivery attributes, this research employs choice-based conjoint (CBC) experiments (presented in detail in section 2.3). The data collection was conducted through an online survey targeting online consumers in ten European countries: Belgium, the Netherlands, Italy, France, Spain, Norway, Sweden, Poland, Greece, and Germany. A total of 10,092 respondents completed the survey, with approximately 1,000 participants per country. Respondents were recruited by the panel provider IPSOS, using quota sampling (see section 2.2) to ensure representativeness of national populations of e-commerce users. Respondents did not receive specific financial incentives for this survey. However, as members of the consumer panel, they were able to collect points through participation, which are redeemable according to the panel's existing reward system.

The survey was structured into six main parts (see **Annex I – Questionnaire** for full questionnaire):

1. **Introduction and informed consent**, including information on data processing and GDPR compliance.
2. **Questions on online shopping and delivery habits**, such as purchase frequency, preferred delivery methods, and return experiences.
3. **Choice-based conjoint experiment**, composed of ten choice tasks per respondent. Each task presented three delivery options. No "none of the above" option was included. As this component is the core of the survey, it is described in more detail in section 2.3.
4. **Attitudinal statements** questions related to their **sustainability engagement**, and delivery expectations.
5. **Attitudinal statements** questions related to **return preferences**
6. **Demographic and socio-economic questions**, covering age, gender, household composition, education, employment status, and urbanisation level.

The survey was programmed and distributed using Sawtooth Software Lighthouse Studio v9.15, and the main fieldwork took place between January 28th, 2025, and February 26th, 2025. A soft launch was conducted in the last week of January, with 100 respondents per country completing the survey to verify technical functionality and respondent comprehension.

Given the multilingual nature of the study, the survey was made available in each country's native language(s). Translations were managed within the consortium, with each partner responsible for validating the versions in their respective languages.

To ensure the quality of the dataset, a thorough data cleaning process was implemented both during and after data collection. During the data collection, participants were excluded for:

1. Incomplete responses (N=5,364)
2. Participants who did not shop online and were therefore outside of the research population (N=1,817)
3. Respondents who exhibited straight-lining behaviour, i.e., selecting each time the same response option within the statement questions, which could indicate a potential un-engagement (N=796).

After data collections, additional exclusions were applied:

1. Respondents classified as speeders, defined as completion times below one-third of the median completion time for the respondent's country (N=178)
2. Entries with clearly invalid or meaningless answers in the open-ended questions (N = 10) were also removed.

Following this cleaning process, a final dataset of 10,092 complete responses was retained for analysis.

2.2 Sampling and quota construction

To ensure that the survey results reflect the diversity of e-commerce users in each of the selected countries, a quota sampling strategy was applied. A quota sampling strategy involves selecting respondents to match key population characteristics (Ahmed, 2024). In this case, quotas were used to ensure representativeness in terms of age, gender, family composition, occupation, education, and urbanisation degree of e-commerce users, defined as individuals who made at least one online purchase in the past 12 months. The sampling approach was based entirely on data from Eurostat, to ensure consistency and comparability across the ten countries.

The starting point for constructing the quotas was the Eurostat dataset isoc_ec_ib20 (2023), which provides the share of individuals engaging in e-commerce within each of the six quota variables. This dataset helped developing an initial understanding of the demographic and socio-economic profile of e-commerce users. However, these e-commerce usage rates cannot be directly applied to the desired sample size, since the demographic structure in the general population varies between countries. This means their overall contribution to the e-commerce population depends not just on their usage rate, but also on the population structure. Quotas must reflect both. To account for this, factors were calculated to determine the relative size of each demographic group within the general population in each country. To being able to calculate those factors, the following Eurostat (2023) datasets were used:

- Age and gender: demo_pjangroup
- Household composition: lfst_hhnhtych
- Occupational status: lfsa_egan, lfsa_ugan, lfsa_igan
- Educational level: edat_lfs_9903
- Urbanisation level: lfst_r_pgauwsc

These factors were then combined with the e-commerce usage rates from isoc_ec_ib20 to calculate the final target percentages for each group. This ensured that quotas were based not just on how likely someone is to shop online, but also on how many people like them actually exist in each country's population. The resulting country-specific quotas were used to guide recruitment during fieldwork. By relying on a single data source (Eurostat) and combining structural data about the population and behavioural data about the usage of e-commerce, the sampling process maintained national representativeness and cross-country comparability. A detailed overview of the applied quotas per country is provided in **Annex III: Quota overview by country.**

2.3 Choice-based-conjoint experiments

Rather than asking individuals to rate or rank attributes independently, choice-based conjoint (CBC) analysis engages participants in a sequence of realistic scenarios, where they are required to choose their preferred option from several alternatives. As a form of discrete choice experiment and a widely used stated preference technique, CBC helps understand how people evaluate and balance various features of a product or service (Shang & Chandra, 2023; Eggers et al., 2022; Steiner & Meißner, 2018). By simulating actual choice situations, this method offers deeper insight into how individuals simultaneously consider and prioritise multiple attributes (Eggers et al., 2022).

CBC-methodology has become increasingly prominent in consumer behaviour and transport studies (e.g., Caspersen & Navrud, 2021; Nguyen et al., 2019; Buldeo Rai et al., 2019), especially where the choices involve trade-offs between cost, convenience, and sustainability, as is the case for last-mile delivery options. Within the context of the CodeZERO project, the CBC approach is used to investigate how online consumers weigh different delivery options, and under which conditions they are willing to trade in their preferred deliveries for more sustainable alternatives.

As outlined by Shang and Chandra (2023), a CBC study typically involves three core phases: (1) selecting relevant attributes and levels; (2) estimating utilities that reflect participant preferences; and (3) conducting choice simulations based on these utility estimates. The following sections detail each of these components.

2.3.1 The selection of relevant attributes and attribute levels

The first step in designing a CBC experiment involves identifying the most relevant attributes and corresponding levels, as these elements critically influence the validity and interpretability of preference estimations (Steiner & Meißner, 2018). Attributes must be clearly defined, mutually exclusive, and pertinent to the decision context to ensure that participants engage meaningfully with each trade-off (Steiner & Meißner, 2018). To maintain a balance between realism and cognitive load, researchers typically recommend including between six and eight attributes per choice task (Orme, 2010; Hair et al., 2010). After selecting attributes, it is equally essential to specify meaningful and realistic levels. These levels should mirror actual market conditions and avoid extremes that could distort participant responses (Eggers & Sattler, 2011; Steiner & Meißner, 2018). To reduce complexity, attribute levels should be concise and or visually supported (Orme, 2010) and evenly distributed to minimize the number-of-levels effect, which occurs when respondents give undue weight to attributes with more levels (Steiner & Meißner, 2018). A commonly suggested range is two to five levels per attribute (Orme, 2010; Steiner & Meißner, 2018).

Following these methodological recommendations and building on the framework developed in deliverable 1.1 (Fiorello et al., 2024), as well as qualitative findings from deliverables 2.2 (Pernot et al., 2025) and 2.3 (Phillips & Pernot, 2025), six key delivery attributes were selected for this study: delivery price, delivery location, delivery speed, delivery partner & ethics, packaging, and tracking information. Each attribute included five levels, all of which were designed to reflect real-world delivery conditions in the European e-commerce landscape (see Table 1).

Table 1: Summary of attributes and levels

Delivery price[1]	Delivery location	Delivery speed	Delivery partner & ethics	Packaging	Tracking information
Free	Home address	Within two hours	Eco-friendly carrier	Cardboard box	Basic tracking (estimated delivery date)
€ 2.99	Retail group's store	Tomorrow	National postal service	No extra box, primary packaging only	Time window tracking (delivery within a specific time range)
€ 3.99	Pick-up point	Within 1-3 days	Global express courier	Recycled cardboard	Route updates (regular tracking updates)
€ 4.99	Parcel lockers	Within 3 – 5 days	App-based couriers	Reusable plastic box	Delivery redirection (track and change location)
€ 6.99	Delivery at workplace	Scheduled delivery (date of choice, minimum 3 business days later)	No selection possible	Reusable cardboard box	Full control (live tracking with real-time changes)

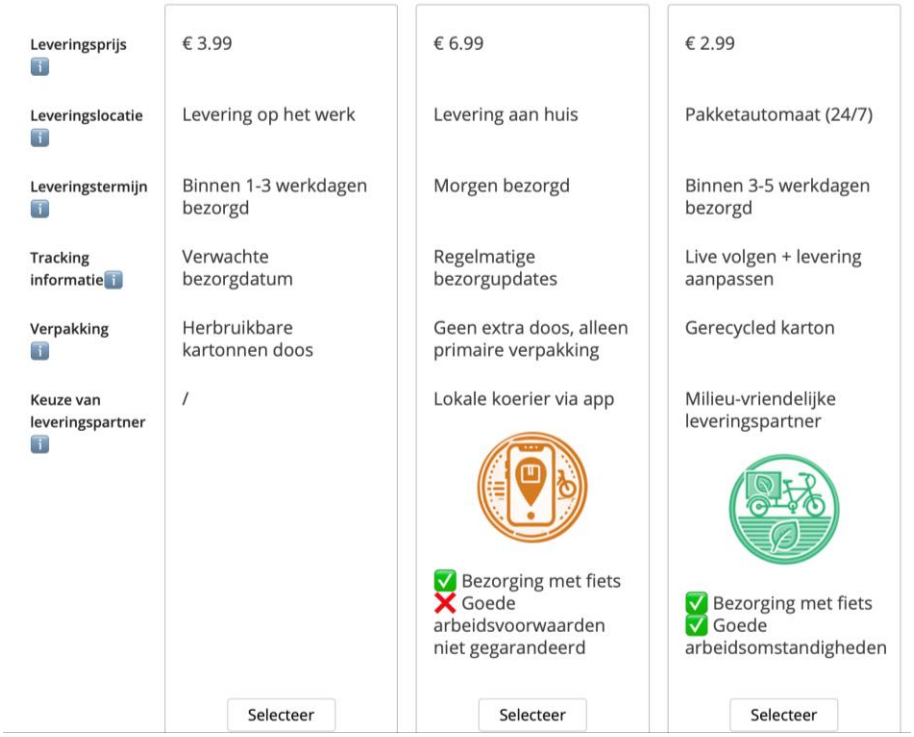
Note: Each respondent completed ten choice tasks, with three delivery alternatives per task.

Figure 1 gives an example of a choice task. No "none of the above" option was included, to ensure clear preference revelation between the presented profiles. Choice sets were constructed using a balanced overlap design, allowing some repetition of attribute levels while maintaining experimental efficiency (Steiner & Meißner, 2018). No restrictions were placed on attribute-level combinations.

[1] Price levels were adapted across countries (see Section 2.3.1.1 for details)

To improve clarity and engagement, the attribute delivery partner & ethics was visually supported by custom-designed icons generated with ChatGPT-4 image assistance (see Figure 2).

Figure 1: Example of a choice task in Dutch



The attribute delivery partner's goal was to encompass more than just designate the company in charge of parcel delivery. Delivery partners carry their own reputation, shaped by their practices, values, and visibility in the market which can than impact future purchase behaviour (Rao et al., 2011). This shows that consumers already associate certain delivery partners and retailers with positive or negative (sustainability) practices (Viet et al., 2023; Pernot et al., 2025). Sustainability, in this context, encompasses both environmental and social dimensions. The environmental dimension refers to reducing the ecological impact such as minimizing greenhouse gas emissions (Purvis et al., 2019), while the social dimension related more to the fair labour conditions and the well-being of the delivery worker (Purvis et al., 2019).

Due to the potential presented by this preexisting layer of consumer perception, these perceptions were incorporated into the delivery partner & ethics attribute rather than developing a distinct sustainability attribute. This approach allows sustainability to be part of the delivery design without needing to explain or overemphasize it explicitly. Instead, it becomes a natural extension of the consumer's existing perceptions and expectations of delivery services.

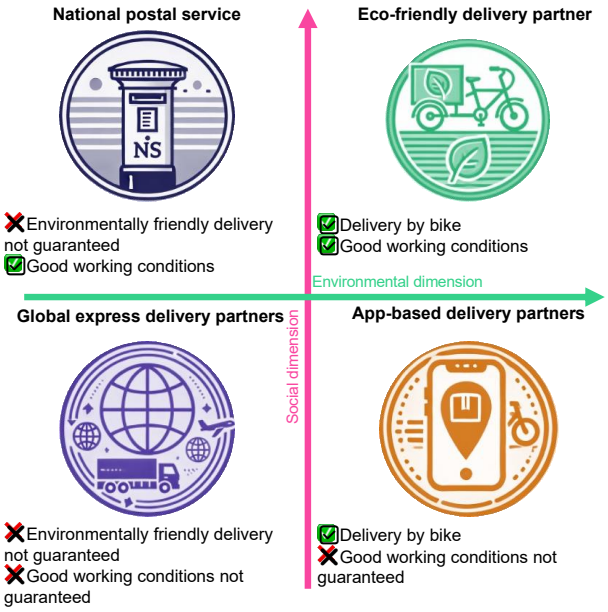
However, this approach also has its limitations. First, the operational organisations of some delivery partners might vary depending on the geographical regions. App-based platforms, for example, can use bicycles in city centres but vehicles in more rural areas (Deliveroo, 2023; Tanghe, 2018). In addition, some delivery partners outsource work to third parties (Van Chaze, 2024; Hiroux, 2021). Also, certain global express couriers and national postal services are working to establish more sustainable fleets (Jacobs, 2022). As a result, actual environmental and social performance may vary considerably. Therefore, giving a partner's name a sustainability connotation could exaggerate or even mislead the true impact of the specific delivery partner.

Second, it becomes more difficult to determine the precise factors influencing consumer choices when sustainability is incorporated into the delivery partner's attribute. Is it brand awareness, sustainability

perspective, or both that is important for the consumer. This affects analytical clarity and makes it more difficult to determine the precise role of sustainability.

In conclusion, adding a sustainability aspect to the delivery partner attribute simplifies the experimental design and matches the consumer intuition, but it also creates uncertainty about what is being assessed (partner reputation or sustainability information). This trade-off must therefore be acknowledged when interpreting the findings.

Figure 2: Classification matrix of the sustainability signals given by delivery partners



2.3.1.1 Price adaptation across countries

Given the multi-country nature of the study, it was essential to ensure that all attribute levels were both realistic for each national market and methodologically comparable across countries. The delivery price attribute can be particularly difficult to align due to variations in cost of living, e-commerce pricing practices, and different currencies across countries.

To account for these variations, country-specific adjustments were applied using the OECD's Price Level Index (PLI) of 2022, which provides a measure of the relative cost of living in each country compared to the EU average. The core set of price levels was identical in structure (ranging from free delivery to €6.99). The adjustment process involved the following steps: (1) First, Belgian delivery prices were used as the baseline. (2) Secondly, each price level was multiplied by the country's PLI correction factor to reflect the relative purchasing power and cost of delivery in that country. (3) Then, for countries outside the eurozone (Poland, Norway, and Sweden), prices were converted into local currencies using Eurostat's 2023 exchange rates. To maintain realism and consistency with market expectations, all adjusted prices were rounded to local pricing conventions:

- Eurozone: rounded to the nearest .99
- SEK/NOK: rounded to the nearest 10 minus 1 (e.g., 49, 59, 69)
- PLN: rounded to nearest .99

This adaptation ensures that all price levels presented in the choice tasks are perceived as realistic within each national context, while still being methodologically harmonised for cross-country comparison. A detailed overview of the calibrated price levels and currency conversions per country is provided in **Annex IV – Delivery price adapted with price level index.**

2.3.1.2 *Product description before the CBC-experiments*

Before starting the choice-based conjoint tasks, respondents were presented with a brief, product-specific scenario to help them contextualise the upcoming choices. The goal was to simulate a realistic online shopping situation, increase engagement, and reduce the risk of hypothetical or disengaged responses. Each respondent was randomly assigned to one of three product types: non-food, food, or circular products. For each group, a tailored narrative described a typical online purchase situation, followed by instructions on how to complete the choice tasks. The framing was designed to be neutral and relatable, without steering participants toward any delivery preferences. The approach will also allow to explore how trade-offs may differ by product category (RQ1d):

1. **Food product description**: Imagine the following situation: You know you have a busy schedule ahead of you in the coming weeks and decide to order a meal box to save time and still be able to prepare healthy, varied meals. In the following screens, you will be shown 10 times three different combinations of delivery options. In each screen, choose the delivery option that best suits your preference.
2. **Non-food description**: Imagine the following situation: You want to upgrade your office space with a new desk lamp that matches your style. After finding the ideal lamp online that fits exactly what you are looking for, you come to the final step: choosing the desired delivery option. In the next 10 screens, you will be shown three different combinations of delivery options each time. In each screen, choose your preferred delivery option.
3. **Circular product description**: Imagine the following situation: You have found a beautiful pair of second-hand shoes online that perfectly suits your taste and style. After placing your order, you choose your preferred delivery option. In the next 10 screens, you will be shown three different combinations of delivery options each time. In each screen, choose your preferred delivery option.

Again, to improve clarity and engagement, the descriptions were visually supported by custom-designed visuals (see Figure 3) generated with ChatGPT-4 image assistance.

Figure 3: Visuals for descriptions: Food - non-food and circular product

2.3.2 Utility computation

Secondly, the analytical foundation of discrete choice experiments and choice-based conjoint experiments lies in the random utility theory, which assumes that individuals make decisions by selecting the option that provides them with the highest perceived utility (Friedel et al., 2022). Since utility is not directly observable, McFadden's (1974) econometric framework enables researchers to infer preferences based on observed choices, allowing for the estimation of relative utility values associated with different attribute levels.

In this context, utility values, also known as part-worth utilities, reflect how strongly each attribute level contributes to the likelihood of an option being chosen (Orme, 2010). The range between the most and least preferred levels of an attribute indicates its relative importance to respondents. Negative utility values do not imply active dislike; rather, they signal that the level is less preferred compared to others in the set. To estimate these utility scores, several modelling approaches exist. In this study, two different modelling techniques were employed, depending on the specific research objective.

For research question 1a, which aims to understand how key delivery attributes influence consumer decision-making, the Hierarchical Bayesian Multinomial Logit (HB-MNL) model was applied. This method is well-suited for estimating preferences at the individual level and is particularly robust in large samples. Recent simulation work by Goeken et al. (2023) has demonstrated the strong performance of HB-MNL in estimating stable and reliable part-worth utilities across diverse respondent groups. For research questions 1d and 1e, a Hierarchical Bayesian Multinomial Logit (HB-MNL) model with a covariate was estimated. In the model, product type description (for RQ1d) and country (for RQ1e) were included as covariates. The HB model produced posterior part-worth utility estimates for each delivery attribute level, segmented by the levels of the covariates. Pairwise comparisons between these posterior distributions enabled the calculation of Bayesian confidence levels, reflecting the probability that one group (e.g., a product type or country) values a specific delivery level more than another. Confidence levels above 95% or below 5% were interpreted as strong evidence of meaningful differences in preferences between groups.

For research question 1b, which seeks to identify whether distinct segments of consumers exhibit different patterns of trade-offs, a Latent Class Multinomial Logit (LC-MNL) model was used. This segmentation technique identifies subgroups within the sample that share similar preference structures. Unlike HB-MNL, which assumes continuous variation across individuals, LC-MNL reveals clusters of respondents whose decision-making is internally consistent but differs from other groups (Paetz et al., 2019). This approach is valuable for uncovering heterogeneity in how consumers value delivery options.

2.3.3 Choice simulation

After estimating part-worth utilities, these values serve as the basis for conducting choice simulations, which model how changes in delivery attributes influence consumer decision-making. This step makes it possible to test how hypothetical delivery options would perform in the market, by projecting the likelihood that consumers would choose a particular option over others (Steiner & Meißner, 2018).

Simulations offer valuable insights into the relative appeal of specific combinations of features, for example, identifying which sustainable delivery formats are most likely to be accepted, or how different pricing and speed trade-offs affect preferences. They also make it possible to assess which attributes drive choices most strongly, enabling more targeted intervention strategies.

In the context of this study, market simulations were applied to address research question 1c, which examines the circumstances under which consumers are willing to substitute fast and free delivery with more sustainable alternatives.

3 Results

3.1 Sample description

3.1.1 Socio-economic and demographic profile

The final dataset consists of 10,092 respondents from ten European countries, with approximately 1,000 participants per country (see Table 2). As described in section 2.2, the sample was drawn using quota sampling, based on demographic and socio-economic characteristics of e-commerce users in each country. The goal was to ensure representativeness of the national populations of individuals who had made at least one online purchase in the last 12 months.

To verify representativeness, Chi-square tests of homogeneity were conducted to compare the sample distributions against the targeted population structure per country. The p-value threshold for statistical significance was set at $p < 0.05$.

Overall, the achieved sample closely mirrors the targeted population structure. Age and gender distributions were not significantly different from the population in any of the countries, indicating strong alignment on these key characteristics. For the other variables (i.e., education, geographical spread, occupation, and family composition) small but sometimes significant deviations were observed in several countries. A full overview of the achieved sample distribution across key demographic characteristics is provided in Table 2. This table presents the national distributions for each variable and highlights the alignment with the targeted quotas discussed in Section 2.2. Numbers in pink indicate statistically significant differences ($p < 0.05$) between the sample and the target population while number in green indicate no significant difference, based on Chi-square tests of homogeneity.

Table 2: Sample composition by demographic characteristics and country

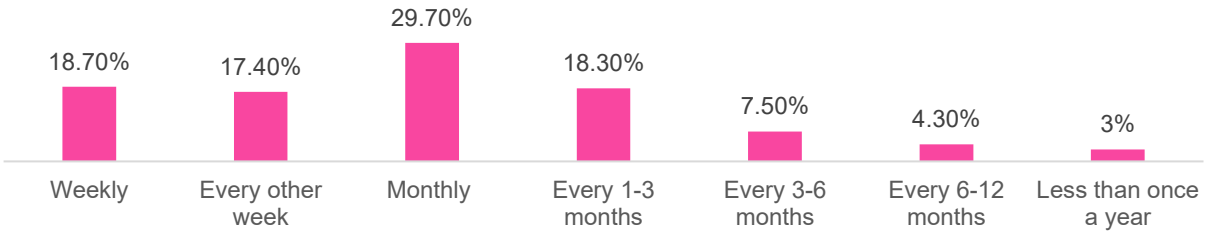
Demografic variables	BE (N = 1003)	DE (N = 1009)	GR (N = 1002)	SP (N= 1021)	FR (N= 1002)	IT (N= 1021)	NL (N= 1015)	PL (N= 1006)	SE (N= 1010)	NO (N= 1003)
GENDER										
Males	47.3%	50.7%	51.8%	49.1%	46.0%	51.0%	49.3%	49.0%	48.5%	50.0%
Females	52.7%	49.3%	48.2%	50.9%	54.0%	49.0%	50.7%	51.0%	51.5%	50.0%
AGE										
16-24	17.1%	13.5%	18.2%	15.5%	18.5%	16.7%	16.6%	15.1%	15.2%	15.9%
25-34	18.0%	18.7%	19.6%	18.0%	15.7%	17.4%	16.8%	22.6%	17.9%	19.5%
34-44	20.4%	18.5%	23.5%	21.6%	20.1%	20.3%	17.8%	25.9%	18.6%	18.2%
45-54	18.5%	18.8%	21.7%	22.3%	18.6%	22.2%	18.2%	19.6%	18.5%	19.8%
55-64	15.7%	19.6%	11.8%	15.3%	16.1%	16.4%	18.6%	10.6%	17.5%	15.6%
65-74	10.2%	10.8%	5.1%	7.4%	11.2%	7.2%	11.9%	6.2%	12.2%	11.0%
EDUCATION										
ISCED 0-2	**7.2%**	15.8%	**4.7%**	**24.8%**	14.4%	23.4%	**16.6%**	7.7%	**16.3%**	**9.9%**
ISCED 3-4	**46.2%**	51.8%	**45.3%**	**31.5%**	42.6%	49.2%	**43.0%**	50.0%	**43.8%**	**45.4%**
ISCED 5-8	**46.7%**	32.4%	**50.0%**	**43.7%**	43.0%	27.4%	**40.5%**	42.3%	**39.9%**	**44.8%**
GEOGRAPHICAL SPREAD										
In cities	**35.2%**	**42.9%**	**64.7%**	**61.1%**	**48.8%**	37.5%	**59.5%**	**43.4%**	**47.1%**	**46.7%**
In town and suburbs	**49.3%**	**36.3%**	**21.4%**	**33.8%**	**21.6%**	47.5%	**33.8%**	**27.6%**	**27.2%**	**31.7%**
In rural areas	**15.6%**	**20.8%**	**13.9%**	**5.1%**	**29.6%**	15.0%	**6.7%**	**29.1%**	**25.6%**	**21.6%**
OCCUPATION										
Retired/not in labour force	**21.6%**	**18.8%**	**10.8%**	**11.3%**	20.9%	**16.5%**	**18.6%**	12.8%	**15.7%**	**19.5%**
Employees, self-employed, familiy workers	**63.5%**	**70.7%**	**70.2%**	**69.5%**	63.5%	**65.5%**	**72.0%**	74.6%	**69.6%**	**70.1%**
Students	**11.7%**	**7.6%**	**11.8%**	**11.3%**	10.8%	**9.0%**	**5.8%**	9.5%	**7.7%**	**6.0%**
Unemployed	**3.2%**	**2.9%**	**7.2%**	**7.9%**	4.9%	**9.0%**	**3.5%**	3.1%	**6.9%**	**4.4%**
FAMILY COMPOSITION										
With children	**33.2%**	**25.5%**	**48.0%**	**33.2%**	**32.2%**	27.9%	24.1%	**35.3%**	**34.3%**	**35.2%**
Without children	**66.8%**	**74.5%**	**52.0%**	**66.8%**	**67.8%**	72.1%	75.9%	**64.7%**	**65.7%**	**64.8%**

3.1.2 E-commerce behaviour

This section presents an overview of the online shopping behaviour of the sample. It describes how frequently respondents engage in e-commerce, the types of products they purchase, their preferred delivery and return options, and their access to various delivery features.

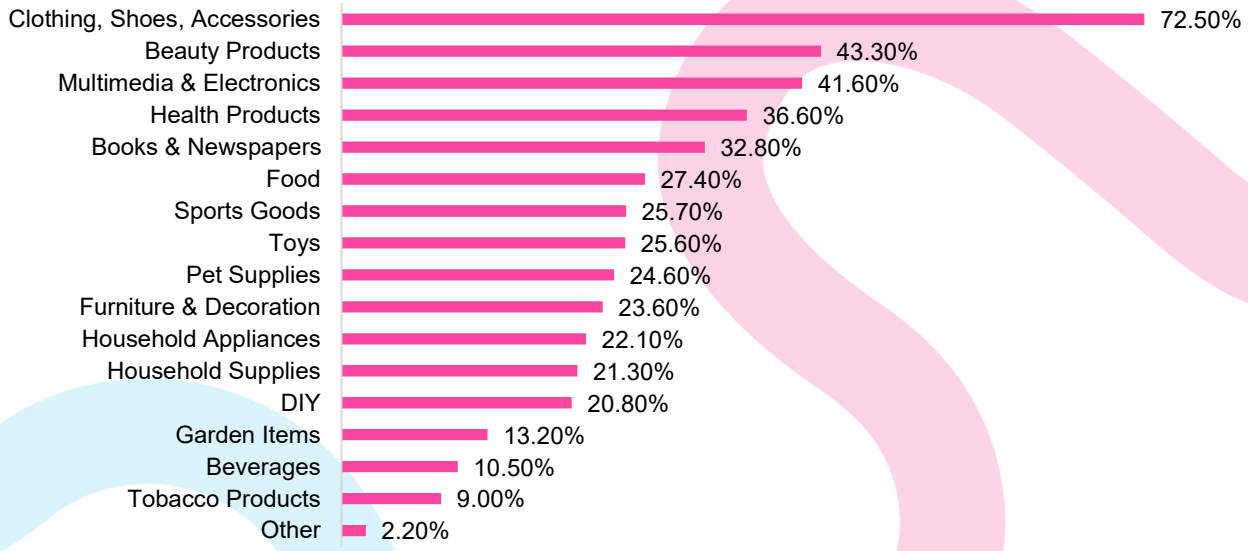
Online shopping is a routine activity for most respondents. Nearly one in five (18.7%) indicated that they shop online weekly, while an additional 17.4% do so every other week. The most frequently reported frequency was monthly (29.7% of respondents). Additionally, there were also less frequent purchase behaviours. 18.3% of the sample gets between 4 and 12 parcels delivered a year, whilst 7.5% shop every 3 to 6 months. Only 4.3% shop once or twice a year, and 3.0% reported shopping less than once a year. These figures show that over 65% of respondents purchase online at least once a month, which indicates that e-commerce is here to stay (see Figure 4).

Figure 4: Purchase frequencies of online shopping



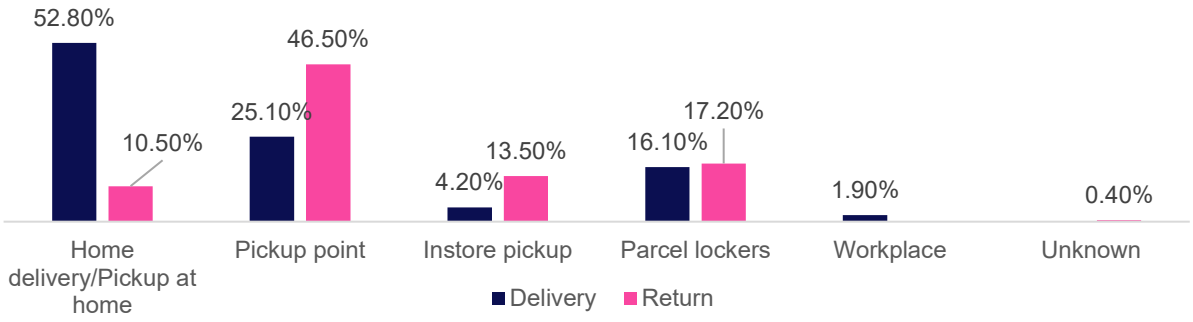
Respondents reported purchasing a broad range of product types online. The most purchased category was clothing, shoes, and accessories, with 72.5% of the sample indicating they had bought such items online in the past six months. Other frequently purchased categories included beauty products (43.3%), multimedia and electronics (41.6%), and health products (36.6%). Around one-third (32.8%) of respondents reported buying books or newspapers online. Meanwhile, categories such as food (27.4%), sports goods (25.7%), toys (25.6%), and pet supplies (24.6%) were less commonly purchased, but still notable. Less frequent were purchases of furniture and decoration (23.6%), household appliances (22.1%), and household supplies (21.3%). Garden items (13.2%), beverages (10.5%), and tobacco products (9.0%) were the least common (see Figure 5).

Figure 5: Product categories purchased online in the past 6 months (% of respondents)



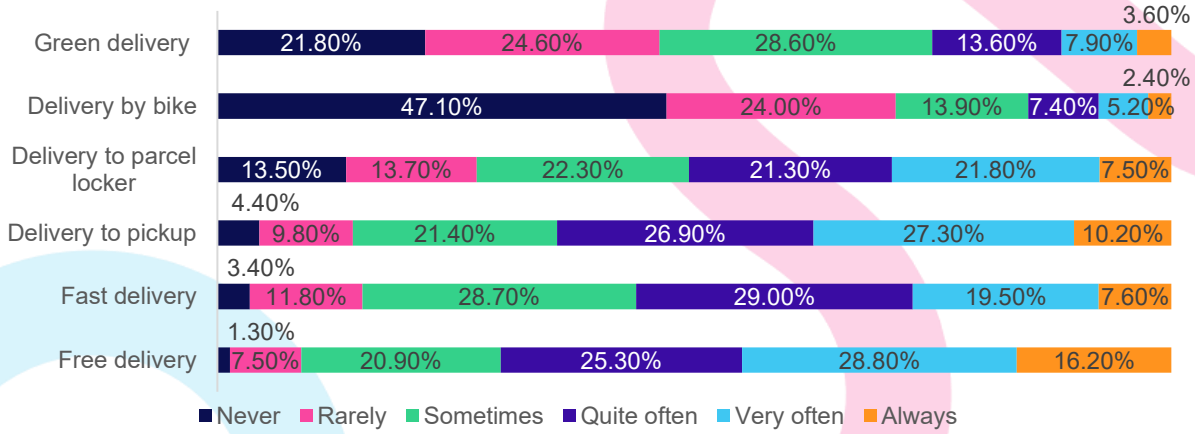
Home delivery remains the most frequently used method for receiving online purchases that are not large or heavy. Just over half of respondents (52.8%) reported using home delivery most often in the past six months. A substantial share (25.1%) used pickup points, while parcel lockers were the preferred option for 16.1% of the sample. Other methods, such as click-and-collect from a store (4.2%) and delivery to the workplace (1.9%), were much less common. Regarding return options, pickup points were the most frequently used return option, selected by 52.8% of respondents who had returned items. Other commonly used methods included parcel lockers (19.5%), returns to physical stores (15.3%), and home pickup services (11.9%). These responses suggest a general preference for flexible return channels (see Table 2). Around 12% of the sample did not provide information on their return method, possibly reflecting lack of recent return experience (see Figure 6).

Figure 6: Most frequently used delivery and returns methods



Respondents reported varying degrees of access to specific delivery features in their recent online shopping experiences. Free delivery was highly accessible: nearly half of the sample reported having it available very often (28.8%) or always (16.2%). Similarly, fast delivery options, such as same-day or next-day shipping, were also widely available, with 29.0% indicating they had access quite often and 19.5% very often. Delivery to pick up points was accessible to many respondents as well, with more than half reporting availability very often (27.3%) or quite often (26.9%). Parcel lockers were slightly less common, though still widely available; 21.8% of respondents had access to them very often, and 21.3% quite often. In contrast, sustainable delivery options appear to be less available. Only 7.9% of respondents reported very frequent access to green delivery options, and just 3.6% always had this option available. Availability of bike delivery was even more limited: nearly half the sample (47.1%) said they never had this option, and only 2.4% reported always having access to it. These findings indicate that while convenience-driven delivery features are broadly accessible across the sample, access to more sustainable alternatives remains limited (see Figure 7).

Figure 7: Reported availability of delivery features



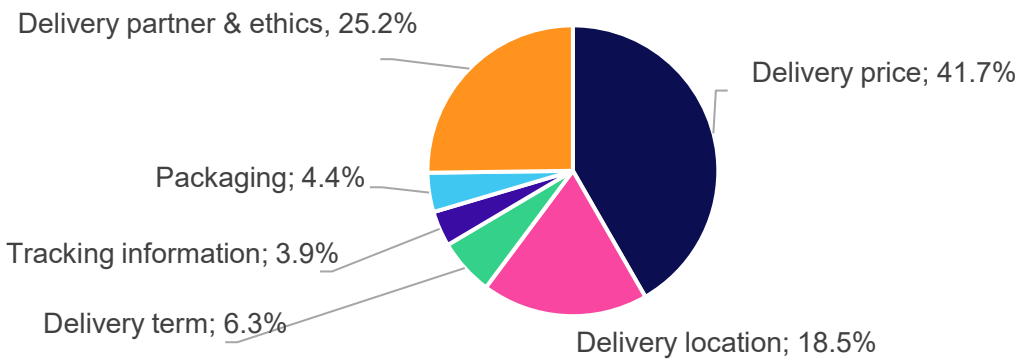
3.2 Understanding consumers' willingness to trade their preferred option for a more sustainable alternative

3.2.1 How do key delivery attributes shape preferences of online consumers? (RQ1a)

To understand how consumers make trade-offs when choosing between the different delivery options, preferences at the aggregate level (i.e., across all product types and countries) were examined. Using Hierarchical Bayesian (HB) estimation model, individual-level part-worth utilities for each delivery attribute and level were computed. This allowed for quantifying how each attribute contributes to consumers' decision-making processes.

As shown in Figure 8, delivery price was the most influential factor (41.7%), followed by choice of delivery partner & ethics (25.2%) and delivery location (18.5%). Delivery term (8.3%), packaging (4.4%), and tracking information (3.9%) had smaller yet statistically significant effects. All attributes significantly influenced consumer choices ($p < 0.01$), except for the attribute tracking information, whose impact was weaker ($p < 0.05$). This suggests that consumers made clearer trade-offs among the levels of the other five attributes, indicating strong and consistent preferences for specific levels. In contrast, the weaker significance and lower chi-Square value ($p < 0.05$) for tracking information reflect less distinct preferences across its levels, implying that tracking information played a less decisive role in driving consumer decisions.

Figure 8: Importance scores of attributes - aggregated levels (N = 10,092)

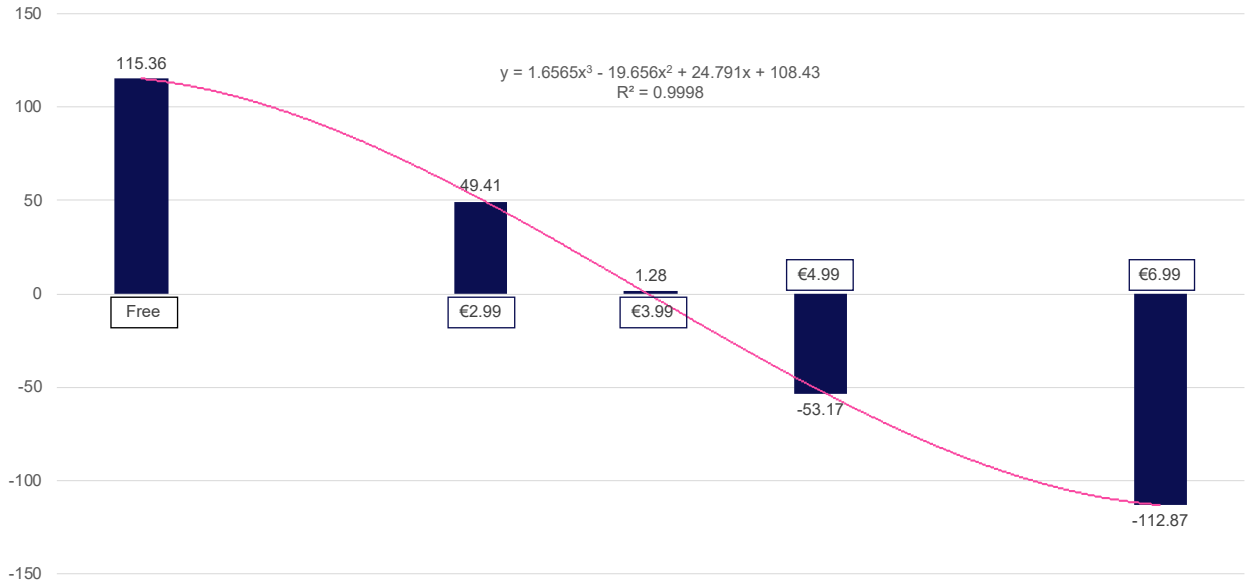


The above-mentioned relative importance scores are determined based on the range of part-worth utilities for each attribute, reflecting the extent and influence of each attribute on consumer preferences. A wider range indicates stronger consumer preferences for specific levels within that attribute, resulting in a higher importance score. With the importance of each attribute established, it is also essential to examine how the specific levels within those attributes are distributed and influence consumer decision-making. These levels, derived from the Hierarchical Bayesian model, indicate the relative desirability of each attribute level. Positive utility scores reflect higher consumer preference, while negative values suggest lower appeal. The following section will discuss those levels and the range between the levels within the attributes of delivery price, delivery partner & ethics, delivery location, delivery speed, tracking information, and packaging.

As the most influential attribute, delivery price shows a clear preference curve (Figure 9). Free delivery is by far the most preferred option (+115.36), confirming that price remains the dominant driver in delivery decisions. Lower delivery fees of €2.99 and €3.99 are still positively received (+49.41 and +1.28, respectively), but utility drops sharply once fees exceed €4.99. At €4.99, preferences shift into negative utility values (−53.17) and reach a strong rejection at €6.99 (−112.87). As captured by a third-order polynomial utility function, price sensitivity is non-linear, meaning consumers react most strongly to the shift from free to paid delivery, tolerate small fees (€ 2.99 – € 3.99), but sharply reject higher fees

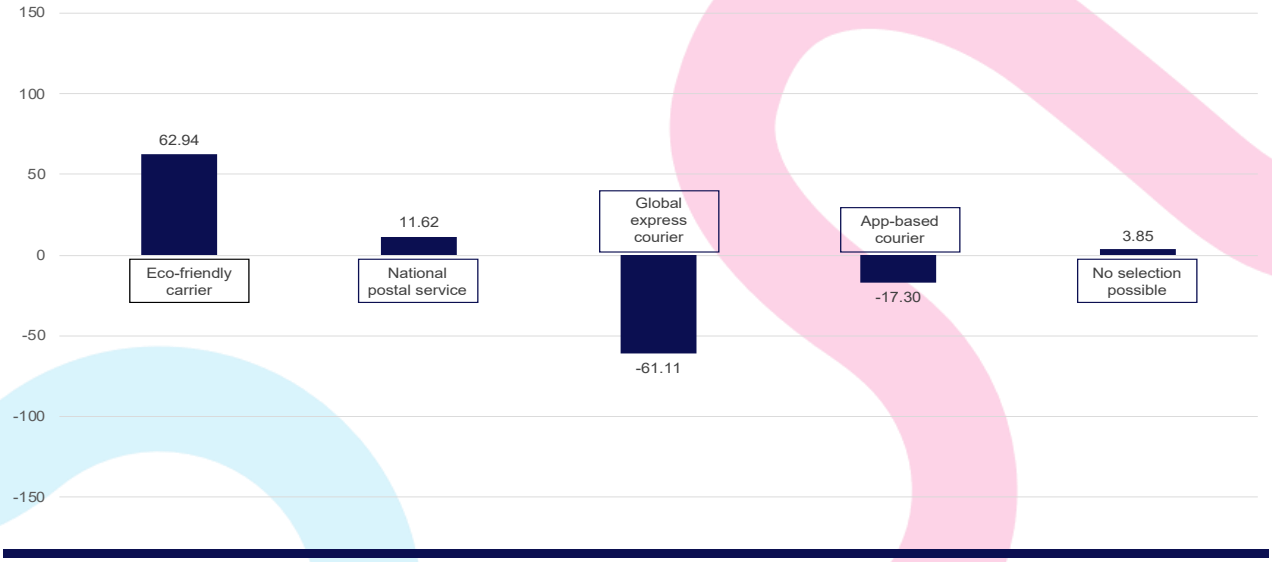
(€ 4.99+). Data suggest that while consumers might be willing to pay a small price for added convenience or other features, this willingness has limits.

Figure 9: Part-worth utilities - Delivery price - aggregated level (N = 10,092)



The attribute delivery partner & ethics is the second strongest driver in consumer choices (Figure 10). The highest utility is assigned to eco-friendly carriers (+62.94), suggesting a strong preference for logistics providers perceived as both environmentally and socially responsible. National postal services were also broadly accepted (+11.62), possibly due to their familiarity and perceived reliability. By contrast, global express couriers (−61.11) received the lowest utility score, suggesting strong aversion, likely due to environmental and labour concerns. App-based couriers were somewhat less negatively perceived (−17.30), indicating moderate scepticism or uncertainty about their reliability. Interestingly, the option where no selection was possible (+3.85) received a slightly positive utility, suggesting that for some consumers, being assigned a delivery partner is acceptable. This indicates that while delivery partner & ethics matters for many consumers, some are willing to accept a default assignment without making an active choice.

Figure 10: Part-worth utilities – Delivery partner & ethics – aggregated level (N=10,092)



Delivery location ranked as the third most influential attribute in consumers' delivery decisions, accounting for 18.5% of relative importance. Among the location options, home delivery was by far the most preferred, with a utility score of +38.12 suggesting that consumers continue to prioritise convenience, comfort, and familiarity when choosing how their parcels are delivered (Figure 11) . Parcel lockers (+4.44) and pick-up points (+2.82) received modestly positive scores, indicating that while some consumers value the flexibility and extended access hours these solutions offer, they are not yet strong alternatives to home delivery. In contrast, delivery at the workplace and store pick-up were the least favoured, with negative utility scores (-28.07 and -17.31, respectively). These options may be perceived as less flexible, more effort intensive or less familiar.

Figure 11: Part-worth utilities – Delivery location – aggregated level (N=10,092)

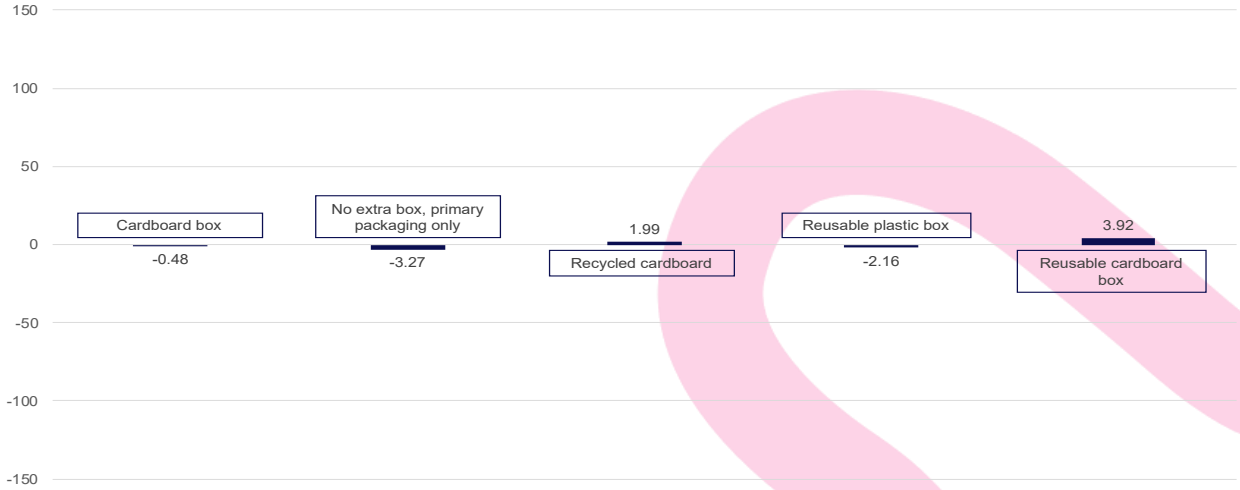
Delivery speed ranked as the fourth most influential attribute, with a relative importance of 8.3%. While this indicates that consumers consider speed when selecting delivery options, it plays a more secondary role compared to price, delivery partner & ethics, or location. Among the options, next-day delivery was slightly more preferred (+7.23) than same-day (within two hours) delivery (+6.72), suggesting that ultra-fast options do not provide substantial added value over next-day delivery (

Figure 12). Standard delivery within 1–3 days received a modestly positive utility (+1.86), indicating broad acceptance of this timeframe. By contrast, longer waits of 3–5 days (-10.43) and scheduled delivery (minimum three business days later) (-5.19) were associated with negative utilities, showing that consumers tend to reject options that involve longer delays or rigid scheduling. However, the relatively small gap between preferences across the different levels highlights that consumers are willing to accept slower deliveries if other attributes compensate for it.

Figure 12: Part-worth utilities – Delivery speed – aggregated level (N=10,092)

Packaging was the fifth most influential delivery attribute, with a relative importance of 4.4%. Although not a primary driver of consumer choice, packaging still shaped preferences in subtle ways. Consumers showed a clear preference for reusable cardboard packaging (+3.92), likely due to its perceived durability, sustainability, and growing familiarity in the e-commerce space (Figure 13) . Recycled cardboard (+1.99) also had a positive utility, suggesting it is seen as a reliable and eco-conscious choice. Traditional cardboard boxes were rated neutrally (-0.48), indicating general acceptance but less enthusiasm compared to explicitly sustainable options. By contrast, no extra packaging (using only the product's original packaging) scored lowest (-3.27), hinting at concerns over product protection or a lack of perceived quality. Plastic packaging was also slightly disliked (-2.18). Overall, while packaging is less critical in shaping delivery decisions, consumers appear responsive to eco-friendly solutions, especially those that balance sustainability with perceived product safety.

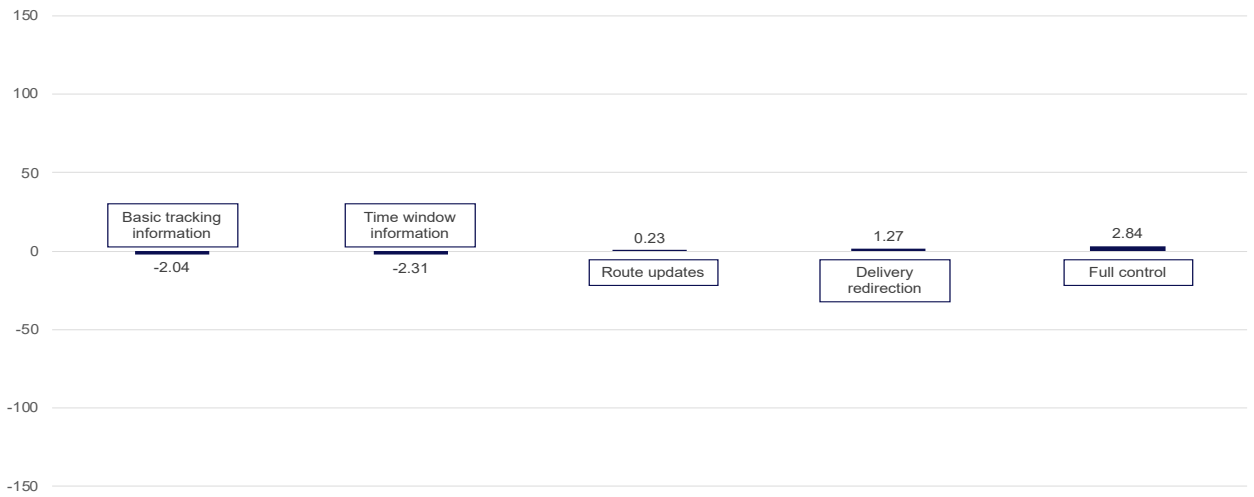
Figure 13: Part-worth utilities – Packaging – aggregated level (N=10,092)



Tracking information was the least influential attribute in shaping consumer preferences, with a relative importance of 3.9% and a matter less to consumers (Within Att. Chi-Square $p<0.05$). While this suggests that tracking features are not a major driver of choice, there were still some notable differences in how various options were perceived. Live tracking with real-time updates and change options received the highest utility (+2.84), reflecting consumer appreciation for greater control and visibility over the delivery process (Figure 14). Delivery redirection (+1.27) and route updates (+0.23) were viewed as modestly

positive, suggesting that features enabling more interaction or timely information are generally welcomed. In contrast, time-window tracking (−2.31) and basic tracking with only an estimated delivery date (−2.04) received negative scores. These results imply that limited or vague tracking options fall short of expectations, especially as consumers become accustomed to real-time logistics features in other service contexts. Overall, while tracking information does not heavily influence delivery choice on its own, consumers appear to favour interactive and dynamic tracking tools over static or minimal ones.

Figure 14: Part-worth utilities – Tracking information – aggregated level (N=10,092)



Beyond examining the main effects of each delivery attribute individually, interaction effects were analysed to determine whether consumers evaluated certain attributes in combination rather than in isolation. Interaction effects reveal that consumers do not evaluate these attributes in isolation. Specifically, significant two-way interactions were found between delivery price and delivery location, delivery price and delivery term, delivery price and delivery partner & ethics, and delivery location and tracking information (all $p < 0.01$), suggesting that the value consumers place on certain attributes varies depending on the configuration in which they appear. While all two-way interaction effects were statistically significant ($p < 0.01$), this section focuses on those with the strongest utility differences and highest practical relevance, as detailed in Figure 15. A complete overview of tested interactions is provided in **Annex V – Interaction effect.**

The most impactful interactions involved delivery price, indicating that pricing plays a central role in shaping how consumers evaluate other features. Figure 15 illustrates these interaction effects numerically.

Firstly, a strong interaction was observed between delivery price and delivery location. While home delivery was generally preferred, consumers exhibited greater price sensitivity when choosing out-of-home options, such as parcel lockers or pick-up points. For example, when delivery is free, home delivery has a part-worth utility of 0.678, while the part-worth utility for a free delivery at a parcel locker is 0.593. When the price increases to €3.99, home delivery drops to 0.388 (a 43% decrease), while parcel locker falls to 0.287 (a 52% decrease) and if the price increases to €3.99 both utilities drop even more, respectively with a 67% decrease for home delivery and 75% for a parcel locker. This suggests that while these alternatives may be acceptable under certain conditions, even small additional fees can substantially reduce their appeal.

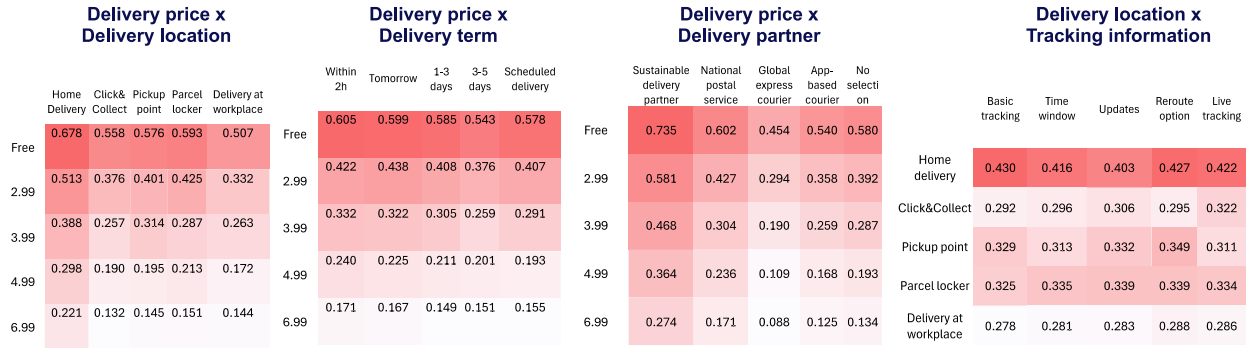
Secondly, the interaction between delivery price and delivery partner & ethics highlighted that consumers are less price-sensitive when deliveries are carried out by eco-friendly carriers. This indicates a willingness to pay more for a delivery service perceived as environmentally and socially responsible.

A third notable interaction emerged between delivery price and delivery term. Consumers were more tolerant of longer delivery times (e.g., 3 to 5 days) when the delivery was low-cost. However, when prices rose, patience declined, and preferences shifted toward faster delivery. This reflects a nuanced

trade-off between cost and speed: consumers are willing to wait, but only if it comes with a financial benefit.

Lastly, a moderate interaction was observed between delivery location and tracking information. For home delivery, the utility of having delivery redirection is 0.427, slightly under the basic tracking (0.430, a 0.7% decrease). However, for pickup point, the reroute options for parcel lockers score 0.349, compared to 0.329 for basic home delivery tracking, a 6% higher utility in favour of more flexible tracking for out-of-home locations. Consumers valued more detailed tracking (e.g., live updates or redirection options) especially for out-of-home deliveries, which may reflect a need for reassurance when deliveries are not sent to a personal address.

Figure 15: Interaction effect between attributes



These results underscore that consumer preferences are not fixed but shaped by the interplay between delivery features, with price acting as a key actor across different contexts.

In summary, the analysis of aggregate preferences and the part-worth utilities revealed a clear preference for free or low-cost delivery, eco-friendly carriers, and home delivery, whereas high delivery fees, global express couriers, and delivery at the workplace were consistently less favoured. Importantly, several interaction effects, particularly those involving delivery price, highlight that consumer preferences are not fixed, but context-dependent, with trade-offs shaped by how features are combined.

3.2.2 Are these preferences consistent across all consumers? (RQ1b)

As the previous section has shown, delivery trade-offs are shaped by multiple attributes, with consumers prioritizing price, delivery partner & ethics, and location most strongly. However, these results reflect aggregate preferences and assume that all consumers make decisions in the same way. In reality, prior studies indicate that preferences are heterogeneous: some consumers prioritize cost and speed while others are influenced by sustainability (Nguyen et al., 2019; Caspersen & Navrud, 2021). To capture this heterogeneity, a Latent Class Multinomial Logit (LC-MNL) model was applied.

The LC-MNL model segments consumers into groups with similar preference structures, offering a deeper understanding of how different segments weigh trade-offs between the delivery features. To determine the optimal number of classes, a combination of statistical fit indicators was considered, including Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), adjusted BIC (ABIC), and the Consistent AIC (CAIC). While all values improved as segments increased from two to four, the fifth segment offered only marginal gains and showed a slight increase in BIC. Following Weller et al. (2020) and Killian et al. (2019), BIC was prioritized, as it balances model fit and parsimony effectively. Moreover, segment sizes remained above the recommended 5% threshold (O'Donnell et al., 2017), with all groups containing at least 10% of the sample. Based on these considerations, a four-class solution was selected. Figure 16 presents the importance scores across delivery attributes for each of the four identified consumer segments. These segments vary significantly in how they evaluate and prioritize delivery features.

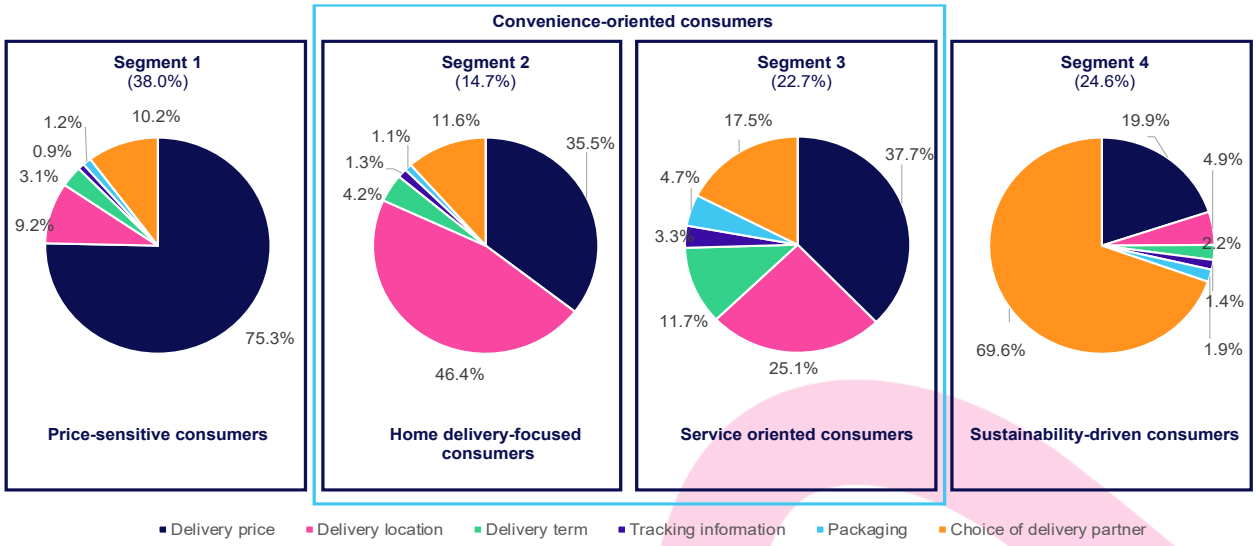
The first and largest group, comprising 38.0% of the sample, consists of **price-sensitive consumers**. These individuals are primarily influenced by delivery price, which accounts for 75.3% of their decision weight. They overwhelmingly prefer free or low-cost (€2.99) delivery options and are quick to reject higher fees, while other delivery features play only a marginal role in their choices.

The second segment, labelled **home delivery focused consumers** (14.7%), places the greatest emphasis on delivery location. With 46.4% of their decision weight assigned to this attribute, these consumers demonstrate a strong preference for home delivery, valuing convenience and accessibility. Although price also remains important (35.5%), it is secondary to location in this group's decision-making process.

The third group, representing 22.7% of the sample, are **service-oriented consumers**. Their preferences are more evenly distributed across attributes, with importance given to price (37.7%), delivery partner & ethics (17.5%), and delivery location (25.1%). This segment shows a stronger interest in overall service quality and tends to favour a balanced combination of affordability and convenience. In contrast to the other segments, they also express higher preferences for out-of-home delivery options, such as parcel lockers and pickup points, which may reflect their need for flexibility and control.

Finally, **sustainability-driven consumers** make up 24.6% of the sample and are distinguished by their clear preference for environmentally and socially responsible delivery partners. For this group, the delivery partner & ethics attribute is dominant, accounting for 60.6% of the importance weight, while price plays a much smaller role (19.9%). They also show interest in sustainable packaging and delivery methods, indicating a higher willingness to pay for eco-friendly alternatives.

Figure 16: Importance scores across delivery attributes – LCA Segmentation



To gain deeper insights into the underlying drivers of each segment's decision-making process, the part-worth utilities for each attribute level were compared. This breakdown reveals not only which attribute matter most to each group, but also how their specific preferences for attribute levels differ. This breakdown illustrates how the same attribute can have different levels of influence depending on the segment.

- **Delivery Price** (Figure 17): Price sensitivity is highest among Segment 1 (Price-sensitive consumers), with steep utility drops at higher fee levels. Segment 2 (Home delivery focused consumers) also prefers lower fees but is less extreme. Segment 3 (Service-oriented consumers) is moderately price-conscious, while Segment 4 (Sustainability-driven consumers) is the least sensitive, though still favouring affordability.
- **Delivery partner & ethics** (Figure 18): Sustainability-driven consumers (Segment 4) show the strongest preference for eco-friendly carriers, while Segments 1 (Price-sensitive consumers)

and 2 (Home delivery-focused consumers) treat this as a secondary factor. Segment 3 appreciates sustainable and reliable delivery partners but is more pragmatic.

- **Delivery location** (Figure 19): Home delivery dominates among Segment 2 (Home delivery-focused consumers), who avoid out-of-home alternatives. Segment 3 (Service-oriented consumers) favours out-of-home delivery options like pickup points and parcel lockers. Segment 4 (Sustainability-driven consumers) prefers sustainable delivery modes, including out-of-home options, while Segment 1 (Price-sensitive consumers) shows no strong location preference.
- **Delivery speed** (Figure 20): Fast delivery matters most to Segment 3 (Service-oriented consumers) and Segment 2 (Home delivery-focused consumers). Segment 4 (Sustainability-driven consumers) shows the highest tolerance for slower deliveries, especially if paired with sustainable options. Segment 1 shows only mild speed preferences.
- **Packaging** (Figure 21): Packaging matters primarily to Segment 4 (Sustainability-driven consumers), who favour recycled cardboard. Segment 3 (Service-oriented consumers) avoids plastic and "no extra box" options but doesn't prioritize packaging overall. Segments 1 (Price-sensitive consumers) and 2 (Home delivery-focused consumers) are largely indifferent.
- **Tracking information** (Figure 22): This attribute is most influential for Segment 3 (Service-oriented consumers), who favour full tracking and control. Other segments show minimal interest, especially Segment 4 (Sustainability-driven consumers), who prioritize sustainability over convenience features like tracking.

Figure 17: Part-worth utilities for each segment – Delivery price

Figure 18: Part-worth utilities for each segment – Delivery partner & ethics

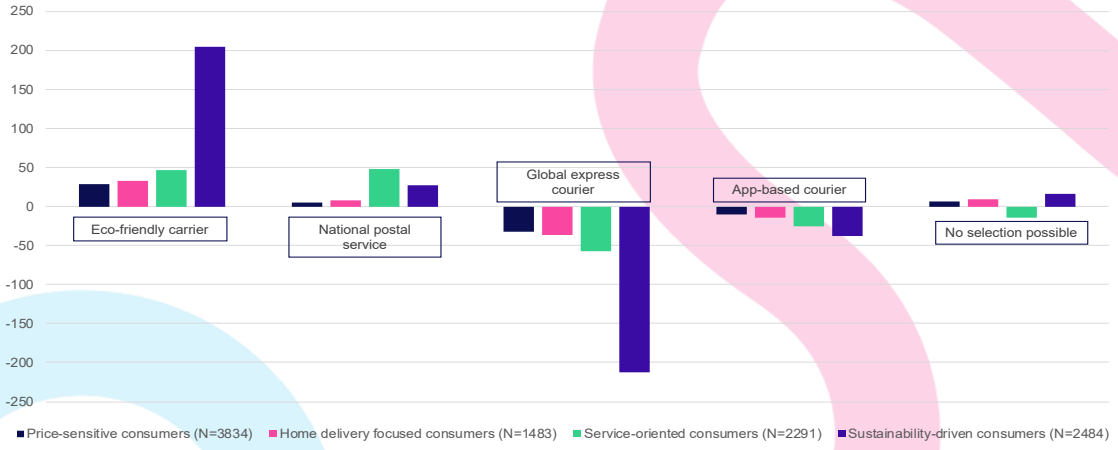


Figure 19: Part-worth utilities for each segment – Delivery location

Figure 20: Part-worth utilities for each segment – Delivery speed

Figure 21: Part-worth utilities for each segment – Packaging

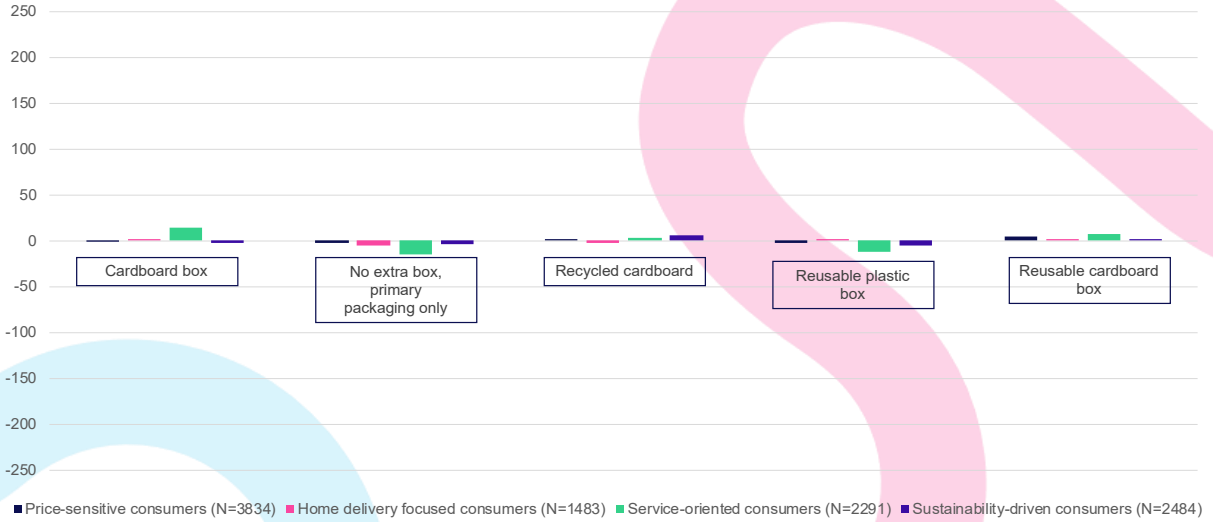
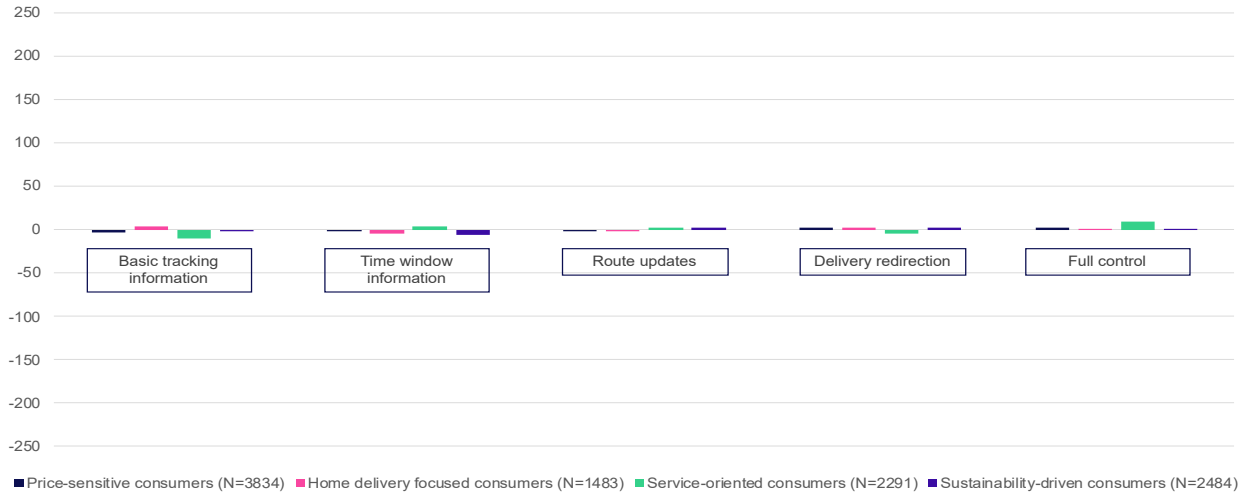


Figure 22: Part-worth utilities for each segment – Tracking information



3.2.3 Under which circumstances do consumers trade their preferred delivery features for more sustainable alternatives? (RQ1c)

As described in the methodology section (section 2), choice simulations were applied using the estimated part-worth utilities to assess how consumers would respond to sustainable delivery alternatives in realistic decision contexts (Steiner & Meißner, 2018). By doing so, the likelihood of adoption for each sustainable alternative could be quantified in the form of the total utility of each option. This will form an answer to the research question 1c which seeks under which circumstances consumers do trade their preferred delivery features for more sustainable alternatives.

Since four consumer segments were identified in the previous section, i.e., price-sensitive, home delivery-focused, service-oriented, and sustainability-driven, the average part-worth utilities for each segment were used for these simulations which derived from the Latent Class Multinomial Logit (LC-MNL) model. For each segment, the total utility of every delivery alternative was calculated and compared with two benchmarks: an ideal scenario composed of the preferred attribute levels specific to that segment, and a business-as-usual (BAU) scenario. The BAU scenario was constructed to reflect a commonly observed delivery option across European markets: a low-priced home delivery (€2.99), arriving within 1–3 days, with a conventional cardboard box, no specific delivery partner, and tracking via route updates. This profile served as a neutral reference point to measure shifts in consumer preference toward more sustainable alternatives.

To support this simulation-based analysis, a set of three sustainable delivery alternatives was developed and kept the same across all four consumer segments. The design of these sustainable delivery alternatives was grounded in findings from academic literature and more particularly the work of Mommens & Cauwelier (2025). They demonstrated, using data from five million parcels across multiple e-retailers and delivery providers, combined with survey data from more than 5,000 respondents, that the environmental impact of last-mile delivery varied depending on the delivery setting, especially the availability of alternative delivery facilities, urban density, and proximity to retailers.

Over the past decade, research into the sustainability impact of last-mile delivery has grown significantly and has been explored from a variety of perspectives (Nogueira et al., 2024; Buldeo Rai, 2021; Jaller & Pahwa, 2020). There is a broad consensus that different delivery configurations can vary substantially in their environmental footprint (Mommens & Cauwelier, 2025). However, as research in this field progresses, it has also become increasingly clear that the sustainability impact depends on a complex set of interrelated factors, including delivery location (Peppel & Spinler, 2022; Ozyavas et al., 2025; Seghezzi et al., 2022), delivery speed (Nogueira et al., 2022; Gund & Daniel, 2024; Muñoz-Villamizar et al, 2021), vehicle type (Kin & Quak, 2025; Llorca & Moeckel, 2021; Alverhed et al., 2021), consumer

travel behaviour (Buldeo Rai et al., 2022; Niemeijer & Buijs, 2023), omnichannel practices (Siragusa & Tumino, 2022; Buldeo Rai et al., 2019), return behaviour (Bertram & Chi, 2017; Marriott et al., 2025), and spatial characteristics such as drop density and proximity to distribution centres (Cardenas et al., 2017; Boyer et al., 2009). Because of these interrelated factors, it remains challenging to provide a universally applicable solution to consumers and e-retailers on which delivery options is the most sustainable.

That being said, the objective of this study is not to establish a single definition of what a sustainable delivery option is. Instead, the focus is on understanding how consumers respond to delivery alternatives that are generally associated with more sustainable outcomes. As mentioned by Mommens and Cauwelier (2025), in urban environments, where dense retail infrastructure is present, in-store pickup tends to be the most sustainable option especially if consumer live within two kilometres of a physical retail store (Mommens & Cauwelier, 2025). Accordingly, the first sustainable alternative, referred to as the (1) urban scenario, features delivery to a retailer's store, offered free of charge and available the next day. The service is provided by the global express carrier, uses minimal packaging (primary packaging only), and includes time window tracking. In urbanised areas or towns, where retail stores are less prevalent but pickup points are available, in particular if pick-up points are located within one kilometre of consumers' homes, consolidating parcels to these points is generally more sustainable (Mommens & Cauwelier, 2025; Mommens et al., 2021). The second sustainable alternative, called the (2) town scenario, features delivery to a pick-up point and occurs within 1-3 days. It is handled by an eco-friendly delivery partner, uses recycled cardboard packaging and included standard route updates for tracking. The delivery price is set at € 2.99 which is in line with the business-as-usual scenario. In contrast, for rural areas where infrastructure for alternative delivery location is more scattered and limited, home delivery appears to be the most sustainable choice (Mommens & Cauwelier, 2025). The (3) rural scenario reflects this context: parcels are delivered to the consumer's home within 3–5 days, via the national postal service, using reusable cardboard packaging. Basic tracking is provided, and the delivery is priced at €3.99.

These three sustainable alternatives, as can be found in Table 3, formed the foundation for evaluating the conditions under which consumers are willing to trade preferred delivery features for more sustainable options. By keeping the alternatives constant across segments, the analysis could highlight differences in preferences and decision-making across the four consumer segments. The following section introduces these alternatives in detail and presents the results of the simulations conducted for each consumer segment.

3.2.3.1 Price-senstive consumers (Segment 1)

The results for the price-sensitive consumer segment clearly demonstrate that delivery price is the most influential factor driving their preferences, as it has the biggest contribution in the total utility scores (see Figure 23), often having the edge over the other delivery attributes such as speed, location, or delivery partner & ethics. This is reflected in their ideal scenario, which combines free delivery with a next-day home delivery executed by an eco-friendly delivery partner, resulting in the highest total utility (296.27). This segment consistently favours options with no delivery fee, and their willingness to accept trade-offs for sustainability depends on this condition. When offered a free sustainable delivery, even with slower speeds or less preferred delivery locations, price-sensitive consumers are highly receptive.

Among the three sustainable alternatives, this is most visible in the urban scenario (total utility: 188.36). While the scenario involves a less preferred delivery location (a retailer's store) and a delivery partner with a negative utility score, the absence of a delivery fee significantly offsets these less preferred levels. The next day delivery further contributes to the overall utility, though its effect appears to be marginal compared to price. This indicates that as long as the price stays low, price-sensitive consumers are willing to sacrifice the other delivery attributes.

While the urban scenario highlights that price can offset even disliked delivery features, a different pattern emerges when comparing two equally priced options: the town scenario and the business-as-usual scenario, both priced at € 2.99. The business-as-usual configuration, i.e. home delivery within 1–3 days with no delivery partner selection computes a total utility score of 128.02. The town scenario, involving a delivery to a pick-up point by an eco-friendly carrier, yields a slightly higher score (134.45). The modest difference suggests a limited but present willingness to pay for a more sustainable

alternative, as long as the cost remains low. However, the difference also indicates that location and delivery partner & ethics attributes only marginally influence preference when price is not a differentiator.

Table 3: Overview of delivery scenarios used in the choice simulations

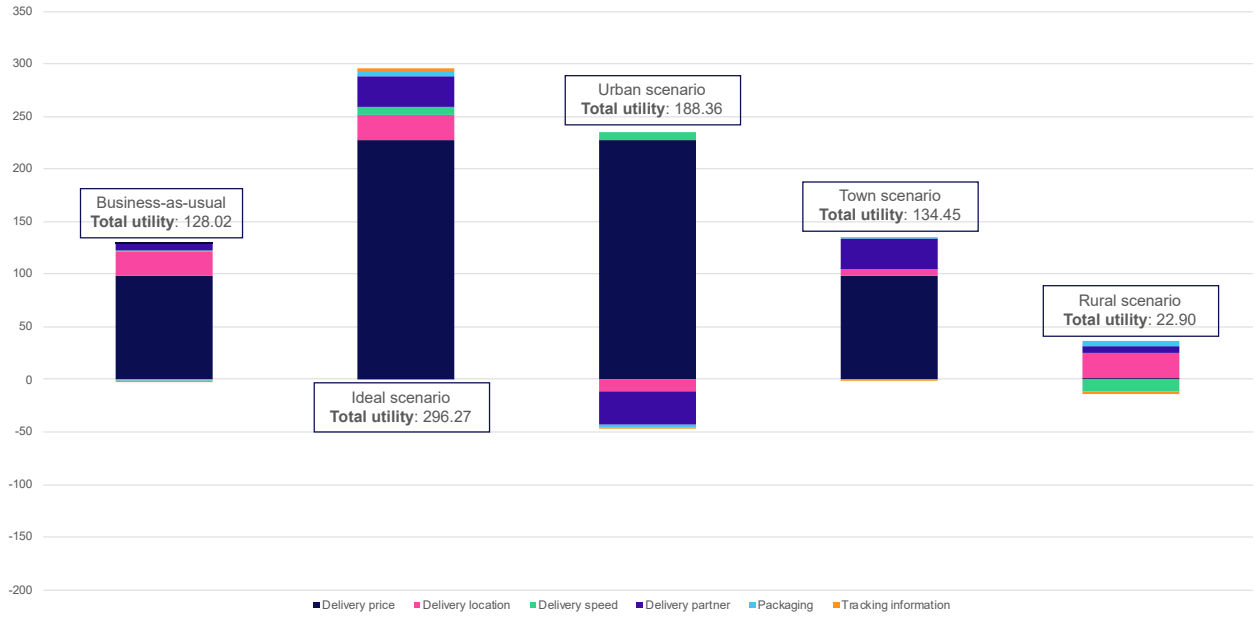
Alternative	Delivery price	Delivery location	Delivery speed	Delivery partner& ethics	Packaging	Tracking information
Business-as-usual	€ 2.99	Home delivery	1-3 days	No selection	Cardboard box	Route updates
Preferred levels (ideal scenarios)						
Segment 1: Price-sensitive	Free	Home delivery	Tomorrow	Eco-friendly carrier	Reusable cardboard box	Delivery redirection
Segment 2: Home delivery-focused	Free	Home delivery	Within two hours	Eco-friendly carrier	Reusable cardboard box	Basic tracking
Segment 3: Service-oriented	Free	Parcel lockers	Within two hours	National postal service	Cardboard box	Full control
Segment 4: Sustainability-driven	Free	Home delivery	1-3 days	Eco-friendly carrier	Recycled cardboard	Delivery redirection
Sustainable alternatives						
Urban scenario	Free	Retail group's store	Tomorrow	Global express carrier	No extra box, primary packaging only	Time window tracking
Town scenario	€ 2.99	Pick-up point	1-3 days	Eco-friendly carrier	Recycled cardboard	Route updates
Rural scenario	€ 3.99	Home delivery	Within 3 – 5 days	National postal service	Reusable cardboard box	Basic tracking

As delivery prices increase further, unwillingness to trade their preferred delivery features for more sustainable alternatives becomes more pronounced. The rural scenario, priced €3.99, performs significantly worse (22.90) than the other scenarios. Despite offering home delivery, which is the preferred location. With other words, the combination of a higher delivery fee (€3.99) and slower delivery speed (3–5 days) results in a sharp decline in utility. This confirms that, for this segment, higher costs are not compensated by sustainable or convenient attributes, even when those attributes would otherwise be attractive.

For price-sensitive consumers, the key trade-offs revolve around price. They are willing to trade off speed, convenience, and even sustainability features, this flexibility is conditional on price remaining zero or at a low price point (€2.99). As soon as a delivery price is introduced, the attractiveness of the delivery option declines, regardless of improvements in other attributes. With other words, their

willingness to accept less convenient or slower delivery formats suggests that with the right pricing structure, sustainable behaviours can be adopted, but only if the trade-off does not affect their wallet.

Figure 23: Attribute-level contributions to total utility across the scenarios – Price sensitive consumers



3.2.3.2 Home delivery-focused consumers (Segment 2)

For the Home delivery-focused consumers, the simulation results confirm that delivery location is the dominant factor influencing their choice (Figure 24). This segment highly values home delivery, and their willingness to adopt more sustainable alternatives is shaped by how these alternatives align with their strong location preference. The ideal scenario, offering free, home-based delivery within two hours by an eco-friendly partner, achieves the highest total utility (353.17).

When their preferred delivery location is maintained (i.e., home delivery), this group is open to other trade-offs. The business-as-usual scenario, which also offers home delivery, albeit at a cost of (€2.99) and with less favourable attributes in terms of delivery partner & ethics, still yielded a high total utility score of 256.73. This illustrates that home delivery is a non-negotiable baseline for this segment.

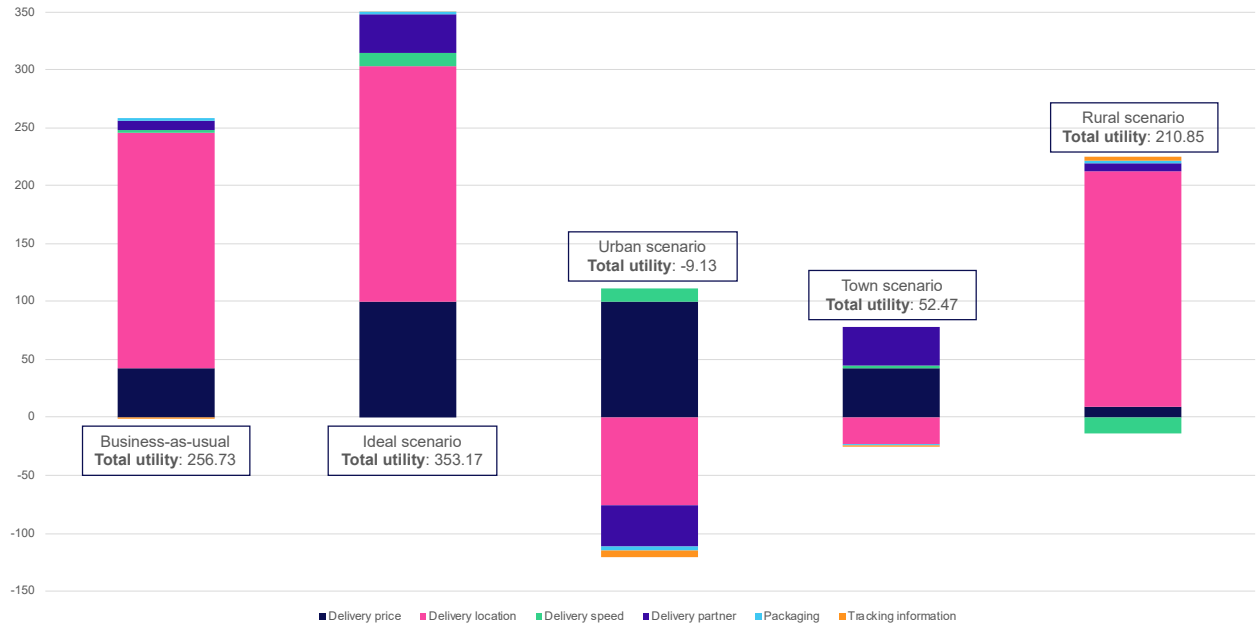
This is also supported by the total utility scores of the sustainable alternatives, where only the rural scenario (210.85) performs reasonably well. Despite its slower delivery speed (3–5 days) and delivery fee (€3.99), it preserves the home delivery location, which appears to outweigh the other disadvantages. This reinforces that location is not only preferred but can compensate for less desirable attributes such as price or speed.

In contrast, the town scenario, which involves delivery to a pickup point, sees a steep decline in total utility (52.47), even though it includes an eco-friendly delivery partner and a moderate price (€2.99). The change in location alone is enough to dramatically reduce this segment's preferences, demonstrating that sustainability features and low prices are insufficient to drive adoption of sustainable option if they require consumers to alter their preferred delivery routines. This is only further confirmed by the urban scenario. It has the lowest utility score, even a negative one (-9.13). Despite being free and fast (next-day delivery), the combination of a retail group's store as delivery location, a less trusted delivery partner, and minimal packaging results in major rejection. These consumers are clearly unwilling to accept instore pickup, even when those options offer speed, sustainability signals, and cost advantages.

In summary, location is the defining factor for this consumer segment. While they show some willingness to accept slower delivery or modest fees, they are unwilling to trade home delivery for sustainability,

speed, or free service. Strategies to engage this segment should therefore focus on improving the sustainability impact of a home delivery, rather than attempting to shift them toward pickup-based alternatives.

Figure 24: Attribute-level contributions to total utility across the scenarios – Location driven consumers



3.2.3.3 Service-oriented consumers (Segment 3)

The service-oriented consumer segment places the highest value on speed and control over the delivery experience. This is reflected in their preferred scenario with a total utility of 315.29, which combines ultrafast delivery (within two hours), with parcel lockers as their preferred delivery location, and full tracking control. These consumers are less sensitive to price and more responsive to features that enhance the service quality, flexibility, and predictability of the service (Figure 25).

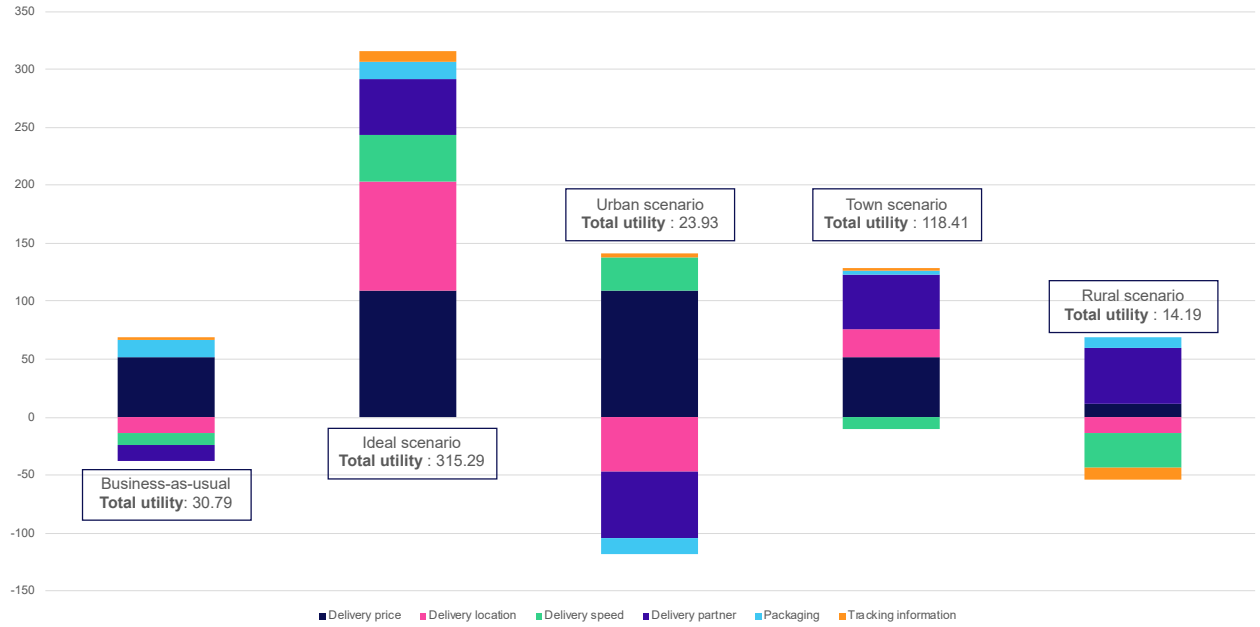
As a result, none of the three sustainable alternatives meet their expectations. The town scenario, while performing better than the two other sustainable options, reaches only a total utility score of 118.41. This scenario includes a pickup point, a moderate delivery speed of 1-3 days, and an eco-friendly delivery partner. Although the tracking information and delivery partner & ethics are preferred, the location and speed are suboptimal compared to their preferred scenario. Still, the relatively high utility shows that service-oriented consumers are willing to accept some trade-offs if reliable service attribute levels are present.

In contrast, the urban scenario scores much lower (23.93), despite offering a free and next-day delivery. The combination of an unwanted delivery location (retail store), a less preferred delivery partner, and minimal packaging appears to lower the preference in this option. The time window tracking offered in the scenario marginally offsets these drawbacks but is absolutely not enough to make it a competitive alternative. While the delivery speed and price are preferred, this alternative indicates that this segment places more importance on the delivery location, choice of delivery partner & ethics and tracking control than simply speed or cost.

The rural scenario performs even worse, with a total utility score of 14.19, despite the presence of a trusted delivery partner (national postal service). The slow delivery, at home and lack of full tracking information results in a sharp drop. These consumers clearly associate slower speed, at home delivery and basic tracking with low control which makes the delivery feel uncontrollable, even if other features are acceptable. This is also the case of the business-as-usual scenario, where the utility score totals at 30.79. This only further emphasises that service quality, not price or sustainability, drives preferences.

Service-oriented consumers are primarily motivated by a reliable delivery experience. They are willing to trade off price and, to some extent, sustainability, but only if the delivery offers speed, preferred locations, and enhanced tracking. For this segment, sustainability is most effective when integrated into high-service-quality formats. Strategies aimed at this group should focus on green premium delivery options that maintain the integrity of the service experience, rather than promoting budget-friendly or slower options with fewer service features.

Figure 25: Attribute-level contributions to total utility across the delivery scenarios – Service oriented consumers



3.2.3.4 *Sustainability-driven consumers (Segment 4)*

For the sustainability-driven segment, the simulation results confirm that environmental and societal impacts are core drivers of delivery preferences, but sustainability alone does not fully determine their choices. This segment clearly values sustainable delivery partners and shows a higher tolerance for slower or less convenient formats, as long as they align with sustainable principles. However, the results also show that these consumers still consider affordability and practical features, such as delivery speed and location, when making trade-offs (Figure 26).

The ideal scenario for this segment includes a free home delivery within 1–3 days via an eco-friendly partner, with recycled packaging and delivery redirection, achieves the total utility of 290.99, indicating that sustainable features combined with moderate convenience are most preferred.

The town scenario (251.31) is the best-performing sustainable option. It keeps the preferred delivery partner & ethics and packaging type and provides a typical delivery speed, but the parcel is delivered to a pickup point instead of the preferred home delivery. The price of €2.99 seems acceptable and this can be attributed that the delivery method is made clearly sustainable. This result shows that these consumers are willing to pay a modest price and accept alternative delivery locations as long as sustainability is made visible.

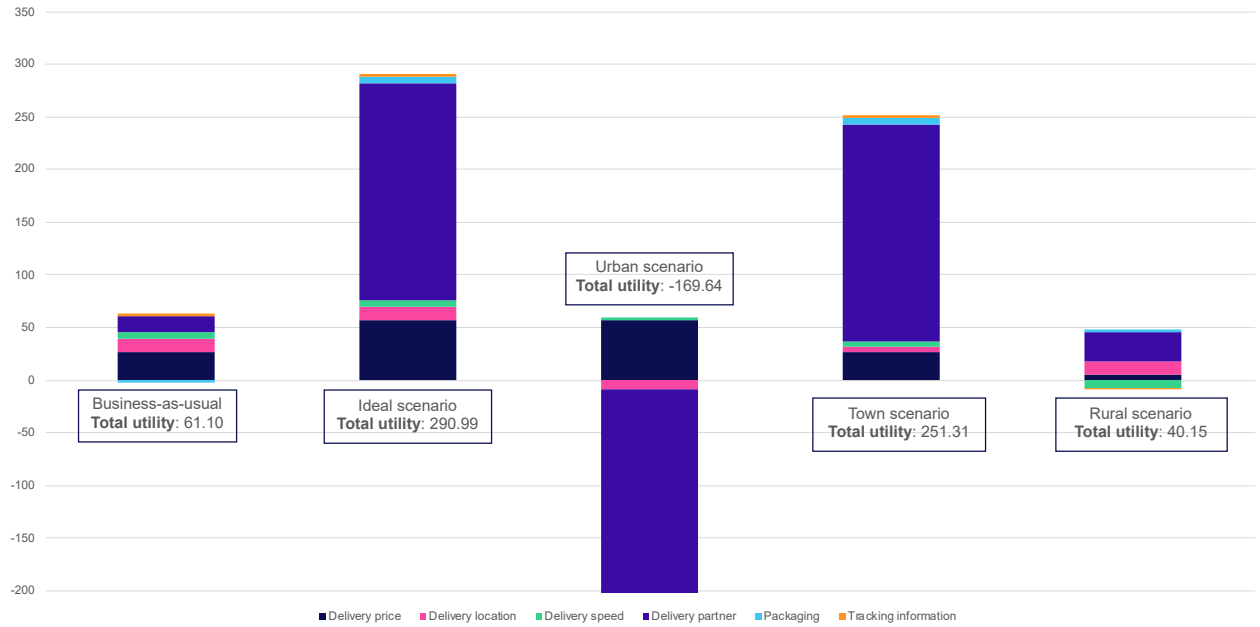
In contrast, the urban scenario performs poorly (-169.64), despite offering free next-day delivery. Its negative score is driven primarily by the use of a delivery partner perceived as unsustainable. This suggests that price or speed alone are not sufficient to generate interest if the delivery method lacks authentic sustainability signals. This group appears to actively reject delivery options that undermine environmental and social values, even when they involve convenience or zero cost.

The rural scenario, which involves a slower home delivery (3–5 days) by the national postal service, receives a moderate score (40.15). Although it maintains home delivery and uses reusable packaging,

the slower speed and less valued delivery partner reduce its appeal. These results indicate that practical attributes still matter to this segment, especially when sustainability is present but not maximized. Finally, even the business-as-usual scenario scores relatively low (61.10), suggesting that this group does not favour conventional delivery options unless they are significantly upgraded with sustainability features.

Sustainability-driven consumers are highly receptive to sustainable delivery alternatives, especially those that involve eco-friendly partners, slower speeds, and moderate pricing. They are willing to trade off convenience, speed, and even delivery location when they perceive a strong environmental benefit. However, their preferences are not unconditional, sustainability information must be visible and credible, and price or location still play a role. Sustainable delivery formats aimed at this group should therefore focus on transparent green features, and can include slower or alternative delivery modes, if they clearly contribute to reducing environmental impact.

Figure 26: Attribute-level contributions to total utility across the scenarios – Sustainability driven consumers



3.2.3.5 Comparative overview of consumer segment preferences and trade-offs

In summary, the simulation results reveal clear differences in how each consumer segment evaluates trade-offs between price, speed, location, and sustainability. While some overlaps exist, for instance, a general willingness to slower delivery if compensated by other features. Each group prioritizes delivery attributes differently (Table 4), leading to contrasting preferences across otherwise similar scenarios.

Price-sensitive consumers are driven almost exclusively by cost. Their ideal scenario is free and fast, and they are willing to sacrifice location and delivery partner & ethics to keep costs low. Among the sustainable alternatives, only the urban scenario, which is free, generates high utility. The town scenario performs only slightly better than the business-as-usual baseline, despite its sustainability advantages, while the rural scenario, with a higher price, is strongly rejected. This shows that this group only accepts sustainable alternatives if they are low cost, suggests that with the right pricing structure, sustainable behaviours can be adopted, as long as the trade-off does not affect their wallet.

Table 4: Total utility scores across consumer segments and the different delivery scenarios

Scenario	Total utility – Price-sensitive	Total utility – Home delivery-focused	Total utility – Service-oriented	Total utility – Sustainability-driven
Business -as-usual	128.02203	256.73079	30.78992	61.10239
Ideal scenario	296.27217	353.16985	315.29028	290.98898
Urban scenario	188.35686	-9.13048	23.92501	-169.64047
Town scenario	134.45131	52.46626	118.40683	251.31086
Rural scenario	22.89835	210.84999	14.18535	40.15035

In contrast, home delivery-focused consumers strongly prioritize home delivery, with their preferred and business-as-usual scenario scoring the highest because of the home delivery. While they are open to trading off speed and price, any deviation from home delivery, such as parcel lockers or pickup points, leads to sharp declines in utility which was the case for the urban and town scenarios, even if these options are more sustainable. The rural scenario, which maintains home delivery but introduces a slower speed, still performs well, confirming that the choice of delivery location outweighs other considerations. For this group, sustainable innovations must be integrated into convenient, home-based formats to be successful.

Service-oriented consumers, on the other hand, are motivated by the overall quality of the delivery experience. They value fast, predictable, and controllable delivery. While they are not opposed to sustainable options, these must be embedded within high-service formats, such as premium tracking, preferred locations, or ultrafast delivery. As a result, their ideal scenario vastly outperforms all others, while the business-as-usual and rural alternatives score low. The town scenario, which includes a preferred delivery partner & ethics and moderate speed, performs best among the sustainable options. Price is less of a barrier for this group, as long as the service experience meets their expectations.

Finally, sustainability-driven consumers show the greatest willingness to adapt their behaviour in favour of sustainability impact. They are open to slower delivery speeds, alternative locations, and even modest price increases if the option includes strong sustainability signals, especially through eco-friendly carriers and recycled packaging. The town scenario performs almost as well as their ideal, even with a €2.99 fee and a pickup location, highlighting their willingness to sacrifice convenience for environmental gains. In contrast, the urban scenario, which lacks a trusted delivery partner, is strongly rejected despite being free and fast. However, their choices still reflect some sensitivity to convenience and cost, emphasizing that even the most environmentally conscious consumers respond to a combination of practical and ethical considerations.

These findings underscore the importance of segment-specific strategies when designing or promoting sustainable last-mile delivery options. A universal sustainable alternative is unlikely to appeal equally to all consumer types. Instead, targeted formats and tailored messaging are needed to match the trade-offs each segment is willing to make.

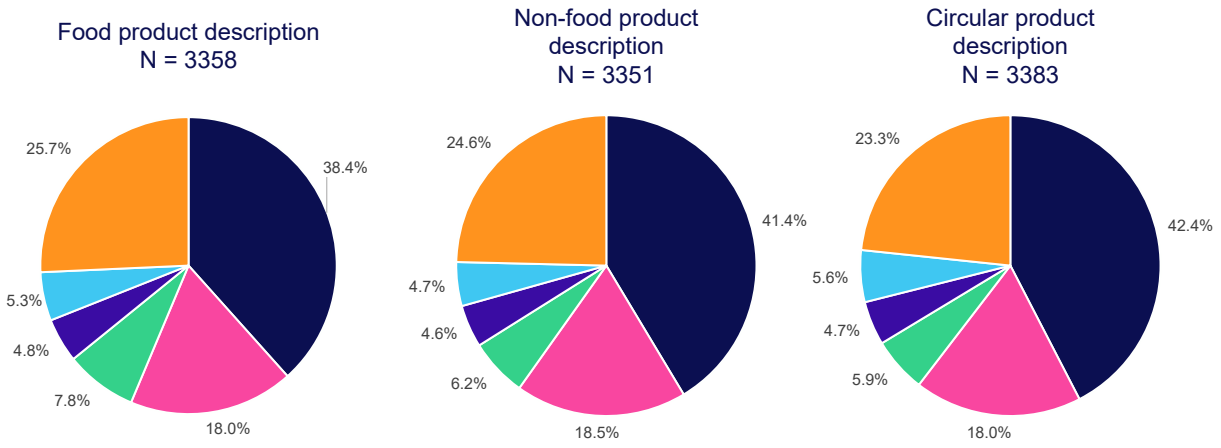
3.2.4 How do consumer preferences for delivery options vary across product types (non-food, food, circular items)? (RQ1d)

Given that respondents were given a brief, product-specific scenario prior to beginning the choice-based conjoint task, it was also possible to examine whether this product framing affected the trade-offs that consumers made. To investigate this, the part-worth utilities, estimated for each group using a Hierarchical Bayesian Multinomial Logit (HB-MNL) model, were analysed.

As shown in Figure 27, the differences are less pronounced than those observed between the various consumer segments (see 3.2.2). Delivery price is the most influential attribute across all product descriptions, accounting for 38.4% in food, 41.4% in non-food, and 42.4% in circular product descriptions. This is followed by choice of delivery partner, ranging between 23.3% and 25.7%, and

delivery location, which remains around 18%. Less influential attributes such as delivery term, packaging, and tracking information made up smaller shares, generally between 4.6% and 7.8%.

Figure 27: Importance scores of attributes – product type level



Based on the count analysis, the set of choices across the levels of delivery price, delivery location, delivery partner, and delivery speed were statistically significant within the attribute itself and this for each product type. This significance indicates that participants exhibited clear preferences among the levels within each attribute. This suggest that these delivery-related attributes had a strong influence on participant choices. In contrast, the influence of packaging and tracking information varied across product types. For food product descriptions, packaging had a weaker but still statistically significant effect on preferences ($p < 0.05$), indicating some level of differentiation among packaging options. However, the Within Attribute Chi-Square for tracking information was not significant, meaning that participants did not show a consistent preference for any specific tracking level. In the non-food condition, neither packaging nor tracking information reached statistical significance. This suggests that the distribution of choices across the levels of these attributes did not differ significantly, and participants did not display strong preferences. For circular product descriptions, both packaging and tracking information had marginal effects ($p < 0.05$), with some variation in preferences. This indicates that these effects were relatively weak, pointing to slight but not consistent preferences for specific levels within those attributes.

Despite these nuances, the overall ranking and relative importance of attributes remain broadly consistent across product types. This consistency suggests that the decision-making process for delivery choices is largely similar regardless of product type, with delivery price, delivery partner, and delivery location prioritized over other factors. Here, it's important to keep in mind that only three product categories were examined and that, because of certain characteristics such as bulky or pricey parcel, delivery preferences might be different for those purchases. This is in line with the literature where Cauwelier et al. (2024) and Bjerkan et al.'s (2020) find that parcel weight has an impact on delivery location choice.

Similar attribute rankings do not necessarily imply that individual attribute levels (e.g., specific price points or delivery partners) are equally valued across product types. To investigate potential differences in how consumers evaluate specific delivery options, two complementary analytical approaches were used. First, a counting analysis was used to examine how frequently each delivery level was selected within and across product types, with between-group chi-square tests identifying statistically significant in the preference patterns. Second, posterior draws from the HB-MNL model were used to estimate Bayesian confidence levels for differences in part-worth utilities between product conditions (Orme & Howell, 2009; Orme & Chrzan, 2017). This approach provides a more robust and nuanced picture of how product framing influences delivery preferences.

Delivery price emerged as the most influential attribute across all product framings, with free delivery being the most frequently selected level in every condition. According to the counting analysis, free delivery was chosen by 61.4% of respondents in the non-food framing, 61.0% in the circular condition, and 58.2% in the food condition. Although these differences are relatively small in absolute terms, Bayesian posterior comparisons reveal deeper insights (Table 5). In particular, respondents in the food and circular conditions valued free delivery significantly more than non-food respondents (Bayesian confidence: 99.75% and 100%, respectively).

As delivery prices increased, selection rates declined across all product types, reflecting general price sensitivity. For example, the €6.99 option was selected by only 15.9% (food), 14.2% (non-food), and 13.9% (circular). However, the HB model offers deeper insight into how this sensitivity varied by product framing. At €2.99, food respondents showed significantly stronger aversion than both non-food (99.87% confidence) and circular respondents (98.50% confidence), indicating a sharper utility drop even for relatively mid-range prices. Circular respondents were also significantly more price-sensitive than non-food at this level (98.53% confidence). At higher price points (€4.99 and €6.99), this pattern became even more pronounced: circular respondents reacted more negatively than non-food respondents, with 99%+ confidence at both price levels.

In sum, both methods reinforce that free delivery is widely favoured, but the HB model reveals that food and circular deliveries are evaluated with greater price sensitivity, showing steeper utility declines as delivery costs increase. In contrast, non-food product respondents appear more tolerant of delivery fees, despite similar selection patterns in the choice data.

Table 5: Bayesian confidence levels by product description and price Level

	Free	2.99	3.99	4.99	6.99
Food	99.8%	99.9%	50.0%	0.7%	0.2%
Non-food	33.4%	98.5%	95.6%	21.5%	13.8%
Circular	100.0%	98.5%	7.7%	0.9%	0.0%

While eco-friendly delivery partners were the most frequently selected option across all product types, preference patterns did vary significantly depending on the product framing (between-group $\chi^2(8) = 25.164$, $p < 0.01$). The HB estimates reveal important differences in how they were valued. Specifically, non-food respondents showed significantly higher utility for eco-friendly carriers compared to food respondents (98.6% confidence) (Table 6). Similarly, circular product respondents also valued eco-friendly delivery more than food respondents (94.9% confidence). These results suggest that sustainability is more important when the product itself is framed as non-perishable or already environmentally conscious.

Respondents in the food condition showed a significantly stronger preference for global express partners compared to both non-food (96.0% confidence) and circular (99.4% confidence) conditions. This suggests that when reliability is prioritized, as may be the case with food products, global express options are more appealing. Lastly, the “no choice available” option showed that circular respondents were significantly more likely to tolerate the lack of choice (100% confidence compared to non-food), possibly reflecting lower expectations for logistical control when ordering second hand goods. In sum, while eco-friendly delivery remains broadly popular, the HB analysis highlights how sustainability framing influences trade-offs. Consumers evaluating circular or non-food products may be more open to alternatives, while those in the food condition have a slightly less preference for the sustainable delivery partners.

Table 6: Bayesian confidence levels by product description and delivery partner & ethics

	Eco-friendly carrier	National postal service	Global express carrier	App-based carrier	No Selection
Food	1.4%	7.5%	96.0%	31.2%	98.6%
Non-food	5.1%	34.4%	99.4%	62.8%	9.6%
Circular	28.0%	17.6%	14.3%	20.8%	100.0%

Home delivery was the most preferred option across all product types, selected by 42.0% of respondents in the food condition, 40.4% for non-food, and 40.5% for circular product descriptions. Selection rates were broadly similar, and the HB posterior distributions showed no statistically significant differences in utility for home delivery between the three conditions, suggesting that it indeed remains a consistently preferred choice, regardless of product framing.

However, Bayesian comparisons revealed that respondents in the circular condition were significantly more open to out-of-home delivery options than those in the non-food condition (Table 7). Specifically, they showed stronger preferences for pickup points (98.2%), parcel lockers (98.6%). Compared to non-food respondents, food respondents also exhibited significantly stronger preferences for pickup points (99.3%) and parcel lockers (99.4%), suggesting broader openness to out-of-home options. Workplace delivery was notably less preferred in food than in either non-food or circular contexts.

These results highlight that although home delivery remains dominant, product framing subtly shapes openness to delivery alternatives. Both food and circular framings appear to encourage greater flexibility in delivery locations, whereas non-food respondents lean more heavily on traditional home delivery.

Table 7: Bayesian confidence levels by product description and delivery location

	Home	Instore	Collection	Parcel locker	Workplace
Food	10.5%	34.3%	99.3%	99.4%	0.1%
Non-food	77.3%	98.5%	77.1%	58.2%	0.0%
Circular	2.0%	0.9%	98.2%	98.6%	73.5%

Preferences for delivery speed were again relatively consistent across product types. The most popular options were next-day delivery, selected by 35.0% of food respondents, 34.8% of non-food, and 34.6% of circular product respondents. However, again some subtle differences did emerge (between-group $\chi^2(8) = 35.575$, $p < 0.01$).

Respondents in the circular condition demonstrated a stronger preference for slower delivery options compared to the non-food respondents (Table 8). For instance, they were significantly more likely to prefer delivery within 1–3 business days (97.4% confidence), 3–5 business days (98.4%), and planned delivery (50.8%). These results suggest that circular product framing aligns with a greater openness to slower, potentially more sustainable delivery methods. Food respondents, in contrast, showed significantly stronger preference than non-food for those same timeframes, but not compared to circular.

Despite assumptions that food-related deliveries might demand higher urgency, there was no strong evidence that food respondents preferred same-day or next-day delivery more than other groups. The simulation scenario, which detailed a scheduled order of a mealkit box to help manage a hectic schedule over the upcoming weeks, might have had an impact on this outcome. Urgency may be more important

in delivery choices in situations requiring perishable goods or instant consumption. Interestingly, non-food respondents showed a significantly stronger preference for same-day delivery compared to both food (99.9% confidence) and circular (100%) respondents, suggesting that urgency was more pronounced in non-food contexts rather than in food or circular ones.

Overall, while fast delivery remains broadly popular, the HB estimates reveal that non-food respondents demonstrated the strongest preference for same-day delivery, significantly more so than both food (99.9% confidence) and circular (100% confidence) respondents. In contrast, respondents evaluating circular products were more accepting of slower delivery options, such as 1–3 and 3–5 business days, with high confidence in their stronger preferences over both food and non-food.

Table 8: Bayesian confidence levels by product description and delivery speed

	Within two hours	Tomorrow	Within 1-3 days	Within 3-5 days	Scheduled delivery
Food	0.1%	18.7%	92.3%	99.9%	22.1%
Non-food	31.7%	18.0%	39.3%	98.1%	20.7%
Circular	0.0%	51.1%	97.4%	98.4%	50.8%

For the remaining attributes, tracking information and packaging, no statistically significant differences were found between the product types ($\chi^2(8) = 5.608$, p = not sig; $\chi^2(8) = 4.808$, p = not sig). This suggests that consumer preferences for these delivery features are relatively the same regardless of product framing. Since preferences for these attributes did not differ significantly across food, non-food, and circular product descriptions, see section 3.2.1 for more information on the level preferences of those attributes.

3.2.5 Are there differences in consumer preferences for delivery options across European countries? (RQ1e)

Similarly to the previous analysis of product-type framing, the multi-country context of the survey allows for the exploration of whether and to what extent consumer preferences for delivery options differ across the ten surveyed European countries: Belgium, the Netherlands, France, Italy, Spain, Norway, Sweden, Greece, Poland, and Germany.

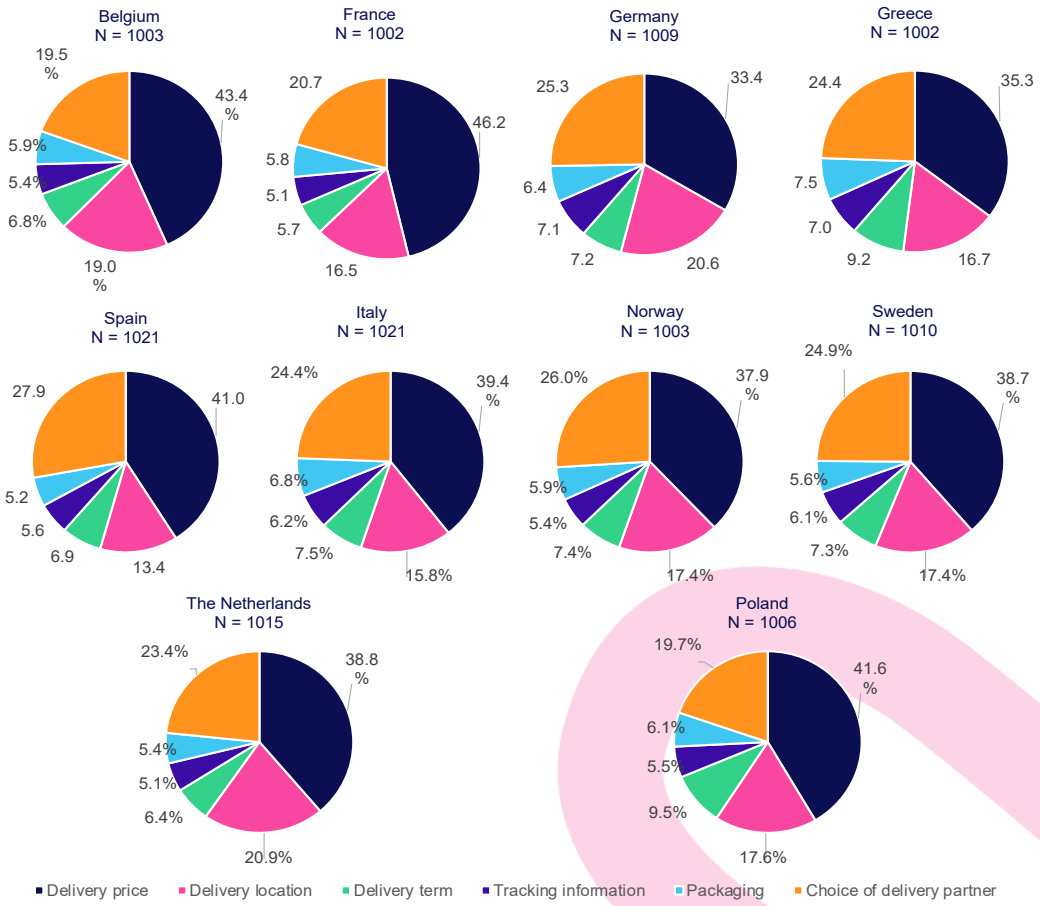
As shown in Figure 28, once again the differences here are less significant than those observed across the various consumer segments (see 3.2.2). Delivery price emerged as the most influential attribute across all ten countries, with importance scores ranging from 33.4% in Germany to 46.2% in France. This was followed by choice of delivery partner, which ranked second in importance, ranging between 19.5% (Belgium) and 27.9% (Spain). Delivery location consistently held the third position, with scores varying from 13.4% (Spain) to 20.9% (the Netherlands). The remaining attributes: delivery term, tracking information, and packaging, were less influential, each accounting for under 10% of decision weight across countries. Despite some variation, the overall ranking of attributes remained relatively consistent, underscoring a shared prioritization of price and partner choice in evaluations of delivery options across the ten European countries.

To investigate more closely differences in country-level preference, a counting analysis was first performed to examine whether the distribution of choices across delivery attribute levels significantly varied by country. This initial analysis revealed statistically significant differences ($p < 0.01$) in the attributes, delivery price, delivery location, and delivery partner. Regarding the other characteristics, tracking information, delivery speed, and packaging, no statistically significant variations between countries were discovered ($\chi^2(36) = 17.334$, p = not sig; $\chi^2(36) = 50.546$, p = not sig; $\chi^2(36) = 25.993$, p = not sig). This implies that, regardless of country-specific context, consumer preferences for delivery

speed, tracking information and packaging are essentially the same. For more details on the level preferences of those attributes, check section 3.2.1.

Following the count analysis, a Hierarchical Bayesian Multinomial Logit (HB-MNL) model was estimated with country included as a covariate. Belgium was selected as the reference country (as it was the first listed in the dataset). The HB model produced posterior part-worth utility estimates for each country and delivery attribute level. Pairwise comparisons between these distributions allowed for the calculation of Bayesian confidence levels, indicating how likely it is that one country values a specific delivery level more than another. Importantly, all comparisons are made within attribute across countries, not between attributes. A confidence level above 95% or below 5% was interpreted as strong evidence of a meaningful difference. For interpretability, high confidence wins (confidence ≥ 95%) for each level were counted to determine how often one country's respondents significantly valued a level more than those in another country. Based on this approach, countries were grouped based on similar utility patterns, identified through visual inspection of Bayesian confidence heatmaps and posterior comparisons (see **Annex VI – Bayesian confidence intervals for countries**). The following sections summarise the results for each attribute that showed a significant difference in the counting analysis.

Figure 28: Importance scores of attributes – country level



3.2.5.1 Country-specific differences in delivery price

Based on the posterior comparisons and Bayesian confidence estimates, distinct patterns of price sensitivity emerged across Europe (Table 9). These patterns were identified using the number of high confidences wins (≥95% Bayesian confidence) for each country at each price level. A high confidence win indicates strong evidence that a country values a specific price level more (or dislikes it more, in the case of higher fees) compared to the other countries.

Table 9: Number of high confidence wins (≥95%) by country and price level

	Free	2.99	3.99	4.99	6.99
Belgium	0	0	6	9	8
Netherlands	7	4	2	2	1
France	3	4	4	3	2
Italy	9	9	2	0	0
Spain	2	1	2	2	6
Norway	7	3	2	0	2
Sweden	2	1	0	6	3
Greece	2	5	0	3	4
Poland	1	0	4	3	7
Germany	2	1	9	2	1

Italy, the Netherlands and Norway exhibited the strongest overall preference for free delivery. Italy outperformed all other countries at this price level, registering 9 out of 9 high confidence wins, meaning that in every pairwise comparison, the Bayesian posterior distributions showed at least 95% confidence that Italian respondents valued free delivery more than their counterparts. The Netherlands and Norway followed closely with 7 out of 9 wins each. However, both Italy and the Netherlands showed a sharp drop in wins as prices increased. Italy had no significant wins at the highest price points (€4.99 and €6.99), and the Netherlands had only two win €4.99 at and one win at €6.99. These results point to a clear preference of free delivery among Italian, Dutch, and Norwegian consumers.

Belgium, Germany and Poland showed relatively low preference for free delivery compared to the other countries, with Belgium and Germany securing few or no high confidence wins at the free level. However, they exhibited strong aversion to higher delivery fees. Belgium had 9 out of 9 high confidence wins at €4.99 and 8 out of 9 at €6.99, meaning the Bayesian model estimated with high confidence that Belgian respondents disliked these higher prices more than almost all other countries. Germany similarly led with 9 out of 9 wins at €3.99, and Poland showed a strong aversion to €6.99 (7 out of 9). This group appears particularly sensitive to rising delivery costs, preferring lower prices not necessarily because they value free delivery more, but because they more strongly reject expensive options.

France, Greece and Spain displayed more balanced distribution of wins across the mid-price levels. France and Greece had the highest number of high confidence wins at €2.99 (4/9 and 5/9 respectively), while Spain stood out with 6/9 wins at €6.99. None of the countries demonstrated extreme behaviour at either end of the price scale, as reflected by their more even spread of Bayesian confidence levels. These consumers may be more willing to pay moderate delivery fees and are less reactive to both free delivery and high-cost extremes.

Lastly, Sweden was the only country that did not show a clear pattern. It has low wins across most levels but a small peak at €4.99 (6/9). These results were confirmed by Bayesian confidence intervals that fluctuated across levels and country comparisons. This profile suggests moderate to low price sensitivity, with preferences that are more evenly distributed or context dependent.

3.2.5.2 Country-specific differences in delivery location

In the case of delivery location, a high confidence win was defined as a ≥95% posterior Bayesian probability that respondents from one country value a particular delivery location more than respondents from another country. The total number of high confidence wins per location level was calculated for each country, resulting in distinct patterns across Europe (Table 11).

Table 10: Number of high confidence wins (≥95%) by country and location option

	Home	Instore	Collection	Parcel locker	Workplace
Belgium	8	2	0	0	6
Netherlands	6	6	5	0	1
France	5	6	7	2	0
Italy	1	5	8	4	0
Spain	1	2	3	0	7
Norway	1	6	2	0	7
Sweden	1	1	3	6	1
Greece	1	1	4	6	0
Poland	0	0	0	7	8
Germany	3	1	0	9	2

Belgium and the Netherlands stand out as strong users of home delivery, with Belgium earning 8 out of 9 possible wins and the Netherlands 6. This indicates that consumers in these countries hold home delivery as the default and most trusted option. In contrast, Italy and France show clear preferences for collection points, with 8 and 7 high confidence wins respectively. These findings suggest that consumers in these markets are more accustomed to or accepting of picking up parcels themselves.

Workplace delivery was favoured most in Poland (8/9), Spain (7/9), and Norway (7/9), signalling that in these contexts, receiving parcels at work is considered convenient or practical. These countries may have infrastructures or work cultures that support or encourage this delivery mode. Turning to parcel lockers, Germany leads decisively with 9/9 wins, followed by Poland, Greece, and Sweden—all with at least 6 wins. These countries appear to embrace autonomous parcel retrieval, suggesting maturity in self-service delivery systems and high consumer trust in locker-based logistics.

Finally, some countries like Sweden, Greece, and Germany exhibit more fragmented or mixed preferences. While each shows a strong preference for lockers, they don't demonstrate high consistency across other locations. For example, Sweden performs modestly across most locations except lockers (6 wins), while Greece combines wins in collection and lockers, but not others.

3.2.5.3 Country-specific differences in delivery partner & ethics

Bayesian posterior comparisons were also used to explore national differences in preferences for delivery partner types: Eco-Friendly Carriers, National Postal Services, Global Express Carriers, App-Based Local Couriers, and No Selection. For each level, pairwise comparisons identified high confidence wins (≥95%), reflecting a significantly higher utility for a delivery partner in one country relative to another (see Table 11).

Table 11: Number of high confidence wins (≥95%) by country and delivery partner & ethics

	Eco-friendly carrier	National postal service	Global express carrier	App-based carrier	No Selection
Belgium	3	2	3	6	0
Netherlands	0	1	3	6	2
France	3	0	3	5	1
Italy	2	0	3	2	2
Spain	2	0	3	2	2
Norway	9	2	0	1	2
Sweden	3	9	0	0	5
Greece	3	4	0	0	1
Poland	0	1	3	2	3
Germany	0	0	4	4	6

Norway stood out clearly with 9 out of 9 high confidence wins for eco-friendly carriers, indicating a strong, statistically significant preference for sustainability conscious delivery options. The Norwegian consumers have a clear preference for delivery partners that focus on environmental and societal sustainability. Sweden emerged as the only country showing overwhelming preference for national postal services, with 9 wins. This could reflect institutional trust in state services and the perceived reliability or familiarity of national systems.

On the other hand, Germany was the only country showing a clear preference toward global express delivery partners, earning 4 high confidence wins in this category, along with 4 in app-based delivery. This indicates a preference for speed and potentially international reach. Both Belgium and the Netherlands recorded 6 high-confidence wins for app-based courier services, showing an openness to flexibility, convenience, and possibly more innovative or tech-enabled logistics. Their preference for app-based services distinguishes them from the other countries.

France, Italy, Spain, Greece, Poland did not show a dominant preference for any one partner type. Their high confidence wins were spread thinly across several categories, indicating that consumers in these markets are more open to different delivery arrangements depending on context. Some leaned moderately toward app-based or global carriers, but not with overwhelming certainty. This pattern suggests either more heterogeneity within the population or a lack of strong conviction around one type of delivery partner.

3.3 Understanding consumers' relation to returns

Having gained insights into consumers' willingness to trade fast and free deliveries for more sustainable alternatives (Objective 1), this section shifts focus to understanding consumers' relationship to returns as a key factor behind varying return rates (Objective 2). To address this, the survey included twenty statement questions, developed based on an extensive review of the scientific literature. These statements were subjected to exploratory factor analysis using principal axis factoring with direct Oblimin rotation to account for potential factor correlations. The scree test criterion guided factor retention. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.86, and Bartlett's test of sphericity was significant ($p < 0.001$), confirming the suitability of the data for factor analysis. Four factors emerged, corresponding to convenience, acceptance, avoidance, and technology as key concepts. We relied on the pattern matrix for interpretation, as oblique rotation optimizes factor differentiation. Although two of the statement questions had loadings below 0.45, they were retained due to their conceptual relevance. Cronbach's alpha range from 0.63 to 0.88, indicating acceptable to good reliability (Nunnally, 1978). Removing the two lower-loading items did not substantially improve reliability. Table 12 presents the factor structure and reliability coefficients.

Table 12: Factor structure of the twenty statement questions (factor loadings <|0.4| are not shown)

	Factor 1	Factor 2	Factor 3	Factor 4	Cronbach's alpha
Convenience					**.882**
When returns are free, I tend to return more.	.833				
When returns are free, I tend to purchase on impulse.	.796				
When returns are convenient, I tend to return more.	.769				
Returns are fun.	.695				
I have returned an online purchase after finding a better deal.	.688				
When returns are free, I tend to purchase more.	.672				
I have returned an online purchase after using it.	.610				
Avoidance					**.634**
I feel guilty when I return an online purchase.		.476			
I believe that reducing my returns helps the environment.		.467			
By consulting descriptions and visuals, I try to make the right purchase choice and avoid a return.		.460			
By consulting customer reviews, I try to make the right purchase choice and avoid a return.		.431			
Returns are stressful.		.416			
I avoid returns by only ordering items I intend to keep.					
Acceptance					**.662**
Returns are a common and to be expected part of online shopping.			-.638		
Returning online purchases feels acceptable in my social circle.			-.626		
Free returns are important to reduce the risks of online shopping.			-.608		
I make sure I know the retailer's return policy before making an online purchase.			-.411		
I only return online purchases when I have a legitimate reason to do so.					
Technology					**.785**
I am willing to use virtual and augmented technologies provided by the retailer, if it helps me avoid a return.				-.844	
I am willing to use online fit assistants provided by the retailer, if it helps me avoid a return.				-.763	
"Eigen" value	4.632	3.332	1.911	1.100	
Explanation of variance	23.159	16.661	9.554	5.499	
Cumulative explanation of variance	23.159	39.820	49.375	54.874	
Principal axis factoring with direct oblimin rotation. KMO measure of sampling adequacy = 0.860.					

The first factor, **convenience**, reflects consumers' view on returns as a mean to facilitate the online shopping process. Consumers scoring high on this factor tend to use free and convenient return options to shop and return more frequently and more impulsively. Some find returning even "fun" (Cullinane & Cullinane, 2021). The statements within this factor are based on several sources. Foscht et al. (2013) refer to the online shopping process as a set of two discrete decisions. First, consumers have to decide whether or not to order the products and second, they have to decide whether to keep or return the products after they have been delivered (Foscht et al., 2013). Return policies impact both decisions. For example, not only do free returns drive sales, they also fuel frivolous product orders and can cause consumers to overspend (Saarijärvi et al., 2017). "Regret and overspending may lead to complaints and dissatisfaction", state Lv and Liu (2022), "making it easier for consumers to have the desire to return". Similar economic reasoning causes consumers to return online purchases after finding a better product or price elsewhere (Powers & Jack, 2015). Yet some consumers take advantage of generous return policies to order products with the explicit intention of returning them (Mun et al., 2014; Ketzenberg et al., 2020). This occurs, for example, when ordering multiple colours and sizes of the same item (i.e., "bracketing") or when using it once for a specific purpose (i.e., "retail borrowing" or "wardrobing") (Cullinane & Cullinane, 2021). Such over-ordering behaviours are considered abusive and fraudulent, inflating return rates. In the consumer return typology by Rosenbaum and Bitner-Olson (1999), consumers scoring high on the convenience factor align with the "sport" and "unethical" returner types.

The second factor, **avoidance**, reflects consumers' view on returns as a part of the online shopping process to avoid. To consumers scoring high on this factor, returns are guilt-inducing and stressful, encouraging specific behaviours to avoid them. The statements within this factor are based on several sources. Rintamäki et al. (2021) find that feelings of guilt are associated with the recognition that product returns represent a cost to the company. Those feelings can also result from awareness of the environmental problems that returns cause (Lv & Liu, 2022). Such negative emotions are stressful. Yet stress can also stem from the time pressure and the process of repacking the items and sending them back (Rintamäki et al., 2021). Return avoidant consumers refrain from planned returns by only ordering items they intend to keep (Saarijärvi et al., 2017), while relying on descriptions, visuals, and reviews to make the right purchase (Buldeo Rai, 2022). None of the types within the consumer return typology by Rosenbaum and Bitner-Olson (1999) align well with consumers scoring high on the avoidance factor.

The third factor, **acceptance**, reflects consumers' view on returns as an acceptable and accepted part of the online shopping process. This view holds both to themselves and their social circle. The statements within this factor are based on several sources. Saarijärvi et al. (2017) categorize return behaviours and consider reclamation (i.e., defective products), order-fulfilment (i.e., wrong products delivered), disconfirmation (i.e., unexpected product features), and size chart (i.e., wrong size) as reasons to return. These behaviours align with what Wachter et al. (2012) call valid and legitimate. Returns allow consumers to manage uncertainty when shopping online, highlighting the importance of knowing the applicable return policies (Mun et al., 2014). According to Foscht et al. (2013), this kind of risk avoidance is more important for "occasional returners" than for "heavy returners" and "medium returners". Over time, uncertainty decreases as consumers become more familiar with the products and the company (Foscht et al., 2013). In this way, non-abusive and non-fraudulent consumers perceive returns as acceptable behavior, implying that it might not be right, yet not totally wrong either (Wachter et al., 2012). Mun et al. (2014) add the importance of social (and asocial) norms, identifying that the key for consumers to engage in "retail borrowing" is the knowledge of others who successfully borrow or knowledge that others hold positive attitudes toward borrowing. Moral recognition, moral judgment, and social consensus within consumers' social circle are thus essential (Chang & Yang, 2022). In the consumer return typology by Rosenbaum and Bitner-Olson (1999), consumers scoring high on the acceptance factor align with the "ethical" as well as with the "educated" returner types.

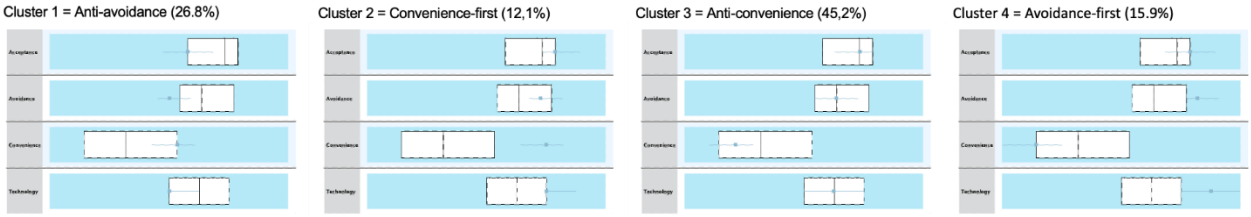
The fourth factor, **technology**, reflects consumers' view on returns as a part of the online shopping process to avoid, using advanced technologies such as augmented technologies and online fit assistants (Buldeo Rai, 2022).

In addition, we conducted a two-step cluster analysis based on the four factors. The analysis revealed four main clusters and one outlier cluster with an average Silhouette measure of cohesion and separation of 0.3. The outlier cluster includes 38 respondents (0.4% of the sample), which were not fitting well into any of the main clusters based on log-likelihood distance. They were therefore excluded

from further cluster-based comparison analyses. The smallest cluster includes 1,212 respondents (12.1%), while the largest cluster contains 4,548 respondents (45.2%). All four factors share an equal predictor importance of 1. Figure 29 introduces the clusters and their composition.

The first cluster is called "**anti-avoidance**" and comprises 26.8% of respondents. This cluster contains consumers who are bothered by returns, but do not actively try to avoid them. The second cluster is named "**convenience-first**" and comprises 12,1% of respondents. This cluster represents consumers whose purchasing patterns are affected by returns and who tend to abuse their convenience. The third cluster is called "**anti-convenience**" and represents 45.2% of respondents. This cluster unites consumers whose purchasing patterns are unaffected by returns. The fourth cluster is named "**avoidance-first"** and represents 15.9% of respondents. This cluster contains consumers focused on avoiding returns by any means possible, including technologically advanced ones.

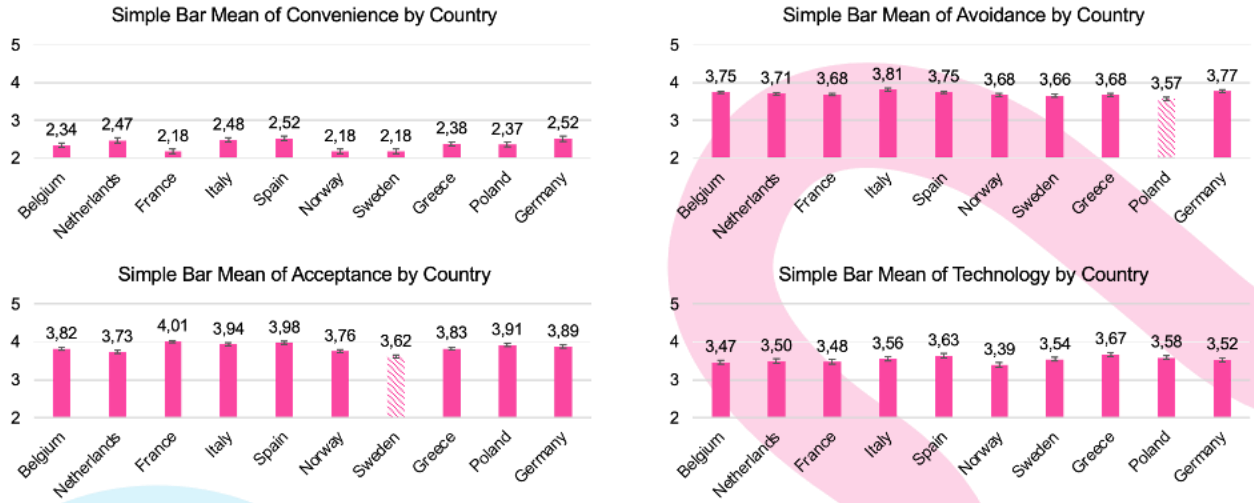
Figure 29: Clusters composition of the four factors



3.3.1 Do consumers in European countries relate differently to e-commerce returns? (RQ2a)

To determine if consumers across Europe relate differently to e-commerce returns, we conducted one-way ANOVA and one-way Welch ANOVA, when homogeneity of variances was violated as assessed by Levene's Test. Doing so, we found that consumers' mean scores on the factors **convenience** (Welch's F(9, 4106.744) = 20.759, p < .001), **avoidance** (F(9, 10082) = 12.131, p < .001), **acceptance** (Welch's F(9, 4106.886) = 37.835, p < .001), and **technology** (Welch's F(9, 4106.741) = 8.416, p < .001) differ significantly among nationalities (Figure 30).

Figure 30: Mean scores on the four factors by country

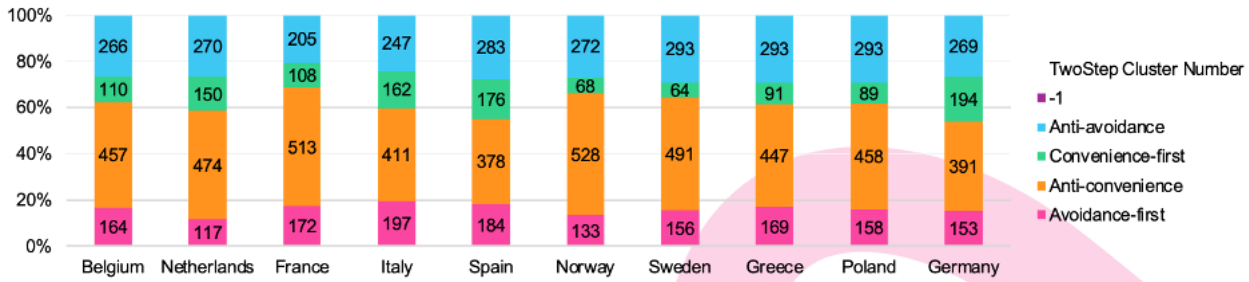


Note: (striped bars represent factor means significantly different from all other countries in the selection, as determined by Tukey or Games-Howell post hoc analysis)

The following data is presented as mean ± standard deviation. Convenience scores increase from France (2.18 ± 0.99), Norway (2.18 ± 0.88), and Sweden (2.18 ± 0.90) on the lower end, to Spain (2.52 ± 1.02) and Germany (2.52 ± 1.08) on the higher end. French, Norwegian, and Swedish consumers are thus less favourable of using (and abusing) returns to facilitate the online shopping process, while Spanish and German consumers are more favourable. Avoidance scores increase from Poland (3.57 ± 0.64) on the lower end, to Italy (3.81 ± 0.62) on the higher end. Polish consumers thus feel less strongly about avoiding returns, while Italian consumers feel more strongly. Tukey post hoc analysis revealed that the difference in avoidance scores of Poland and all other considered countries is significant. Acceptance scores increase from Sweden (3.62 ± 0.63) on the lower end, to France (4.01 ± 0.63) on the higher end. Swedish consumers are thus less inclined to accept returns as part of the online shopping process, while French consumers are more inclined. Games-Howell post hoc analysis revealed that the difference in acceptance scores of France and all other considered countries is significant. Technology scores increase from Belgium (3.47 ± 0.93) and France (3.48 ± 1.01) on the lower end, to Greece (3.67 ± 0.83) on the higher end. Belgian and French consumers are thus less willing to use advanced technologies to avoid returns, while Greek consumers are more willing. The range between acceptance (0.39) and convenience (0.34) scores is stronger than the range between avoidance (0.24) and technology (0.20) scores.

A chi-square test for association indicates a significant association between consumers' relation to returns and their country of residence ($\chi2(27) = 260.353$, $p = .001$). As presented in Figure 31, anti-avoidance consumers are relatively less represented in France (20.5%) and relatively more represented in Poland (29.4%), Greece (29.3%), and Sweden (29.2%). The average country representation of this cluster is 26.8%. With an average country representation of 12.1%, convenience-first consumers are less present in Sweden (6.4%) and Norway (6.8%) and a lot more present in Germany (19.3%). Anti-convenience consumers are relatively less represented in Spain (37.0%) and Germany (38.8%) and relatively more represented in France (51.4%) and Norway (52.7%). The average country representation of this cluster is 45.2%. With an average country representation of 15.9%, avoidance-first consumers are less present in the Netherlands (11.6%) and a lot more present in Spain (18.0%) and Italy (19.4%).

Figure 31: Clusters by country



Finally, we conducted a multinomial logistic regression analysis to examine the influence of various predictors on membership in the four clusters. We included the following variables: psychological attitudes motivation, individual self, and sustainability awareness, which are based on the statement questions related to consumers' sustainability engagement and delivery expectations, country, age, education, environment, occupation, children, purchase frequency, and return frequency. The model fit was statistically significant, indicating that the full model provides a better fit to the data than the intercept-only model ($\chi2(111) = 4782.87$, $p = .001$). The -2 Log Likelihood for the final model was 20202.61. Pseudo R^2 values indicate good model fit (Cox & Snell = 0.38, Nagelkerke = 0.42, and McFadden = 0.19). Significant predictors of cluster membership include the psychological attitudes, sociodemographic variables, country, purchase frequency, and return frequency. Notably, return frequency was a strong differentiator among clusters, with exponentially increasing odds ratios (ORs) for more frequent returners.

First, compared to the avoidance-first cluster, consumers with higher motivation (OR = 1.491) and lower sustainability awareness (OR = 0.373) are more likely to be **anti-avoidance**. Being from the Netherlands (OR = 1.92) and Greece (OR = 1.80) increases odds, next to being younger (ORs between 2.34 and 2.98 for 16–44-year-olds) and lower educated (OR 2.02 for ISCED 0-2). Higher purchase frequency decreases odds (OR = 0.30 for weekly online shoppers), while higher return frequency is the strongest predictor (OR = 35.10 for weekly online returners and OR = 14.22 for monthly online returners). Second, consumers with higher individual self-orientation (OR = 2.23) are more likely to be **convenience-first**. Being from the Netherlands (OR = 1.70) increases odds, next to being younger (ORs between 2.39 and 3.12 for 16-44) and lower educated (OR = 4.90 for ISCED 0-2). Return frequency again has very strong effects (OR = 89.35 for weekly online returners and OR = 29.51 for monthly online returners). Third, consumers with higher individual self-orientation (OR = 0.791) are less likely to be **anti-convenience**. Being from the Netherlands (OR = 1.74) increases odds, next to being lower educated (OR 1.40 for SCED 0-2). Lower purchase frequency increases odds (OR 1.59 for every 6-12 months online shopping), while return frequency shows moderate but consistent effects (OR 2.08 for monthly online returns and 1.91 for returns every one to three months). Detailed parameter estimates can be found in **Annex VII – Multinomial logistic regression parameter estimates.**

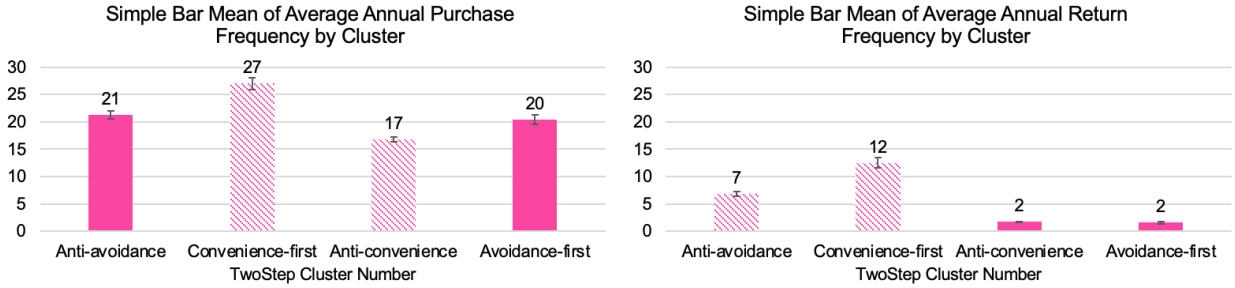
In response to RQ2a, consumers in European countries relate differently to e-commerce returns when it comes to statements related to convenience, avoidance, acceptance, and the use of technology.

3.3.2 Do differences in how consumers relate to e-commerce returns result in different purchase and return behaviour? (RQ2b)

To determine if consumers' relation to e-commerce returns results in different behaviours, we conducted one-way Welch ANOVA, as homogeneity of variances was violated as assessed by Levene's Test. Doing so, we found that purchase (Welch's $F(3, 3568.277) = 119.392$, $p < .001$) and return (Welch's $F(3, 3256.269) = 313.220$, $p < .001$) volumes differ significantly among e-commerce return clusters. We calculated these volumes based on the indications of return frequency, with weekly frequencies implying 52 parcels, frequencies every other week implying 26 parcels, monthly frequencies implying 12 parcels, frequencies between one and three months implying 8 parcels, frequencies between three to six months implying 3 parcels, frequencies between six to twelve months implying 1.5 parcels, and frequencies less than once a year implying 0.5 parcels.

What stands out is that anti-convenience (2 returns/year) and avoidance-first (2 returns/year) consumers send considerably fewer online purchases back than anti-avoidance (7 returns/year) and especially convenience-first (12 returns/year) consumers. Nonetheless, avoidance-first (20 purchases/year) and anti-avoidance (21 purchases/year) consumers are equally active online shoppers, although less active than convenience-first (27 purchases/year) consumers, who return almost half of what they order. Games-Howell post hoc analyses revealed that the difference in purchase volumes of convenience-first consumers on the one hand and anti-convenience consumers on the other hand, are significant from all other clusters. These analyses revealed as well that return volumes of anti-avoidance consumers on the one hand and convenience-first consumers on the other hand, are significant from all other clusters. Figure 32 presents the findings.

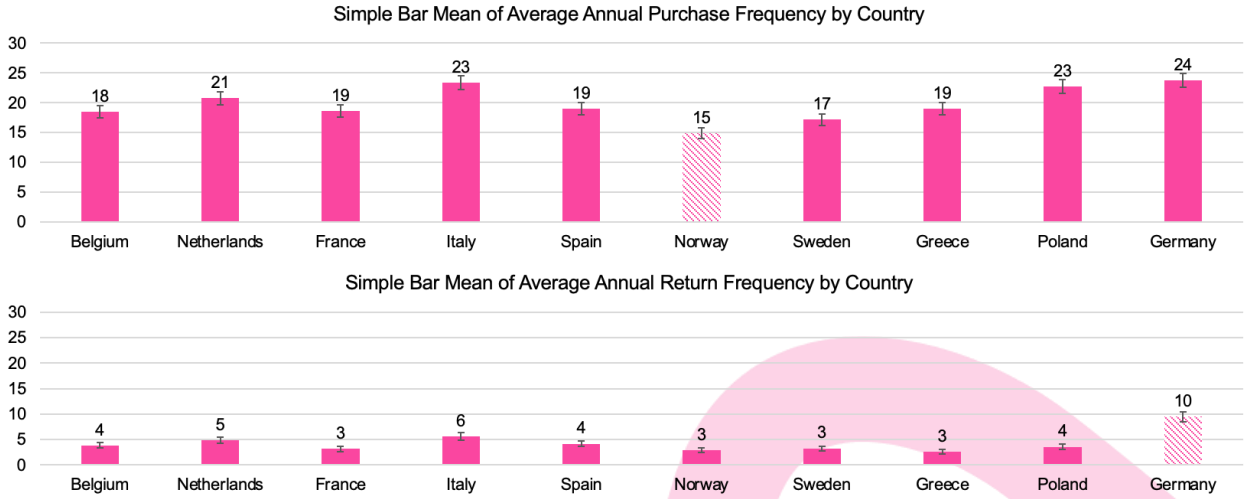
Figure 32: Average annual purchase and return frequency by cluster



Note: Striped bars represent parcel volumes significantly different from all other clusters, as determined by Games-Howell post hoc analysis

In addition, we conducted a binary logistic regression to examine the factors influencing the likelihood that consumers return products on a monthly or more frequent basis compared to returning less than monthly. The final model was statistically significant, with a -2 Log Likelihood of 4952.07. The model explained approximately 37.5% of the variance in return frequency (Nagelkerke $R^2 = 0.375$), indicating a moderate model fit. The model achieved an overall classification accuracy of 90.0%. However, it performed much better in predicting non-frequent returners (correctly classifying 97.9% of "less than monthly") than in identifying frequent returners (correctly classifying only 28.2% of "monthly or more").

Figure 33: Average annual purchase and return frequency by country



Note: Striped bars represent parcel volumes significantly different from all other clusters, as determined by Games-Howell post hoc analysis

Significant predictors of higher likelihood to return goods monthly or more include country of residence, with Polish consumers in particular having increased odds (OR = 2.10), convenience (OR = 3.09), motivation (OR = 1.14), occupation, with retired consumers in particular having increased odds (OR = 1.48), and purchase frequency (OR = 1.04 per unit). Significant predictors of reduced likelihood of frequent returns include country of residence, with Swedish (OR = 0.42) and Greek (OR = 0.54) consumers in particular having decreased odds, age, with consumers between 35 and 44 years old (OR = 0.68) and between 45 and 54 years old (OR = 0.68) in particular having decreased odds, lower education (OR = 0.66 for ISCED 0–2 and OR = 0.69 for ISCED 3–4), town living (OR = 0.76), individual self-orientation (OR = 0.90), sustainability awareness (OR = 0.84), and avoidance (OR = 0.69). **Annex VIIII – Binary logistic regression variables in the Equation** presents the Variables in the Equation.

Confirming these results, return (Welch's $F(9, 4091.666) = 24.399$, $p < .001$) and purchase (Welch's $F(9, 4061.643) = 29.494$, $p < .001$) volumes significantly differ among nationalities. Games-Howell post hoc analyses revealed that the differences in purchase volumes of Norwegian consumers (15 purchases/year) and the difference in return volumes of German consumers (10 returns/year) are significant from all other considered countries, with Norwegians purchasing less and Germans returning considerably more.

In response to RQ2b, consumers' relation to returns when it comes to convenience, avoidance, acceptance, and the use of technology does result in different purchase and return behaviour.

4 Conclusions

This report explores how consumers across ten European countries (Belgium, the Netherlands, Italy, France, Spain, Norway, Sweden, Poland, Greece and Germany) make choices about e-commerce deliveries and returns. Using a large-scale online survey (N = 10,092) and a choice-based conjoint exercise, the research aimed to understand the conditions under which consumers are willing to opt for more sustainable delivery options and to explore the role of return attitudes in influencing online shopping behaviour. The report addressed, two main research objectives through a number of targeted research questions, which will be summarized next.

4.1 Research question 1a: How do key delivery attributes (e.g., price, speed, location, reliability, flexibility, packaging) shape preferences of online consumers?

The results show that delivery price is the most influential factor shaping consumer preferences, followed by the attributes delivery partner & ethics and delivery location. Free or low-cost (€2.99) delivery strongly drives decision-making, with sharp declines in preference once costs exceed €3.99. Consumers also show a clear preference for eco-friendly delivery partners, suggesting a willingness to factor sustainability into their delivery choices, especially when the price difference is minimal. Home delivery remains the most popular option, although parcel lockers and pick-up points gain some acceptance. Other attributes, such as delivery speed, packaging, and tracking information, play smaller roles but still influence the delivery decisions. Consumers prefer reusable or recycled packaging and value real-time tracking options, though these features are less decisive on their own.

Importantly, interaction effects reveal that preferences are not formed in isolation. For example, willingness to use alternative delivery locations or accept slower speeds increases when the delivery is free but decreases significantly as costs rise. Likewise, willingness for longer delivery times is greater when the delivery price is low. These findings underscore that consumer decision-making is highly context-dependent, with price frequently serving as an important consideration in the evaluation of the other attributes.

4.2 Research question 1b: Are these preferences consistent across all consumers, or can we identify distinct consumer segments with different preferences?

While the previous analysis provided insights into aggregate consumer preferences, a deeper look revealed that not all consumers value delivery features in the same way. To better understand this variation, a segmentation analysis was carried out using a latent class analysis, which identified four distinct groups, each with their own decision-making process and attribute preferences.

The largest group, accounting for just under 40% of the sample, emerged as highly price sensitive. For these consumers, cost is the most important factor. They strongly prefer free and to a lesser extent low-cost delivery (€ 2.99). They are quick to reject options that come with higher delivery prices, regardless of other the features. In contrast, the home delivery-focused segment, around 15% of respondents, prioritizes the convenience of home delivery above all else. Although price still matters to them, it is secondary to receiving parcels at their preferred location. A third group, comprising 22.7% of the sample, can be described as service-oriented consumers. These individuals weigh multiple attributes more evenly, valuing a combination of affordability, reliable delivery partners, sustainability information and flexible delivery locations like parcel lockers or pick-up points. They also tend to appreciate advanced tracking features that offer control over the delivery process. The fourth and final group stands out as sustainability-driven. Making up just under 25% of the sample, these consumers show a clear preference for environmentally and socially responsible delivery options. For them, the attribute delivery partner & ethics is especially important, eco-friendly providers are strongly preferred, even when delivery comes at a higher cost. This group is also more receptive to sustainable packaging and is the most tolerant of longer delivery times if these are aligned with sustainable goals.

Taken together, these findings illustrate that consumer preferences for delivery options are far from uniform. Some consumers are focused on minimizing delivery price, while others prioritize convenience, service quality, or sustainability. Each group exhibits its own trade-offs in delivery attribute preferences.

4.3 Research question 1c: Under which circumstances do consumers trade their preferred deliveries for more sustainable alternatives?

To further evaluate the willingness to adopt more sustainable alternatives over the preferred delivery option, a simulation-based analysis was conducted. This study approached sustainability not as a fixed definition but as a set of delivery configurations commonly associated with lower environmental impact. This resulted in the setup of three different scenarios, urban, urban and rural, each of which then contained elements that led to a lower environmental impact in that particular situation. The findings were in line with the results of the segmentation analysis and showed that while some consumers are open to more sustainable delivery options, their willingness to adopt these alternatives depends on the specific trade-offs involved, and this vary, as seen in the segmentation results, significantly across the different consumer segments.

Price-sensitive consumers accept sustainability only if delivery is free or very low-cost. Home delivery-focused consumers insist on home delivery and reject pickup options, even when they are more sustainable or cheaper. Service-oriented consumers want speed, flexibility, and tracking, and will only consider sustainable options that maintain service quality. Sustainability-driven consumers are most willing to adapt, but only if green options are clearly mentioned. Price and convenience still matter.

In sum, no single sustainable delivery format appeals universally. Successful adoption of sustainable delivery practices will therefore require strategies that reflect the different conditions under which each consumer segment is willing to make trade-offs.

4.4 Research question 1d: How do consumer preferences for delivery options vary across product types (non-food, food, circular items)?

While product type does influence delivery preferences to some extent, the overall structure of consumer decision-making remains consistent across non-food, food, and circular product contexts. Across all three product framings, consumers consistently prioritized delivery price, followed by delivery partner & ethics and delivery location. Attributes such as packaging, tracking, and delivery speed played more secondary roles, although subtle variations emerged in how consumers evaluated them.

That said, deeper analysis revealed some differences in how strongly certain delivery levels were valued. Consumers evaluating food and circular products showed greater price sensitivity, with sharper declines in preference as delivery fees increased, even at mid-range price points. In contrast, non-food consumers were more tolerant of delivery costs. Circular product respondents were also more open to slower deliveries and out-of-home options like parcel lockers.

While eco-friendly delivery partners were popular across all product types, they were less favoured in the food context, where reliability appeared more important. Meanwhile, preferences for packaging and tracking remained stable across product types, showing little variation.

In summary, while the trade-offs of delivery preferences are stable, product framing can subtly shape how trade-offs are made, particularly around price, speed, and delivery location, with circular and food products prompting more flexible, sustainability-aligned behaviours.

4.5 Research question 1e: Are there differences in consumer preferences for delivery options across European countries?

The overall structure of consumer decision-making is stable across all ten studied countries, despite some national differences emerged. Delivery price, delivery partner & ethics, and location ranked as the top priorities across all ten countries. Italy, the Netherlands, and Norway strongly preferred free delivery, while Belgium and Germany were especially averse to higher fees.

Home delivery was most popular in Belgium and the Netherlands, while France and Italy favoured pickup points, and Germany and Poland preferred parcel lockers. Preferences for delivery partners also varied: Norway stood out for favouring eco-friendly carriers, Sweden preferred postal services, and Germany leaned toward global express and app-based options.

These patterns suggest that while the overall decision-making process is similar across Europe, local preferences reflect national habits and infrastructure, pointing to the need for country-tailored delivery strategies.

4.6 Research question 2a: Do consumer in European countries relate differently to e-commerce returns?

Across the ten surveyed countries, consumers hold different attitudes toward returns, shaped by cultural norms, expectations. Some view returns as a convenient and routine part of online shopping, while others experience them as stressful, guilt-inducing, or something to be avoided altogether. These attitudes were captured in four patterns: convenience-first, avoidance-first, anti-avoidance, and anti-convenience. Their distribution varied by country, for instance, German consumers were more likely to treat returns as convenient, while Swedish and Norwegian shoppers showed stronger reluctance to use return systems. Meanwhile, Italian and Spanish consumers expressed more return-avoidant behaviours, and French consumers showed greater acceptance.

4.7 Research question 2b: Do differences in how consumers relate to e-commerce returns result in different purchase and return behaviour?

Consumers who view returns as convenient return significantly more often than those who avoid them. For example, convenience-first shoppers returned nearly half of what they bought, while avoidance-first and anti-convenience consumers returned very little despite being active online shoppers. National trends also reflected these patterns: German consumers returned more than other Europeans, while Swedes and Norwegians purchased and returned less frequently. Frequent returners were more likely to be younger, highly active online shoppers, and motivated by convenience, while less frequent returners tended to be older, more sustainability-aware, and more averse to the burden of returns.

In short, how consumers feel about returns strongly shapes how they behave, suggesting that return policies and practices must consider not just logistics, but also the psychological and cultural context behind return decisions.

4.8 Limitations and further research opportunities

While this research provides valuable insights into delivery and return preferences in e-commerce in 10 European countries, it also contains some limitations. First, given that the data on preferences in choice-based conjoint analysis is based on self-reported data, it may still differ slightly from actual behaviour. As previously show in Deliverables 2.2 (Pernot et al., 2025) and 2.3 (Philips & Pernot, 2025), life stage and the real-time decision-making process, both of which fall under the category of situational conditions, can influence delivery preferences and the actual choice.

Second, since a choice-based conjoint exercise measures a momentary capture of consumer preference, the cross-sectional nature of the data limits the ability to assess changes over time or the long-term impact of sustainability initiatives. Yet, it can be observed that the results obtained do not differ from other results found in the literature (Sources). However future research may consider conducting longitudinal studies to capture shifts in consumer preferences over time

Lastly, including a sustainability aspect to delivery partners made it possible to include multiple dimensions in one attribute. It also made the design of the choice-based conjoint exercise more straightforward for respondents. It is however also potentially misleading to generally associate sustainability with the name of a supply partner. Moreover, it is difficult to distinguish whether consumer choices are influenced by sustainability itself or only by delivery partner recognition, making the analysis less clear. In future research, it would be interesting to add attributes that treat delivery partner, environmental sustainability and social sustainability separately to better understand which factor weighs most heavily.

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Annex I – Questionnaire

(single-select) Question 1: The survey started with the selection of the language: No question, just the different options and use of one image

Option 1: Kies jouw taal: Nederlands

Option 2: Choisissez votre langue: Français

Option 3: Scegli la tua lingua: Italiano

Option 4: Elija su idioma: Español

Option 5: Velg språket ditt: Norsk

Option 6: Välj ditt språk: Svenska

Option 7: Επιλέξτε τη γλώσσα σας: Ελληνική

Option 8: Wybierz swój język: Polski

Option 9: Wählen Sie Ihre Sprache: Deutsch

(single-select) Question 2: In which country do you live?

QQLand_1: Belgium

QQLand_2: Netherlands

QQLand_3: France

QQLand_4: Italy

QQLand_5: Spain

QQLand_6: Norway

QQLand_7: Sweden

QQLand_8: Greek

QQLand_9: Polish

QQLand_10: German

After the information about the language and country of the respondents, the survey started with an introduction and GDPR information:

Dear respondent,

Thank you for participating in this study! This survey contains 30 questions and takes approximately 15 minutes to complete.

This questionnaire is part of the CodeZERO project, focused on developing sustainable and emission-free solutions for last-mile e-commerce deliveries and returns. More information about the project can be found on the **CodeZERO Project Website**:

Your **data** will be treated **confidentially** according to **GDPR guidelines** and used only for **scientific purposes**. Your **participation** is **voluntary** and can be discontinued at any time. More information on data processing can be found in the **Information and Consent Form (see Annex II)**.

If you have any questions, feel free to contact Kathleen Cauwelier at kathleen.cauwelier@vub.be

Thank you for your cooperation!

(single-select) Question 3: By filling out this survey, I consent to my participation in this study and to the processing of my personal data in accordance with the European General Data Protection Regulation (AVG) by the VUB researchers

Q1GDPRList_1: Yes, I agree

Q1GDPRList_2: No, I do not agree

Add Skip Logic: Post-Skip; Skip if the following logic evaluates to true: Logic: QGDPR = 2; Skip to <TerminateDisqualified>

(single-select) Question 4: Do you purchase physical products online? (For your information: Physical products require delivery, unlike, for example, tickets, e-books,

QAankoopFreqList_1: Yes, weekly

QAankoopFreqList_2: Yes, every other week

QAankoopFreqList_3: Yes, monthly

QAankoopFreqList_4: Yes, every 1-3 months

QAankoopFreqList_5: Yes, every 3-6 months

QAankoopFreqList_6: Yes, every 6-12 months

QAankoopFreqList_7: Yes, less than once a year

QAankoopFreqList_8: I never buy physical products online

QAankoopFreqList_9: Yes, please specify:

Add Skip Logic: Post-Skip; Skip if the following logic evaluates to true: Logic: QAankoopFreq = 7; Skip to <TerminateDisqualified>

(multiple-select) Question 5: Which products do you regularly purchase online? (Multiple answers possible)

QProductCatList_1: Clothing, shoes and accessories

QProductCatList_2: Multimedia and electronics

QProductCatList_3: Do-it-yourself supplies

QProductCatList_4: Beauty products

QProductCatList_5: Health products

QProductCatList_6: Books, magazines, newspapers

QProductCatList_7: Toys

QProductCatList_8: Sports goods

QProductCatList_9: Furniture and home decoration

QProductCatList_10: Garden items

QProductCatList_11: Food

QProductCatList_12: Pet supplies

QProductCatList_13: Alcoholic beverages

QProductCatList_14: Tabacco products

QProductCatList_15: Household supplies

QProductCatList_16: Household appliances

QProductCatList_17: Other, please specify

(single-select) Question 6: Which pickup or delivery option do you typically use when purchasing products online that are not large or heavy items?

QDeliveryOptionList_1: Home delivery

QDeliveryOptionList_2: Pick up at a pick-up point

QDeliveryOptionList_3: Pick up at the store where I bought the product online (Click&Collect option)

QDeliveryOptionList_4: Pick up at a parcel locker (24/7)

QDeliveryOptionList_5: Delivery at workplace

Description allocation: one of the descriptions was shown to the respondents.

Food product description: Imagine the following situation: You know you have a busy schedule ahead of you in the coming weeks and decide to order a meal box to save time and still be able to prepare healthy, varied meals. In the following screens, you will be shown 10 times three different combinations of delivery options. In each screen, choose the delivery option that best suits your preference.

Non-food description: Imagine the following situation: You want to upgrade your office space with a new desk lamp that matches your style. After finding the ideal lamp online that fits exactly what you are looking for, you come to the final step: choosing the desired delivery option. In the next 10 screens, you will be shown three different combinations of delivery options each time. In each screen, choose your preferred delivery option.

Circular product description: Imagine the following situation: You have found a beautiful pair of second-hand shoes online that perfectly suits your taste and style. After placing your order, you choose your preferred delivery option. In the next 10 screens, you will be shown three different combinations of delivery options each time. In each screen, choose your preferred delivery option.

(CBC_Random) Question 7-16: Choose from the 3 options the delivery option you prefer: CBC Task: see 2.3 Choice-based conjoint experiments

Question 17-28 (QAttitudeConsumerProfiles): Please indicate to what extent you agree

Possibilities: Strongly disagree – Disagree – Neutral – Agree – Strongly agree

QAttitudeConsumerProfiles_1: I prioritize cheap and practical delivery options over sustainable options

QAttitudeConsumerProfiles_2: I am willing to pay extra for a sustainable delivery option

QAttitudeConsumerProfiles_3: I never choose one delivery option over another because of sustainability

QAttitudeConsumerProfiles_4: I realize that some ways of delivering products ordered online are more sustainable than others

QAttitudeConsumerProfiles_5: I know which delivery options are better for the environment

QAttitudeConsumerProfiles_6: I feel responsible for making the delivery of my online purchase more sustainable

QAttitudeConsumerProfiles_7: I realize some delivery alternatives involve poorer working conditions for warehouse workers and delivery personnel

QAttitudeConsumerProfiles_8: I normally choose for home delivery when I order online

QAttitudeConsumerProfiles_9: I usually choose the fastest delivery alternative

QAttitudeConsumerProfiles_10: I don't usually notice sustainability of delivery options that are offered online

QAttitudeConsumerProfiles_11: Since I'm already making other sustainable choices, delivery sustainability matters less to me

QAttitudeConsumerProfiles_12: Minimizing the environmental impact of my online order delivery is important to me

(single-select) Question 29 (QRetourFreq): How often do you return products ordered online? Try to estimate an average frequency per year

QRetourFreqList_1: Yes, weekly

QRetourFreqList_2: Yes, every other week

QRetourFreqList_3: Yes, monthly

QRetourFreqList_4: Yes, every 1-3 months

QRetourFreqList_5: Yes, every 3-6 months

QRetourFreqList_6: Yes, every 6-12 months

QRetourFreqList_7: Yes, less than once a year

QRetourFreqList_8: I never return products

QRetourFreqList_9: Yes, please specify:

(single-select) Question 30 (QRetourOption): In case of returning my product, I usually choose to:

QRetourOptionList_1: Return my parcel to a pick-up point

QRetourOptionList_2: Returning my parcel via parcel locker (24/7)

QRetourOptionList_3: Returning my parcel to a physical store where I bought product

QRetourOptionList_4: That my order be picked up back at home

QRetourOptionList_5: Other, please specify

Question 31-50 (QAttitudeRetours): Please indicate to what extent you agree

Possibilities: Strongly disagree – Disagree – Neutral – Agree – Strongly agree

QAttitudeRetours_1: I make sure I know the retailer's return policy before making an online purchase.

QAttitudeRetours_2: Free returns are important to reduce the risks of online shopping.

QAttitudeRetours_3: Returns are a common and to be expected part of online shopping.

QAttitudeRetours_4: Returning online purchases feels acceptable in my social circle.

QAttitudeRetours_5: When returns are free, I tend to purchase more.

QAttitudeRetours_6: When returns are free, I tend to return more.

QAttitudeRetours_7: When returns are convenient, I tend to return more.

QAttitudeRetours_8: When returns are free, I tend to purchase on impulse.

QAttitudeRetours_9: By consulting customer reviews, I try to make the right purchase choice and avoid a return.

QAttitudeRetours_10: By consulting descriptions and visuals, I try to make the right purchase choice and avoid a return.

QAttitudeRetours_11: I am willing to use virtual and augmented technologies provided by the retailer, if it helps me avoid a return.

QAttitudeRetours_12: I am willing to use online fit assistants provided by the retailer, if it helps me avoid a return.

QAttitudeRetours_13: I avoid returns by only ordering items I intend to keep.

QAttitudeRetours_14: I have returned an online purchase after using it.

QAttitudeRetours_15: I have returned an online purchase after finding a better deal.

QAttitudeRetours_16: I only return online purchases when I have a legitimate reason to do so.

QAttitudeRetours_17: Returns are fun.

QAttitudeRetours_18: I feel guilty when I return an online purchase.

QAttitudeRetours_19: I believe that reducing my returns helps the environment.

QAttitudeRetours_20: Returns are stressful.

Question 51-56 (QPossibilitiesDelivery): When ordering online, how often can you normally choose from the following delivery option

Possibilities: Never – Rarely – Sometimes – Often – Very often – Always

QPossibilitiesDelivery_1: Free Delivery

QPossibilitiesDelivery_2: Fast Delivery

QPossibilitiesDelivery_3: Delivery in a pickup point

QPossibilitiesDelivery_4: Delivery in a parcel locker

QPossibilitiesDelivery_5: Delivery by bike

QPossibilitiesDelivery_6: Delivery labelled as ‘green’, ‘environmentally friendly’ or ‘sustainable’

Annex II – Informed consent form

You are asked to participate in the study CodeZERO – Quantitative analysis of consumer preferences. This project has received funding from the European union's Horizon Europe research and innovation programme under grant agreement Nr. 101146909

Your participation is voluntary: you are not obliged to take part and if you refuse, this will have no (negative) consequences for you. Take enough time to decide whether or not you want to participate. You can stop your participation at any time (in writing or orally) and you do not have to give a reason for doing so.

Below you can find more information about the study and how it will proceed. If you would like additional information, you can always contact the researcher or his/her supervisor.

Contact details

Kathleen Cauwelier	Mobilise research group, Vrije Universiteit Brussel	Kathleen.cauwelier@vub.be
Dr. Philippe Lebeau	Mobilise research group, Vrije Universiteit Brussel	Philippe.lebeau@vub.be
Prof. dr. Heleen Buldeo Rai	Mobilise research group, Vrije Universiteit Brussel	Heleen.buldeo.rai@vub.be

1. Purpose of the study

Taking stock of existing research that has demonstrated online consumers' preference for fast and free home deliveries, this task advances the state-of-the-art by addressing a twofold objective. First, it investigates the circumstances in which online consumers are willing and motivated to trade their preferred delivery option with more sustainable alternatives. Second, it studies the interplay between delivery and return conditions in online consumers' choice behaviour, encompassing both purchases and packaging. This project has received funding from the European union's Horizon Europe research and innovation programme under grant agreement Nr. 101146909. This research seeks to contribute to the doctoral and post-doctoral research of Kathleen Cauwelier, dr. Philippe Lebeau and Prof. dr. Heleen Buldeo Rai. In that context, the results of this study will be used for publication(s). In a broader sense, this study also aims to contribute to making European e-commerce more sustainable.

2. Who can participate?

This research targets e-consumers over 16 years old from Italy, the Netherlands, Norway, Belgium, Germany, France, Greece, Poland, Spain and Sweden.

3. Practical conduct of the study and the questionnaire

Respondents will be invited through a Consumer Panel to complete this survey, which is estimated to take about 15 minutes. First, we will ask about their experiences regarding online purchases and their preference for pickup or delivery option. Then, through various choice sets, consumer preferences related to e-commerce delivery will be identified. Here the choice-based conjoint analysis methodology will be applied. Following the CBC-exercise, questions in the form of statements will be asked to grasp the stance of consumers towards sustainability in the delivery and return options. Next, travel patterns associated with the delivery and possible return of online purchases will be identified by asking questions about the mode of travel used, distance traveled, and trip chaining. Finally, respondents will be asked to fill in personal information to capture their socioeconomic profile. We will ask for their gender, age, education level, employment status, questions about residential location and environment, family composition.

4. Possible risks and inconveniences

There are no known risks associated with this research.

5. Possible benefits

Thanks to this study, we will gain a better understanding of the trade-offs made by consumers in the delivery choices. This will help develop delivery options that are both attractive and have a positive environmental and societal impact. In addition, the results will also serve to guide e-retailers in choosing and designing their delivery choices so that they can also assist their consumers towards more sustainable behavior.

6. Privacy and confidentiality

First of all, you should know that, as a researcher, we have a **duty of confidentiality** with regard to the data collected. This means that we undertake, for example in the context of a publication or a conference, never to reveal your name or any other data that could identify you. Nor will individual results ever be published.
Secondly, in the course of this investigation personal data will be collected about/from you. The collection and processing of your data is possible because we carry out scientific research and we receive your **express consent**.

The collection and processing of data is in accordance with the legal principles imposed by the new **European General Data Protection Regulation (GDPR),** which has been in force since 25 May 2018. We, Heleen Buldeo Rai, Philippe Lebeau and Kathleen Cauwelier, supervise the correct processing of your personal data and the associated information obligation.
This obligation to provide information means that I have to inform you about it:

a. What **personal data** I collect from/about you, in particular: your choice related to delivery time, your opinion on sustainability within e-commerce setting, gender, age, education level, employment status, questions about residential location and environment, family composition are mandatory for the purposes outlined above.
b. That the VUB (Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussel, KBO 449.012.406) acts as controller of your data.
c. That the data are collected and processed for the purpose of the aforementioned study. In accordance with the relevant legislation, data collected as part of the study will be archived for the lifetime of the project only, this means until June 2027.
d. That I may only use your personal data for scientific purposes.
e. That you have the right to access and correct your data. You also have the right to erase your data, to limit their processing, to object to their processing and to transfer your data to third parties. If you have any questions, please contact the researcher(s).
f. You have the right to withdraw your consent to the processing of your data at any time. The withdrawal of consent does not affect the lawfulness of the processing of the data obtained prior to the withdrawal of consent.
g. That your details will only be viewed by the researcher(s) appointed above and will not be shared with other institutions.
h. Your data will be stored and secured in accordance with the guidelines of the VUB.
i. If you wish to exercise your rights or if you have any further questions regarding your rights and the processing of your personal data, you can always contact the **VUB Data Protection Officer**: dpo@vub.be.
j. That in order to guarantee your privacy the following protection measures will be taken:
    - The data collected are not anonymous in the first phase, which is why they are converted into codes (pseudonymisation) as soon as possible. This is a second dataset that is created where it is no longer possible to identify you directly. A "translation key" is therefore created which can convert the codes back to their original meaning. Only the researcher and his/her supervisor (Kathleen Cauwelier, dr. Philippe Lebeau & Prof.

dr. Heleen Buldeo Rai) have access to this key and thus to the non-anonymous data. This ensures that only the researcher and the supervisor can link this data to you as a person. The encryption key is stored separately and securely or deleted.

- Your data will only be stored on the SharePoint of the VUB. This has strict access conditions and offers a high degree of protection. Your data is therefore never stored on the personal computer or on a USB stick (except when the data is encrypted on the USB stick) of the researcher(s) and is never forwarded by e-mail.

k. Finally, you also have the right to **complain** about how your data is being handled. You can do this with the Belgian supervisory authority responsible for enforcing data protection legislation, in particular:

Gegevensbeschermingsautoriteit (GBA)

Drukpersstraat 35

1000 Brussel

Tel. +32 2 274 48 00

e-mail: contact@apd-gba.be

Website: www.gegevensbeschermingsautoriteit.be

Annex III: Quota overview by country

The tables below present the final quota percentages applied across the ten participating countries. These quotas were derived by combining Eurostat-based normalisation factors (population structure) with e-commerce usage rates from dataset isoc_ec_ib20 (2023), as described in section 2.2.

BELGIUM

Demografic variables	%	NF	Quota survey	Demografic variables cC	%	NF	Quota survey
GENDER				**URBANISATION DEGREE**			
Males	74 %	1	49 %	In cities	73 %	1	32 %
Females	76 %	0,9988	51 %	In town and suburbs	77 %	1,6603	55 %
AGE				In rural areas	76 %	0,3925	13 %
16-24	84 %	1	17 %				
25-34	88 %	1,1188	20 %	**OCCUPTION**			
34-44	87 %	1,1265	20 %	Retired/not in labour force	54 %	1	20 %
45-54	76 %	1,1240	18 %				
55-64	64 %	1,1458	15 %	Employed	85 %	2,0760	65 %
65-74	49 %	0,8981	9 %	Students	87 %	0,3817	12 %
				Unemployed	52 %	0,1216	2 %
EDUCATION							
ISCED 0-2[1]	55 %	1	18 %	**FAMILY COMPOSITION**			
ISCED 3-4[2]	73 %	1,5615	37 %	With children	85 %	1	30 %
ISCED 5-6[3]	89 %	1,5369	45 %	Without children	71 %	2,8314	70 %

[1]: at most lower secondary education; [2]: upper secondary or post-secondary non-tertiary education; [3]: Tertiary education (short cycle, bacelor, master and doctoral)

GERMANY

Demografic variables	%	NF	Quota survey	Demografic variables	%	NF	Quota survey
GENDER				**URBANISATION DEGREE**			
Males	78 %	1	50 %	In cities	79 %	1	40 %
Females	77 %	0,9959	50 %	In town and suburbs	76 %	1,0633	41 %
AGE				In rural areas	78 %	0,4780	19 %
16-24	81 %	1	14 %				
25-34	88 %	1,2524	19 %	**OCCUPTION**			
34-44	87 %	1,2790	19 %	Retired/not in labour force	58 %	1	18 %
45-54	82 %	1,2795	18 %				
55-64	72 %	1,5436	19 %	Employed	87 %	2,8347	75 %
65-74	54 %	1,1109	10 %	Students	81 %	0,2563	5 %
				Unemployed	63 %	0,0902	2 %
EDUCATION							
ISCED 0-2[1]	56 %	1	16 %	**FAMILY COMPOSITION**			
ISCED 3-4[2]	79 %	2,1883	50 %	With children	84 %	1	22 %
ISCED 5-6[3]	89 %	1,2960	34 %	Without children	75 %	3,9751	78 %

[1]: at most lower secondary education; [2]: upper secondary or post-secondary non-tertiary education; [3]: Tertiary education (short cycle, bacelor, master and doctoral)

GREECE

Demografic variables	%	NF	Quota survey	Demografic variables	%	NF	Quota survey
GENDER				**URBANISATION DEGREE**			
Males	60 %	1	52 %	In cities	63 %	1	45 %
Females	55 %	1,0185	48 %	In town and suburbs	58 %	0,7720	32 %
AGE				In rural areas	45 %	0,7468	24 %
16-24	78 %	1	18 %				
25-34	80 %	1,0370	19 %	**OCCUPTION**			
34-44	74 %	1,3589	23 %	Retired/not in labour	25 %	1	13 %
45-54	60 %	1,5196	21 %	force	72 %		
55-64	40 %	1,3851	13 %	Employed		1,8194	67 %
65-74	19 %	1,1224	5 %	Students	77 %	0,3436	14 %
				Unemployed	53 %	0,2268	6 %
EDUCATION							
ISCED 0-2[1]	29 %	1	13 %	**FAMILY COMPOSITION**			
ISCED 3-4[2]	60 %	1,7057	47 %	With children	70 %	1	32 %
ISCED 5-6[3]	79 %	1,0679	39 %	Without children	53 %	2,8314	68 %

[1] : at most lower secondary education; [2] : upper secondary or post-secondary non-tertiary education; [3] : Tertiary education (short cycle, bacelor, master and doctoral)

SPAIN

Demografic variables	%	NF	Quota survey	Demografic variables	%	NF	Quota survey
GENDER				**URBANISATION DEGREE**			
Males	69 %	1	50 %	In cities	72 %	1	56 %
Females	69 %	1,0101	50 %	In town and suburbs	65 %	0,6229	32 %
AGE				In rural areas	64 %	0,2380	12 %
16-24	80 %	1	16 %				
25-34	87 %	1,0606	18 %	**OCCUPTION**			
34-44	83 %	1,3473	22 %	Retired/not in labour	42 %	1	16 %
45-54	73 %	1,5507	23 %	force	79 %		
55-64	55 %	1,3307	15 %	Employed		2,2491	66 %
65-74	33 %	0,9678	6 %	Students	78 %	0,3646	11 %
				Unemployed	62 %	0,3122	7 %
EDUCATION							
ISCED 0-2[1]	48 %	1	29 %	**FAMILY COMPOSITION**			
ISCED 3-4[2]	75 %	0,5839	27 %	With children	80 %	1	30 %
ISCED 5-6[3]	86 %	0,8491	44 %	Without children	65 %	2,9063	70 %

[1] : at most lower secondary education; [2] : upper secondary or post-secondary non-tertiary education; [3] : Tertiary education (short cycle, bacelor, master and doctoral)

FRANCE

Demografic variables	%	NF	Quota survey	Demografic variables	%	NF	Quota survey
GENDER				**URBANISATION DEGREE**			
Males	76 %	1	48 %	In cities	80 %	1	46 %
Females	78 %	1,0430	52 %	In town and suburbs	74 %	0,4452	19 %
AGE				In rural areas	76 %	0,7786	34 %
16-24	85 %	1	18 %				
25-34	92 %	0,9573	19 %	**OCCUPATION**			
34-44	88 %	1,0423	20 %	Retired/not in labour	56 %	1	20 %
45-54	80 %	1,0686	18 %	force	87 %		
55-64	66 %	1,0585	15 %	Employed		2,1814	66 %
65-74	50 %	0,9317	10 %	Students	82 %	0,3469	10 %
				Unemployed	73 %	0,1730	4 %
EDUCATION							
ISCED 0-2[1]	56 %	1	17 %	**FAMILY COMPOSITION**			
ISCED 3-4[2]	77 %	1,7607	41 %	With children	88 %	1	29 %
ISCED 5-6[3]	91 %	1,5128	42 %	Without children	72 %	3,0161	72 %

[1] : at most lower secondary education; [2] : upper secondary or post-secondary non-tertiary education; [3] : Tertiary education (short cycle, bacelor, master and doctoral)

ITALY

Demografic variables	%	NF	Quota survey	Demografic variables	%	NF	Quota survey
GENDER				**URBANISATION DEGREE**			
Males	54 %	1	52 %	In cities	55 %	1	38 %
Females	49 %	1,0112	48 %	In town and suburbs	48 %	1,4307	47 %
AGE				In rural areas	47 %	0,4632	15 %
16-24	65 %	1	17 %				
25-34	67 %	1,0679	18 %	**OCCUPATION**			
34-44	65 %	1,2240	20 %	Retired/not in labour	26 %	1	17 %
45-54	53 %	1,5935	22 %	force	63 %		
55-64	41 %	1,5382	16 %	Employed		1,6439	68 %
65-74	22 %	1,1852	7 %	Students	67 %	0,1362	6 %
				Unemployed	45 %	0,2981	9 %
EDUCATION							
ISCED 0-2[1]	30 %	1	24 %	**FAMILY COMPOSITION**			
ISCED 3-4[2]	59 %	1,0372	49 %	With children	59 %	1	26 %
ISCED 5-6[3]	74 %	0,4442	26 %	Without children	48 %	3,4643	74 %

[1] : at most lower secondary education; [2] : upper secondary or post-secondary non-tertiary education; [3] : Tertiary education (short cycle, bacelor, master and doctoral)

THE NETHERLANDS

Demografic variables	%	NF	Quota survey	Demografic variables	%	NF	Quota survey
GENDER				**URBANISATION DEGREE**			
Males	92 %	1	50 %	In cities	93 %	1	58 %
Females	93 %	0,9957	50 %	In town and suburbs	92 %	0,5620	32 %
AGE				In rural areas	91 %	0,1680	9 %
16-24	97 %	1	17 %				
25-34	98 %	1,0671	18 %	**OCCUPATION**			
34-44	97 %	0,9908	17 %	Retired/not in labour	80 %	1	19 %
45-54	95 %	1,0666	18 %	force	96 %		
55-64	90 %	1,1178	18 %	Employed		3,3939	76 %
65-74	76 %	0,8939	12 %	Students	98 %	0,1259	3 %
				Unemployed	86 %	0,1250	3 %
EDUCATION							
ISCED 0-2[1]	85 %	1	24 %	**FAMILY COMPOSITION**			
ISCED 3-4[2]	92 %	1,4198	37 %	With children	97 %	1	22 %
ISCED 5-6[3]	98 %	1,3969	39 %	Without children	91 %	3,6729	78 %

[1] : at most lower secondary education; [2] : upper secondary or post-secondary non-tertiary education; [3] : Tertiary education (short cycle, bacelor, master and doctoral)

POLAND

Demografic variables	%	NF	Quota survey	Demografic variables	%	NF	Quota survey
GENDER				**URBANISATION DEGREE**			
Males	64 %	1	49 %	In cities	72 %	1	40 %
Females	65 %	1,0351	51 %	In town and suburbs	65 %	0,7785	28 %
AGE				In rural areas	58 %	1,0284	33 %
16-24	77 %	1	15 %				
25-34	89 %	1,3126	23 %	**OCCUPATION**			
34-44	84 %	1,6603	27 %	Retired/not in labour	33 %	1	14 %
45-54	70 %	1,4217	19 %	force	79 %		
55-64	42 %	1,2810	10 %	Employed		2,2160	75 %
65-74	22 %	1,2729	5 %	Students	75 %	0,3049	10 %
				Unemployed	60 %	0,0644	2 %
EDUCATION							
ISCED 0-2[1]	39 %	1	8 %	**FAMILY COMPOSITION**			
ISCED 3-4[2]	57 %	4,5600	50 %	With children	75 %	1	32 %
ISCED 5-6[3]	89 %	2,4400	42 %	Without children	58 %	2,7879	68 %

[1] : at most lower secondary education; [2] : upper secondary or post-secondary non-tertiary education; [3] : Tertiary education (short cycle, bacelor, master and doctoral)

SWEDEN

Demografic variables	%	NF	Quota survey	Demografic variables	%	NF	Quota survey
GENDER				**URBANISATION DEGREE**			
Males	88 %	1	51 %	In cities	90 %	1	38 %
Females	89 %	0,9636	49 %	In town and suburbs	89 %	0,9769	36 %
AGE				In rural areas	87 %	0,7184	26 %
16-24	83 %	1	15 %				
25-34	95 %	1,2181	20 %	**OCCUPTION**			
34-44	96 %	1,1296	19 %	Retired/not in labour	76 %	1	15 %
45-54	91 %	1,1052	18 %	force	95 %		
55-64	89 %	1,0551	17 %	Employed		3,8370	73 %
65-74	74 %	0,8980	12 %	Students	88 %	0,3682	6 %
				Unemployed	89 %	0,3201	6 %
EDUCATION							
ISCED 0-2[1]	76 %	1	17 %	**FAMILY COMPOSITION**			
ISCED 3-4[2]	89 %	2,0359	40 %	With children	94 %	1	27 %
ISCED 5-6[3]	96 %	2,0923	44 %	Without children	87 %	2,9526	73 %

[1] : at most lower secondary education; [2] : upper secondary or post-secondary non-tertiary education; [3] : Tertiary education (short cycle, bacelor, master and doctoral)

NORWAY

Demografic variables	%	NF	Quota survey	Demografic variables	%	NF	Quota survey
GENDER				**URBANISATION DEGREE**			
Males	90 %	1	51 %	In cities	91 %	1	34 %
Females	91 %	0,9653	49 %	In town and suburbs	92 %	1,0720	37 %
AGE				In rural areas	89 %	0,8385	28 %
16-24	91 %	1	16 %				
25-34	97 %	1,1565	20 %	**OCCUPTION**			
34-44	97 %	1,1045	19 %	Retired/not in labour	77 %	1	19 %
45-54	94 %	1,1223	19 %	force	94 %		
55-64	85 %	1,0183	15 %	Employed		3,2160	73 %
65-74	74 %	0,8255	11 %	Students	89 %	0,2495	5 %
				Unemployed	91 %	0,1198	3 %
EDUCATION							
ISCED 0-2[1]	84 %	1	22 %	**FAMILY COMPOSITION**			
ISCED 3-4[2]	89 %	1,5277	35 %	With children	95 %	1	24 %
ISCED 5-6[3]	95 %	1,7277	43 %	Without children	89 %	3,2918	76 %

[1] : at most lower secondary education; [2] : upper secondary or post-secondary non-tertiary education; [3] : Tertiary education (short cycle, bacelor, master and doctoral)

Annex IV – Delivery price adapted with price level index

Adjusted Price for Country = Base price in Belgium x $(\frac{\text{PLI of country X}}{\text{PLI of Belgium}})$

Price level indices	
Total, OECD=100, 2022	
Category	Price level indices
Norway	115
Sweden	108
Netherlands	100
Germany	96
Belgium	95
France	92
Italy	82
Spain	80
Greece	70
Poland	53

Country	Adapted price for country	Rounded price levels for each country
Belgium	[(1) Free; (2) € 2.99; (3) € 3.99; (4) € 4.99; (5) € 6.99]	[(1) Free; (2) € 2.99; (3) € 3.99; (4) € 4.99; (5) € 6.99]
Norway NOK 11.4248/ €1	[(1) Free; (2) € 3.62; (3) € 4.83; (4) € 6.04; (5) € 8.46] [(1) Free; (2) NOK 41.35; (3) NOK 55.18 ; (4) NOK 69.01; (5) NOK 96.67]	[(1) Free; (2) NOK 39; (3) NOK 59; (4) € NOK 69; (5) NOK 99]
Sweden SEK 11.4788/ €1	[(1) Free; (2) € 3.40; (3) € 4.54; (4) € 5.67; (5) € 7.95] [(1) Free; (2) SEK 39.02; (3) SEK 52.07; (4) SEK 65.12; (5) SEK 91.22]	[(1) Free; (2) SEK 39 ; (3) SEK 59 ; (4) SEK 69; (5) SEK 89]
Netherlands	[(1) Free; (2) € 3.15; (3) € 4.20; (4) € 5.25; (5) € 7.36]	[(1) Free; (2) € 2.99; (3) € 3.99; (4) € 4.99; (5) € 6.99]
Germany	[(1) Free; (2) € 3.02; (3) € 4.03; (4) € 5.04; (5) € 7.06]	[(1) Free; (2) € 2.99; (3) € 3.99; (4) € 4.99; (5) € 6.99]
France	[(1) Free; (2) € 2.90; (3) € 3.86 ; (4) € 4.83; (5) € 6.77]	[(1) Free; (2) € 2.99; (3) € 3.99; (4) € 4.99; (5) € 6.99]
Italy	[(1) Free; (2) € 2.58; (3) € 3.44; (4) € 4.31; (5) € 6.03]	[(1) Free; (2) € 2.99; (3) € 3.99; (4) € 4.99; (5) € 5.99]
Spain	[(1) Free; (2) € 2.52; (3) € 3.36; (4) € 4.20; (5) € 5.89]	[(1) Free; (2) € 2.99; (3) € 3.99; (4) € 4.99; (5) € 5.99]
Greece	[(1) Free; (2) € 2.20; (3) € 2.94; (4) € 3.68; (5) € 5.15]	[(1) Free; (2) € 1.99; (3) € 2.99; (4) € 3.99; (5) € 4.99]
Poland PLN 4.5420/ €1	[(1) Free; (2) €1.67; (3) € 2.23; (4) € 2.78; (5) € 3.90] [(1) Free; (2) PLN 7.58; (3) PLN 10.11; (4) PLN 12.64; (5) PLN 17.71]	[(1) Free; (2) PLN 7.99; (3) PLN 9.99 ; (4) € 12.99; (5) € 17.99]

Annex V – Interaction effect

Interaction effect	Strength of utility differences	Impact on decision-making	Practical relevance	Explanation
Delivery price x Delivery location	0.56978611123662	High-impact interactions	High	See next slide
Delivery price x Delivery term	0.4807354073428	High-impact interactions	Moderate	See next slide
Delivery price x Tracking information	0.4763263000529	High-impact interactions	Low	Tracking features are preferred when shipping is free, but differences between tracking options are small. Consumers care more about price than specific tracking features.
Delivery price x Packaging	0.4770800426199	High-impact interactions	Low	Sustainable packaging is slightly preferred, but price dominates decision-making.
Delivery price x Delivery partner	0.6662801001948	High-impact interactions	High	See next slide
Delivery location x Delivery term	0.1564660394113	Low-impact interactions	Low	Consumers show slight preference differences, but impact is not substantial.
Delivery location x Tracking information	0.1443522361043	Low-impact interactions	Moderate	See next slide
Delivery location x Packaging	0.1552274078900	Low-impact interactions	Low	Packaging plays a minor role in delivery location preference.
Delivery location x Delivery partner	0.3589460583483	Moderate-impact interactions	Low	Consumers show slight preference differences, but impact is not substantial.
Delivery term x Tracking information	0.0493486326814	Low-impact interactions	Low	Minimal impact of tracking on delivery term preferences.
Delivery term x Packaging	0.0622900145827	Low-impact interactions	Low	Packaging has minimal impact on delivery term preference.
Delivery term x Delivery partner	0.2949467125471	Moderate-impact interactions	Low	Consumers show slight preference differences, but impact is not substantial.
Tracking information x Packaging	0.0554493462822	Low-impact interactions	Low	Tracking information has minimal impact on packaging preference.
Tracking information x Delivery partner	0.2668530378665	Moderate-impact interactions	Low	Tracking is somewhat more relevant when choosing delivery partners.
Packaging x Delivery partner	0.2673234689235	Moderate-impact interactions	Low	Packaging plays a minor role in delivery partner preferences.

Annex VI – Bayesian confidence intervals for countries

DELIVERY PRICE

	Free	2.99	3.99	4.99	6.99
Belgium > Netherlands	0.00%	0.61%	99.54%	99.96%	99.99%
Belgium > France	0.03%	0.47%	76.79%	98.81%	99.99%
Belgium > Italy	0.00%	0.03%	98.12%	99.93%	100.00%
Belgium > Spain	0.01%	4.58%	99.34%	99.95%	96.94%
Belgium > Norway	0.00%	1.14%	99.91%	99.99%	99.62%
Belgium > Sweden	0.00%	0.82%	100.00%	95.22%	99.84%
Belgium > Greece	0.03%	0.15%	99.71%	99.97%	99.92%
Belgium > Poland	2.46%	11.64%	90.61%	99.62%	62.24%
Belgium > Germany	0.01%	1.61%	4.75%	99.80%	100.00%
Netherlands > France	100.00%	72.87%	4.70%	1.09%	1.23%
Netherlands > Italy	1.61%	0.05%	29.03%	98.33%	99.68%
Netherlands > Spain	99.98%	99.78%	52.41%	18.13%	0.01%
Netherlands > Norway	85.34%	75.60%	62.66%	95.01%	0.14%
Netherlands > Sweden	99.98%	92.44%	96.12%	0.10%	0.02%
Netherlands > Greece	99.98%	10.01%	97.40%	13.91%	0.07%
Netherlands > Poland	100.00%	99.37%	11.78%	1.46%	0.01%
Netherlands > Germany	99.88%	98.37%	0.06%	16.07%	6.08%
France > Italy	0.00%	0.08%	89.49%	99.94%	99.98%
France > Spain	32.08%	98.22%	94.47%	92.33%	0.50%
France > Norway	0.08%	54.33%	97.68%	100.00%	27.42%
France > Sweden	23.80%	83.89%	99.97%	18.67%	8.69%

	Free	2.99	3.99	4.99	6.99
France > Greece	100.00%	97.80%	99.34%	0.59%	0.00%
France > Poland	98.80%	98.28%	72.01%	54.03%	0.03%
France > Germany	8.73%	93.38%	0.54%	86.58%	77.27%
Italy > Spain	99.99%	99.99%	74.54%	0.64%	0.01%
Italy > Norway	99.89%	100.00%	81.73%	33.07%	0.00%
Italy > Sweden	99.94%	100.00%	98.53%	0.08%	0.00%
Italy > Greece	100.00%	97.80%	99.34%	0.59%	0.00%
Italy > Poland	99.99%	99.97%	17.75%	0.66%	0.00%
Italy > Germany	99.99%	100.00%	0.04%	0.28%	0.05%
Spain > Norway	0.92%	1.83%	63.43%	99.46%	97.16%
Spain > Sweden	41.40%	11.11%	99.22%	1.38%	91.27%
Spain > Greece	33.09%	0.07%	97.01%	44.38%	96.80%
Spain > Poland	99.81%	65.37%	3.03%	10.36%	6.35%
Spain > Germany	18.39%	25.30%	0.00%	43.87%	99.89%
Norway > Sweden	99.50%	78.48%	98.54%	0.00%	21.96%
Norway > Greece	99.00%	2.19%	97.68%	0.90%	33.10%
Norway > Poland	99.95%	97.39%	1.60%	0.40%	0.75%
Norway > Germany	95.62%	90.55%	0.02%	0.62%	90.80%
Sweden > Greece	41.60%	0.45%	43.60%	98.82%	64.49%
Sweden > Poland	99.76%	91.40%	0.00%	86.52%	0.70%
Sweden > Germany	25.30%	71.48%	0.00%	98.59%	97.99%
Greece > Poland	99.81%	99.80%	0.68%	13.07%	0.25%
Greece > Germany	32.04%	99.94%	0.02%	50.79%	96.38%

	Free	2.99	3.99	4.99	6.99
Poland > Germany	0.05%	15.30%	0.45%	85.69%	99.99%

DELIVERY LOCATION

	Home	Instore	Collection	Parcel locker	Workplace
Belgium > Netherlands	94.54%	3.85%	0.20%	81.94%	99.39%
Belgium > France	97.28%	1.19%	0.15%	7.83%	99.95%
Belgium > Italy	99.99%	6.56%	0.07%	3.45%	99.82%
Belgium > Spain	99.99%	64.38%	0.76%	48.03%	1.40%
Belgium > Norway	100.00%	2.36%	1.41%	65.68%	4.20%
Belgium > Sweden	99.99%	82.69%	0.20%	0.04%	99.76%
Belgium > Greece	99.99%	80.18%	0.38%	0.01%	99.82%
Belgium > Poland	99.99%	99.89%	15.01%	0.21%	0.02%
Belgium > Germany	98.82%	98.58%	11.80%	0.00%	98.82%
Netherlands > France	62.67%	61.21%	21.12%	0.72%	98.51%
Netherlands > Italy	99.54%	66.60%	4.78%	0.31%	71.10%
Netherlands > Spain	99.66%	98.50%	99.50%	14.75%	0.03%
Netherlands > Norway	99.93%	48.54%	99.15%	29.49%	0.25%
Netherlands > Sweden	99.26%	97.15%	82.24%	0.01%	30.69%
Netherlands > Greece	99.89%	98.51%	62.47%	0.00%	30.77%
Netherlands > Poland	99.90%	99.78%	99.95%	0.22%	0.10%
Netherlands > Germany	69.08%	99.87%	99.80%	0.00%	6.83%
France > Italy	99.19%	62.41%	18.31%	32.24%	5.90%
France > Spain	99.47%	99.25%	99.59%	90.82%	0.00%
France > Norway	100.00%	38.70%	99.69%	96.75%	0.01%

	Home	Instore	Collection	Parcel locker	Workplace
France > Sweden	98.90%	96.87%	95.44%	0.64%	0.28%
France > Greece	88.84%	98.94%	95.97%	0.03%	14.71%
France > Poland	99.99%	99.89%	99.91%	1.75%	0.01%
France > Germany	61.09%	99.92%	99.87%	0.00%	0.14%
Italy > Spain	45.70%	95.50%	99.90%	95.45%	0.00%
Italy > Norway	82.72%	27.36%	99.84%	98.61%	0.02%
Italy > Sweden	37.19%	97.40%	97.52%	0.56%	14.15%
Italy > Greece	88.84%	98.94%	95.97%	0.03%	14.71%
Italy > Poland	99.40%	99.94%	99.97%	0.96%	0.01%
Italy > Germany	7.11%	99.98%	99.93%	0.00%	1.88%
Spain > Norway	86.86%	1.18%	54.75%	70.30%	65.28%
Spain > Sweden	41.73%	77.66%	5.02%	0.02%	99.99%
Spain > Greece	90.36%	74.11%	1.52%	0.00%	100.00%
Spain > Poland	99.51%	99.38%	96.83%	0.27%	7.80%
Spain > Germany	7.77%	95.29%	95.65%	0.00%	100.00%
Norway > Sweden	9.70%	97.41%	4.60%	0.03%	99.97%
Norway > Greece	59.92%	99.01%	0.79%	0.00%	99.96%
Norway > Poland	95.66%	99.77%	96.11%	0.38%	4.19%
Norway > Germany	1.49%	99.86%	93.35%	0.00%	100.00%
Sweden > Greece	92.91%	47.78%	26.19%	13.87%	51.90%
Sweden > Poland	99.68%	99.62%	99.89%	3.08%	0.05%
Sweden > Germany	11.10%	80.67%	99.77%	0.00%	13.92%
Greece > Poland	95.14%	99.79%	99.81%	13.21%	0.03%

	Home	Instore	Collection	Parcel locker	Workplace
Greece > Germany	1.06%	85.75%	99.60%	0.01%	13.37%
Poland > Germany	0.26%	3.04%	43.00%	0.00%	100.00%

DELIVERY PARTNER

	EcoCarrier	NationalPost	GlobalCarrier	Appbased	NoSelection
Belgium > Netherlands	99.90%	63.34%	48.21%	51.40%	0.01%
Belgium > France	37.44%	95.97%	90.89%	34.76%	0.58%
Belgium > Italy	62.49%	90.44%	85.93%	96.20%	0.01%
Belgium > Spain	87.33%	91.30%	55.58%	96.08%	0.07%
Belgium > Norway	2.73%	52.56%	97.66%	100.00%	0.02%
Belgium > Sweden	33.10%	1.12%	99.61%	100.00%	0.00%
Belgium > Greece	43.05%	32.89%	99.37%	99.35%	0.00%
Belgium > Poland	99.01%	63.23%	73.93%	98.89%	0.02%
Belgium > Germany	99.99%	98.39%	33.06%	69.40%	0.00%
Netherlands > France	0.03%	92.59%	92.61%	35.40%	96.30%
Netherlands > Italy	0.91%	83.33%	87.27%	96.41%	28.56%
Netherlands > Spain	2.18%	87.85%	56.56%	96.60%	39.63%
Netherlands > Norway	0.04%	39.98%	98.20%	99.95%	39.35%
Netherlands > Sweden	0.04%	0.25%	99.67%	99.99%	3.98%
Netherlands > Greece	0.06%	22.67%	99.71%	99.06%	6.21%
Netherlands > Poland	20.97%	49.64%	74.73%	98.17%	5.78%
Netherlands > Germany	69.64%	97.97%	33.74%	65.93%	0.66%

	EcoCarrier	NationalPost	GlobalCarrier	Appbased	NoSelection
France > Italy	75.94%	37.06%	37.97%	98.02%	0.62%
France > Spain	93.48%	41.46%	9.86%	99.08%	2.33%
France > Norway	1.45%	3.94%	97.73%	99.98%	1.11%
France > Sweden	45.66%	0.21%	97.60%	100.00%	0.00%
France > Greece	29.14%	4.54%	98.59%	81.17%	15.54%
France > Poland	99.09%	8.30%	24.25%	99.62%	0.06%
France > Germany	99.98%	81.04%	3.94%	79.97%	0.01%
Italy > Spain	75.24%	53.96%	16.50%	42.45%	62.40%
Italy > Norway	0.16%	10.37%	99.01%	98.66%	61.66%
Italy > Sweden	21.53%	0.03%	98.95%	100.00%	7.08%
Italy > Greece	29.14%	4.54%	98.59%	81.17%	15.54%
Italy > Poland	93.18%	14.03%	32.14%	65.39%	12.85%
Italy > Germany	99.33%	87.07%	7.58%	8.16%	2.58%
Spain > Norway	0.37%	8.17%	98.19%	99.03%	49.20%
Spain > Sweden	6.00%	0.35%	99.67%	99.85%	3.40%
Spain > Greece	10.02%	3.19%	99.51%	83.90%	8.73%
Spain > Poland	86.81%	14.38%	67.72%	71.48%	6.27%
Spain > Germany	99.34%	85.16%	28.51%	10.19%	0.62%
Norway > Sweden	97.95%	0.16%	39.87%	99.47%	2.45%
Norway > Greece	98.98%	27.61%	34.32%	8.54%	9.22%
Norway > Poland	99.76%	60.38%	3.53%	2.42%	4.15%
Norway > Germany	99.96%	98.77%	1.69%	0.04%	1.19%
Sweden > Greece	60.65%	99.46%	44.02%	0.02%	66.79%
Sweden > Poland	99.08%	99.59%	2.03%	0.02%	58.66%

	EcoCarrier	NationalPost	GlobalCarrier	Appbased	NoSelection
Sweden > Germany	99.98%	99.96%	0.61%	0.01%	32.06%
Greece > Poland	97.56%	79.89%	1.73%	31.59%	42.10%
Greece > Germany	99.97%	99.71%	0.21%	1.90%	20.82%
Poland > Germany	91.16%	97.52%	14.42%	3.85%	25.41%

Annex VII – Multinomial logistic regression parameter estimates

	B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
							Lower Bound	Upper Bound
Anti-avoidance								
Intercept	2.296	.391	34.505	1	<.001			
Motivation	.400	.055	52.966	1	<.001	1.491	1.339	1.661
Individual self	-.231	.050	21.028	1	<.001	.793	.719	.876
Sustainability awareness	-.987	.054	331.610	1	<.001	.373	.335	.415
Belgium	.384	.162	5.590	1	.018	1.468	1.068	2.017
Netherlands	.655	.168	15.156	1	<.001	1.924	1.384	2.675
France	.167	.166	1.010	1	.315	1.182	.853	1.636
Italy	.102	.158	.419	1	.517	1.108	.813	1.511
Spain	.157	.159	.980	1	.322	1.170	.857	1.597
Norway	.472	.164	8.321	1	.004	1.604	1.164	2.211
Sweden	.394	.162	5.891	1	.015	1.483	1.079	2.039
Greece	.589	.160	13.494	1	<.001	1.803	1.316	2.468
Poland	.516	.159	10.459	1	.001	1.675	1.225	2.289
Germany	0[b]	.	.	0	.	.	.	.
Age 16-24	1.092	.206	27.974	1	<.001	2.980	1.989	4.467
Age 25-34	1.011	.193	27.293	1	<.001	2.748	1.881	4.015
Age 35-44	.849	.190	19.956	1	<.001	2.337	1.610	3.392
Age 45-54	.290	.186	2.424	1	.119	1.337	.928	1.925
Age 55-64	.140	.179	.613	1	.434	1.150	.810	1.634
Age 65-74	0[b]	.	.	0	.	.	.	.
Education ISCED 0-2	.702	.126	31.253	1	<.001	2.017	1.577	2.580

Education ISCED 3-4	.435	.077	32.016	1	<.001	1.545	1.329	1.796
Education ISCED 5-8	0[b]	.	.	0	.	.	.	.
City	.185	.099	3.475	1	.062	1.203	.991	1.461
Town	.034	.104	.109	1	.741	1.035	.844	1.268
Countryside	0[b]	.	.	0	.	.	.	.
Retired or not working	-.029	.193	.022	1	.882	.972	.665	1.420
Employed or self-employed	.185	.160	1.342	1	.247	1.203	.880	1.645
Student	.030	.200	.023	1	.880	1.031	.697	1.524
Unemployed	0[b]	.	.	0	.	.	.	.
Children	.292	.079	13.604	1	<.001	1.338	1.146	1.563
No children	0[b]	.	.	0	.	.	.	.
Weekly online shopping	-1.212	.219	30.699	1	<.001	.298	.194	.457
Every other week online shopping	-1.212	.217	31.195	1	<.001	.297	.194	.455
Monthly online shopping	-1.037	.208	24.767	1	<.001	.354	.236	.533
Every 1-3 months online shopping	-.727	.213	11.626	1	<.001	.483	.318	.734
Every 3-6 months online shopping	-.349	.237	2.174	1	.140	.705	.444	1.122
Every 6-12 months online shopping	-.105	.271	.148	1	.700	.901	.529	1.533
Less than once a year online shopping	0[b]	.	.	0	.	.	.	.
Weekly online returns	3.558	.441	64.997	1	<.001	35.097	14.778	83.356
Monthly online returns	2.654	.214	153.410	1	<.001	14.216	9.340	21.637
Every 1-3 months online returns	2.046	.167	150.925	1	<.001	7.735	5.581	10.720

Every 3-6 months online returns	1.307	.155	71.416	1	<.001	3.695	2.729	5.003
Every 6-12 months online returns	.598	.143	17.548	1	<.001	1.818	1.374	2.405
Less than once a year online returns	.163	.117	1.947	1	.163	1.177	.936	1.479
Never online returns	0[b]	.	.	0	.	.	.	.
Convenience-first								
Intercept	**-5.151**	**.592**	**75.667**	**1**	**<.001**			
Motivation	-.274	.068	16.245	1	<.001	.760	.665	.869
Individual self	.803	.065	150.365	1	<.001	2.232	1.963	2.538
Sustainability awareness	-.075	.070	1.155	1	.283	.927	.808	1.064
Belgium	.317	.198	2.546	1	.111	1.373	.930	2.025
Netherlands	.532	.201	7.020	1	.008	1.702	1.148	2.523
France	.206	.199	1.075	1	.300	1.229	.832	1.814
Italy	-.052	.186	.078	1	.780	.949	.659	1.368
Spain	.068	.186	.133	1	.715	1.070	.743	1.542
Norway	.154	.215	.515	1	.473	1.167	.766	1.778
Sweden	-.245	.217	1.271	1	.260	.783	.512	1.198
Greece	.266	.203	1.718	1	.190	1.304	.877	1.940
Poland	.046	.201	.052	1	.820	1.047	.705	1.554
Germany	0[b]	.	.	0	.	.	.	.
Age 16-24	1.137	.311	13.342	1	<.001	3.117	1.694	5.736
Age 25-34	1.029	.298	11.958	1	<.001	2.798	1.562	5.014
Age 35-44	.869	.295	8.666	1	.003	2.385	1.337	4.253
Age 45-54	.533	.292	3.345	1	.067	1.704	.963	3.018
Age 55-64	.099	.290	.117	1	.732	1.104	.625	1.951
Age 65-74	0[b]	.	.	0	.	.	.	.

Education ISCED 0-2	1.589	.139	130.553	1	<.001	4.900	3.731	6.436
Education ISCED 3-4	.376	.101	13.846	1	<.001	1.456	1.195	1.775
Education ISCED 5-8	0[b]	.	.	0	.	.	.	.
City	.202	.131	2.373	1	.123	1.224	.947	1.582
Town	-.053	.140	.145	1	.704	.948	.721	1.247
Countryside	0[b]	.	.	0	.	.	.	.
Retired or not working	.059	.266	.050	1	.824	1.061	.630	1.786
Employed or self-employed	.462	.212	4.751	1	.029	1.588	1.048	2.406
Student	-.132	.267	.243	1	.622	.877	.520	1.479
Unemployed	0[b]	.	.	0	.	.	.	.
Children	.389	.096	16.396	1	<.001	1.476	1.222	1.782
No children	0[b]	.	.	0	.	.	.	.
Weekly online shopping	-.171	.352	.237	1	.626	.843	.423	1.678
Every other week online shopping	-.136	.351	.151	1	.698	.873	.439	1.735
Monthly online shopping	-.166	.345	.233	1	.630	.847	.431	1.665
Every 1-3 months online shopping	-.051	.353	.021	1	.885	.950	.475	1.900
Every 3-6 months online shopping	.278	.381	.533	1	.465	1.320	.626	2.784
Every 6-12 months online shopping	.682	.420	2.635	1	.105	1.978	.868	4.504
Less than once a year online shopping	0[b]	.	.	0	.	.	.	.
Weekly online returns	4.493	.458	96.102	1	<.001	89.346	36.391	219.360
Monthly online returns	3.385	.252	180.911	1	<.001	29.505	18.018	48.315

Every 1-3 months online returns	2.474	.213	134.670	1	<.001	11.875	7.819	18.036
Every 3-6 months online returns	1.986	.204	94.710	1	<.001	7.284	4.883	10.866
Every 6-12 months online returns	.920	.203	20.510	1	<.001	2.508	1.685	3.734
Less than once a year online returns	.179	.180	.994	1	.319	1.196	.841	1.702
Never online returns	0[b]	.	.	0	.	.	.	.
Anti-convenience								
Intercept	**3.596**	**.336**	**114.549**	**1**	**<.001**			
Motivation	.061	.048	1.607	1	.205	1.063	.967	1.167
Individual self	-.235	.044	28.559	1	<.001	.791	.725	.862
Sustainability awareness	-.535	.048	125.577	1	<.001	.586	.534	.643
Belgium	.271	.140	3.742	1	.053	1.311	.996	1.726
Netherlands	.556	.147	14.279	1	<.001	1.744	1.307	2.328
France	.370	.139	7.071	1	.008	1.448	1.102	1.903
Italy	.009	.136	.004	1	.948	1.009	.773	1.317
Spain	-.078	.139	.313	1	.576	.925	.705	1.215
Norway	.387	.143	7.352	1	.007	1.472	1.113	1.947
Sweden	.189	.142	1.788	1	.181	1.209	.915	1.596
Greece	.275	.141	3.827	1	.050	1.317	.999	1.736
Poland	.339	.139	5.978	1	.014	1.404	1.070	1.842
Germany	0[b]	.	.	0	.	.	.	.
Age 16-24	-.656	.165	15.719	1	<.001	.519	.375	.718
Age 25-34	-.531	.149	12.718	1	<.001	.588	.439	.787
Age 35-44	-.417	.143	8.531	1	.003	.659	.498	.872
Age 45-54	-.487	.136	12.778	1	<.001	.614	.470	.802

Age 55-64	-.289	.126	5.261	1	.022	.749	.585	.959
Age 65-74	0[b]	.	.	0	.	.	.	.
Education ISCED 0-2	.340	.114	8.977	1	.003	1.406	1.125	1.756
Education ISCED 3-4	.245	.066	13.758	1	<.001	1.278	1.122	1.454
Education ISCED 5-8	0[b]	.	.	0	.	.	.	.
City	-.005	.084	.003	1	.955	.995	.844	1.173
Town	-.054	.087	.384	1	.536	.948	.799	1.124
Countryside	0[b]	.	.	0	.	.	.	.
Retired or not working	-.154	.162	.898	1	.343	.858	.624	1.178
Employed or self-employed	.005	.139	.001	1	.970	1.005	.765	1.321
Student	-.112	.183	.374	1	.541	.894	.625	1.280
Unemployed	0[b]	.	.	0	.	.	.	.
Children	.048	.071	.451	1	.502	1.049	.913	1.205
No children	0[b]	.	.	0	.	.	.	.
Weekly online shopping	-.527	.199	7.021	1	.008	.591	.400	.872
Every other week online shopping	-.481	.197	5.980	1	.014	.618	.421	.909
Monthly online shopping	-.232	.189	1.503	1	.220	.793	.548	1.149
Every 1-3 months online shopping	-.019	.193	.010	1	.921	.981	.672	1.433
Every 3-6 months online shopping	.169	.213	.626	1	.429	1.184	.779	1.799
Every 6-12 months online shopping	.459	.245	3.522	1	.061	1.582	.980	2.556
Less than once a year online shopping	0[b]	.	.	0	.	.	.	.

Weekly online returns	.504	.502	1.011	1	.315	1.656	.620	4.427
Monthly online returns	.732	.215	11.622	1	<.001	2.078	1.365	3.165
Every 1-3 months online returns	.645	.157	16.983	1	<.001	1.906	1.403	2.591
Every 3-6 months online returns	.543	.137	15.727	1	<.001	1.721	1.316	2.250
Every 6-12 months online returns	.471	.117	16.116	1	<.001	1.601	1.273	2.015
Less than once a year online returns	.237	.093	6.575	1	.010	1.268	1.058	1.520
Never online returns	0[b]	.	.	0	.	.	.	.

a. The reference category is: Avoidance-first.

b. This parameter is set to zero because it is redundant.

Annex VIIII – Binary logistic regression variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Country			144.499	9	<.001	
	Belgium	-.215	.160	1.811	1	.178	.806
	Netherlands	-.360	.175	4.248	1	.039	.697
	France	-.038	.155	.060	1	.807	.963
	Italy	-.361	.162	4.952	1	.026	.697
	Spain	-.387	.180	4.632	1	.031	.679
	Norway	-.492	.181	7.403	1	.007	.611
	Sweden	-.865	.186	21.569	1	<.001	.421
	Greece	-.626	.171	13.397	1	<.001	.535
	Poland	.740	.148	25.071	1	<.001	2.096
	Age			29.744	5	<.001	
	16-24	.186	.120	2.404	1	.121	1.205
	25-34	-.085	.128	.437	1	.509	.919
	35-44	-.387	.143	7.302	1	.007	.679
	45-54	-.379	.174	4.759	1	.029	.684
	55-64	-.563	.304	3.422	1	.064	.569
	Education			15.780	2	<.001	
	ISCED 0-2	-.412	.108	14.508	1	<.001	.663
	ISCED 3-4	-.367	.107	11.737	1	<.001	.692
	Living environment			6.692	2	.035	
	City	-.155	.085	3.336	1	.068	.856
	Town	-.269	.119	5.102	1	.024	.764
	Occupation			7.725	3	.052	
	Retired or not working	.389	.177	4.838	1	.028	1.475
	Employed or self-employed	.132	.225	.343	1	.558	1.141
	Student	.398	.244	2.659	1	.103	1.489

		B	S.E.	Wald	df	Sig.	Exp(B)
	Children	.113	.079	2.013	1	.156	1.119
	Motivation	.128	.059	4.669	1	.031	1.136
	Individual self	-.108	.052	4.238	1	.040	.898
	Sustainability awareness	-.171	.054	10.064	1	.002	.843
	Convenience	1.127	.048	540.635	1	<.001	3.086
	Avoidance	-.372	.074	25.290	1	<.001	.689
	Acceptance	-.112	.070	2.591	1	.107	.894
	Technology	-.044	.052	.711	1	.399	.957
	Purchase frequency	.038	.002	360.707	1	<.001	1.039
	Constant	-3.349	.420	63.670	1	<.001	.035

a. Variable(s) entered on step 1: Country, AgeCat, EducationLevel, LivingEnvironment, Occupation, Children, Motivation, IndividualSelf, SustainabilityAwareness, Convenience, Avoidance, Acceptance, Technology, PurchaseFreq_averages.