Online grocery shopping in Europe: consumer research on the role of innovation and local food perceptions

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Abstract:

Purpose

This study investigates the determinants of online grocery shopping adoption in Europe, focusing on the effect of innovation adoption characteristics, food choice motives, and local food perceptions on attitudes and purchase intentions. Based on the significant determinants for adoption, consumer segments are identified to gain insights the diversity in online grocery shopping behaviour.

Methodology

A Pan-European online survey was conducted in March 2024 with 2.899 respondents from Belgium, France, the UK, Spain, and Croatia. The data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) to examine relationships between innovation adoption,

food preferences, and local food perceptions. A segmentation analysis was also performed to identify distinct consumer groups.

Findings

The research identifies the innovation adoptions characteristics, perceived convenience and subjective norms as crucial in shaping purchase intentions across different countries. Additionally, the study reveals insights about the positive influence of e-commerce-related food choice motives on consumer attitudes, while perceived complexity, perceived product risk and local food perception showed negative effects. Five consumer segments were identified, with Digital Pioneers and Complexity-Averse consumers showing the highest engagement potential.

Originality

This research provides a first multi-country assessment for the determinants of the adoption of online grocery shopping in a multi-country European context. New insights into the role of local food perceptions in online grocery shopping adoption are gathered, which can support the market access for small- and midsized producers.

1. Introduction

The 21st century has witnessed a dramatic shift in grocery shopping habits, driven in part by the growth of online distribution channels (Wang et al., 2020). This trend of online grocery shopping, i.e. the purchase of grocery items via a digital platform with delivery at the consumers' home, designated place or in-store collection (Thomas-Francois et al., 2022), is transforming consumer food consumption patterns through various e-commerce models like business-to-consumer platforms, online-to-offline delivery, and in-store meal services (Wang et al., 2020). However, despite projected growth (Statista, 2024), online grocery adoption remains sluggish compared to other online retail sectors (Frank & Peschel, 2020). This can be attributed to the inherent challenges of online food shopping, particularly the difficulty in evaluating product quality, often associated with a lack of trust (Barska & Wojciechowska-Solis, 2020; Schmid & Axhausen, 2019).

The relatively slow adoption of digital technologies for food shopping raises questions about its appeal to consumers (Thomas-Francois et al., 2022). However, the rising consumer interest in local food has become a driving force behind the diversification of marketing channels, including the adoption of online marketplaces (Casteran & Plotkina, 2023). This trend offers a promising

opportunity to make online grocery shopping more appealing by promoting specialty products like local foods through innovative marketing strategies (Samoggia et al., 2021). The post-pandemic era for online grocery shopping presents new challenges, particularly for small- and medium-sized enterprises (SMEs), as it mainly has been large retailers who harvested the digital fruits of the pandemic (Reardon et al., 2022). Nevertheless, SMEs can adhere to these new customer segments by levering the growing demand for local food, adopt tailored strategies, and strengthen both their market position and local food system resilience

Online marketplaces can enhance geographic proximity through innovative business models and logistics, improving accessibility and convenience concerns raised by local food consumers (Berti & Mulligan, 2016; Donner & de Vries, 2023). By aggregating producers and their products, online marketplaces can strengthen the market position of small-scale actors (Kaiser et al., 2020; Sgroi & Marino, 2022). Furthermore, they pave the way for a more inclusive local food system that incorporates intermediaries like collection points and online grocery stores (Casteran & Plotkina, 2023; Printezis & Grebitus, 2018). As such, online marketplaces can be used to scale towards shorter food supply chains by extending the traditional model of direct farmer-consumer interaction that is often associated with local food systems (Anggraeni et al., 2022).

While consumer research on online grocery shopping has been around since the 1990s (Park et al., 1996), the literature has seen substantial growth recently due to the impact of the COVID-19 pandemic (Tyrväinen & Karjaluoto, 2022; Zolfaghari et al., 2023). This period provided a unique opportunity to analyse particular situational factors, which can be instrumental in shifting to online grocery shopping (Hand et al., 2009). Previous research has delved into various aspects investigating consumers' purchase intention, including the impact of prior experience (Zolfaghari et al., 2023), perceived risk and trust (Asgari et al., 2023), and convenience factors through perceived ease of use and perceived usefulness (Driediger & Bhatiasevi, 2019). As the world transitions to a post-pandemic era, consumers are likely to re-evaluate their online grocery habits (Tyrväinen & Karjaluoto, 2022), a trend that has been prevalent in this sector due to consumers' familiarity with traditional stores and the usual hybrid manner in which they use online grocery shopping (Hand et al., 2009). This shift underscores the importance of identifying key determinants that can attract consumers in the post-pandemic period and sustain adoption in the long term (Mondal & Hasan, 2023).

Previous consumer research on online grocery shopping has been undertaken in various countries, such as the US (Chintala et al., 2024; Hansen, 2005), China (Wang & Scrimgeour, 2022; Wang & Somogyi, 2018), the UK (Hand et al., 2009), Belgium (Van Droogenbroeck & Van Hove, 2017), Poland (Bryła, 2018) and Denmark (Frank & Peschel, 2020). This study presents a novel contribution by examining online grocery shopping behaviour across multiple European countries allowing the similarities, differences and overall diversity to be reliably revealed. To the best of our knowledge, it is also the first study to investigate the impact of local food perceptions on purchase intentions for online grocery shopping. By integrating innovation adoption characteristics, food-related preferences regarding online marketplaces, and perceptions of local food, this research builds a comprehensive understanding of the factors shaping consumer behaviour. Furthermore, by segmenting consumers based on these determinants, the study identifies distinct consumer groups, providing valuable insights for targeted marketing strategies and exploring the potential of online marketplaces to support shorter supply chains through localised distribution.

2. Research framework

Inspired by Rogers (1983) diffusion of innovations theory and the theory of reasoned action (Fishbein & Ajzen, 1975), Hansen (2005) identified innovation adoption characteristics specifically for the case of online grocery shopping. Further extending on the theory of reasoned action, Wang (2022) implemented these innovation adoption characteristics together with food choice motives in an attitude-intention model to predict the adoption behaviour of consumers. This approach of researching purchase intentions of online grocery shopping looks at online grocery shopping as an innovation as a whole, rather than approaching it as the adoption of a new technology such as in the technology acceptance model (Davis, 1989).

The research framework of this study further builds upon the work of Wang & Scrimgeour (2022) who developed a model based on their review on the influencing factors for consumer adoption of online to offline food delivery services. This study applies this model in the general context of online grocery shopping and advances existing knowledge by proposing an extended conceptual model that examines the influence of innovation adoption characteristics (Frank & Peschel, 2020; Hansen, 2005; Wang & Scrimgeour, 2022), food choice motives (Wang & Scrimgeour, 2022) and local food perceptions (Denver & Jensen, 2014) on consumer attitudes and purchase intentions towards online grocery shopping.

2.1. Attitude and purchase intention

Attitude has consistently been shown to mediate purchase intentions in consumer research (Hansen et al., 2004; Rozenkowska, 2023). A meta-analysis by Tyrväinen and Karjaluoto (2022) highlighted the need to further examine relationships influencing attitudes toward online grocery shopping intentions, underlining its importance for advancing theoretical frameworks. Empirical studies consistently report a positive effect of attitudes on behavioural intentions within this context, reinforcing its predictive validity (Kang et al., 2015; Wang & Scrimgeour, 2022; Yeo et al., 2017). Therefore, we hypothesize that:

> **Hypothesis 1. (H1):** Consumers' attitudes have a significant relationship with purchase intentions for online food shopping.

2.2. Innovation-adoption characteristics

Early research on online grocery shopping showed that perceived characteristics of an innovation can serve as predictors for the adoption of the innovation itself (Hansen, 2005). These innovation adoption characteristics (i.e. perceived complexity, perceived compatibility, perceived risk, perceived relative advantage and subjective norm) have been revisited in light of evolving consumer experiences with online grocery shopping (Frank & Peschel, 2020; Wang & Scrimgeour, 2022). Further investigation into these relationships could provide deeper insights into consumer adoption of online grocery shopping, such as through the lens of food choice motives, which have been linked to consumer behaviour on online food shopping platforms (Wang & Scrimgeour, 2022).

Perceived characteristics of an innovation, i.e. Innovation-adoption characteristics, have been identified as predictors of attitude and intention (Wang & Scrimgeour, 2022), and actual consumer adoption (Frank & Peschel, 2020) of online grocery shopping. These Innovation Adoption Characteristics include perceived subjective norm (i.e. normative influences from others), perceived compatibility (i.e. the alignment of online food shopping with an individual's lifestyle and values), perceived relative advantage (i.e. the benefits of online food shopping compared to offline), perceived complexity (i.e. the difficulty of using online food shopping services), and perceived risk (i.e. potential issues such as payment problems) (Hansen, 2005; Wang &

Scrimgeour, 2022; Wang & Somogyi, 2018). Based on these concepts, we propose the following hypotheses:

> **Hypothesis 2. (H2):** Consumers' Innovation Adoption Characteristics have a significant relationship with their attitudes towards online food shopping.
>
> **Hypothesis 3. (H3):** Consumers' Innovation-Adoption Characteristics have a significant relationship with purchase intentions for online food shopping.

2.3. Food Choice Motives

Food Choice Motives such as sensory appeal and health benefits (Steptoe et al., 1995) can lead to a better understanding of food consumption patterns. Recent research by Wang et al. (2020) found ten Food Choice Motives particularly relevant to e-commerce related food shopping: taste appeal, value for money, cheap, wide variety, safety concern, quality concern, processed convenience, purchase convenience, others' reviews and discount. Previous research has established a link between these Food Choice Motives and consumers' attitudes and behaviours towards online food shopping platforms (Wang & Scrimgeour, 2022). Three additional Food Choice Motives were created, based on the authors' earlier exploratory work in consumer workshops on the use of digital technology for food shopping and understanding consumers' representations and attitudes towards local food. Consequently the motives related to sustainable food consumption and local food: environmental friendliness, food waste and locality were added to the research framework. Therefore, two hypotheses are formulated to address this relationship:

> **Hypothesis 4. (H4**): Consumers' food choice motives have a significant relationship with their attitudes towards online food shopping.
>
> **Hypothesis 5. (H5):** Consumers' food choice motives have a significant relationship with purchase intentions for online food shopping.

2.4. Local Food Perceptions

Despite the opportunities that online marketplaces present for marketing local food, their digital nature may conflict with consumers' perceptions of local food, which are often linked to personal and community-based attributes (Denver & Jensen, 2014; Lee et al., 2024). This might present a challenge for e-commerce-based local food platforms, as building this sense of community and trust can be more difficult for e-vendors than for traditional, offline relationships (Ji et al., 2020), which may result in consumers who seek for values such as locality in their food purchasing staying true to the physical market.

To investigate this, the influence of consumers' local food perceptions on attitudes and purchase intentions for online food shopping were assessed using six statements related to health, taste, quality, environment, accessibility, and cost (Denver & Jensen, 2014; Roininen et al., 2006). The precise definition of "local food" remains ambiguous for both academics and consumers (Printezis et al., 2019). Nevertheless, it resonates more strongly with consumers than technical terms such as short food supply chains (Kneafsey et al., 2013). Given this ambiguity, this research did not provide a definition of local food, allow for each individual's own cultural or contextual interpretation.

Consequently, we formulate the following hypotheses:

Hypothesis 6. (H6): Consumers' local food perceptions have a significant relationship with their attitudes towards online food shopping.

Hypothesis 7. (H7): Consumers' local food perceptions have a significant relationship with purchase intentions for online food shopping.

Figure 1 presents the conceptual framework, which expands on the framework of Wang & Scrimgeour (2022) by incorporating the concepts of Local Food Perceptions drawn from Denver & Jensen (2014). The factors within this framework that prove to be significant are subsequently used as segmentation variables to identify discrete groups of consumers relating to online food shopping attitudes and preferences. These segments are further profiled based on socio-demographic characteristics, previous online shopping experience, distance to the store, and preferences for local food in online grocery shopping.

Figure 1: Conceptual framework of the study

Source: Authors own work, adapted on Wang & Scrimegeour (2022) and Denver & Jensen (2014)

3. Materials and methods

3.1. Data collection

In March 2024, data were obtained in one wave through a multi-country online survey in Belgium, Croatia, France, Spain and the UK. The different countries were sampled out of convenience, while ensuring a diversity of views were gathered, representing a wide range of European consumers. The questionnaire was initially developed in English and translated to the countries' respective language(s) by native speakers.

Data were collected anonymously and in accordance with the European General Data Protection Regulation. Before participating in the study, respondents were informed about the purpose of the study and the processing of their data. Ethical approval was obtained via the Research Ethics Committee of the Faculty of Political Sciences of Ghent University, Belgium (Reference: ref 2023-48). Participants were recruited through a random selection from respondent panels of an external market agency panel. Eligibility criteria included being 18 years or older, having full or partial responsibility for grocery shopping in their household, owning a smartphone, and providing informed consent. Quota sampling was employed to balance the samples in terms of age and gender across the total and country-specific populations.

The questionnaire gathered information on sociodemographic variables (e.g., gender, age, education, number of people in the household, household income) and additional questions related to the closest distance to the store, previous online shopping experience and their preference to buy local food online. Scales for the assessment of consumers attitudes and purchase intentions toward online grocery shopping were adapted from Hansen (2005) and Wang & Scrimgeour (2022), these included innovation adoption characteristics (15 items) and food choice motives (11 items). In addition, eight items on local food perceptions were included based on adaptations from Denver & Jensen (2014) and Roininen et al. (2006). All items were measured on a five-point Likert agreement scale, with response categories from 1 totally disagree to 5 totally agree. Some precautions were taken in the design of the questionnaire to prevent measurement errors: the study was anonymous in order to avoid personal biases, the presentation of the items within innovation adoption characteristics, local food perceptions, food choice motives, attitudes and purchase intentions were randomised and to test the validity of the questionnaire a false question presented to the respondents.

3.2. Data analysis

To further investigate the constructs Innovation Adoption Characteristics, Food Choice Motives and Local Food Perceptions Exploratory Factor Analyses (EFA) were conducted. All constructs showed satisfactory results for Kaiser-Meyer-Olkin (> 0.5) and Bartletts test of sphericity ($p < 0.05$) (Appendix 1), indicating that the items within each construct were significantly correlated and suitable for factor analysis (Hair et al., 2014). For each construct, EFA was run using Principal Component Analysis with varimax rotation (criteria: eigenvalues > 1.0, percentage of cumulative variance explained > 60% and interpretability of factors). Items were retained if they had indicator loadings > 0.5 and no significant cross-loadings (two or more indicator loadings > 0.4) (Hair et al., 2014). For the Innovation Adoption Characteristics, all items related to perceived risk were removed due to high cross-loading. One of the items related to perceived risk, i.e. perceived product risk, will be maintained in the further analysis given its prevalence in literature for being associated with a lack of trust in online food shopping (Barska & Wojciechowska-Solis, 2020; Schmid & Axhausen, 2019).

Due to high cross-loading, the items cheap and discount were removed for the constructs related to food choice motives. One construct related to local food perceptions was identified after the removal of the statements related to accessibility and cost, again due to cross-loading. The final EFA results can be consulted in Annex 1 and show that all items had indicator loadings higher than 0.5 and no strong cross-loadings for each factor. The latent constructs with corresponding items were used to assess the measurement model.

Partial Least Squares Structural Equation Modelling (PLS-SEM) was used for testing the hypotheses within the conceptual framework (Figure 1). PLS-SEM is extensively used for analysing complex interrelationships among latent variables (Hair et al., 2021), and was chosen for this research as it is particularly suitable for exploratory and predictive analyses (Hair et al., 2018). The PLS-SEM embodied a two-step procedure. First the measurement model was assessed to ensure the reliability and validity of the indicators in measuring their respective constructs. Factor Loadings, Convergent Validity (AVE), Cronbach's Alpha (α), Variance Inflation Factor (VIF), the Heterotrait-Monotrait (HTMT) and Composite Reliability (CR) were used to assess internal consistency, multicollinearity, and discriminant validity (Hair et al., 2021). Once the reliability and validity were confirmed, the hypothesized relationships within the model were tested by analysing the structural model through evaluation of the significance and size of the path coefficients and the in-sample predictive power (R^2) (Hair et al., 2021).

Given the study's multi-country sample, PLS-SEM was also conducted separately for each country. Statistical significance was determined at $p < 0.05$. The analysis was performed using SPSS Statistics (vs. 29.0.1.0) and Smart-PLS software (vs. 4.1.0.2). Smart-PLS was employed to create the Structural Equation Models (SEMs) due to its specialized methodologies for assessing complex causal relationships among latent variables.

To cluster consumers based on the significant variables identified in the PLS-SEM, a two-step cluster analysis was conducted, combining hierarchical and non-hierarchical K-means clustering methods. Hierarchical clustering was performed using Ward's method to identify distinct clusters based on the Squared Euclidean Distance, with the optimal number of clusters determined from the generated dendrogram. This output served as the input for the non-hierarchical K-means clustering in order to generate mean scores for each variable which represent the characteristics

of the members of each cluster (Hair et al., 2014). Cross-tabulation based on a χ^2 test and one-way ANOVA were used to profile the consumer segments.

4. Results

4.1. Participant characteristics

A total of 2899 respondents completed the survey, with approximately 550 respondents in each country sample. Table 1 presents the participant characteristics stratified by country of residence. The varying number of respondents in each sample is based on a time-related quality check of a bottom time of 240 seconds, as the data presented in this study was part of a larger questionnaire. The majority of respondents had prior experience with online shopping, with 50.7% of the pooled sample reporting experience specifically with online grocery shopping. The UK sample exhibited the highest level of online grocery shopping experience at 70.7%, while the Belgian sample had the lowest at 35.1%. Additionally, there is strong consumer support for purchasing local food through online platforms, with 90.9% of the pooled sample expressing encouragement.

Table 1. *Participant characteristics across five European countries*

4.2. PLS-SEM analysis

A structural equation model was developed to associate consumers' Innovation Adoption Characteristics, Food Choice Motives and Local Food Perception with their attitudes and purchase intentions towards online grocery shopping. It uses 7 latent variables and 28 observed variables. The observed variables regarding attitudes and purchase intentions had good internal reliabilities due to the high Cronbach's alpha values: 0.889 and 0.894.

4.2.1. Assessment of the measurement model

The first step of the PLS-SEM analysis is to assess the measurement model of the pooled sample and for the individual countries (Hair et al., 2019). All outer factor loadings were higher than 0.5. CR and α were above the recommended value of 0.7, demonstrating acceptable construct reliability and internal consistency of the items measuring the latent constructs (Cronbach, 1951; Hair et al., 2018). The AVE for all constructs was equal to or above 0.5, confirming the respective construct's convergent validity (Hair et al., 2018). To evaluate the distinctiveness of constructs, e.g. discriminant validity, the HTMT ratio of correlations was assessed. All constructs had values below 0.9, confirming distinction between latent constructs (Hair et al., 2021), except for attitudes and purchase intentions in the case of the models for Spain and the UK. We interpret that the lack of discriminant validity is because attitudes and purchases intention are closely related, but see no implication for the validity of the models as other measures are correct and the pooled model shows overall good results. Despite their contextual differences, attitudes and intentions have been known to be closely related. Finally, the predictor constructs' VIF were evaluated to assess whether collinearity among the constructs is present. VIF values were all below five, indicating no concerns for multi-collinearity among the constructs (Hair et al., 2018). All reliability and validity tests demonstrated good results, allowing for the interpretation of the structural model.

4.2.2. Testing the structural hypothesis

The second step of the PLS-SEM analysis is the assessment of the structural model. A bootstrap analysis with 5000 repeats was conducted to identify significant relationships. Path coefficients of the pooled model are shown in Figure 2.

The model describes the direct and indirect effects of the variables on intentions to purchase groceries online. The effect of attitudes on purchase intentions for the pooled sample was found to be positive and significant (β = 0.533), suggesting that a more positive attitude leads to higher intention of consumers using a digital platform for food shopping. Perceived convenience is an innovation adoption characteristic which was significantly positively associated with attitudes (β = 0.559) and purchase intentions (β = 0.286) towards online food shopping. The innovation adoption characteristic subjective norms was significantly positively associated with attitudes (β = 0.183) and purchase intentions (β = 0.110). Perceived complexity is an innovation adoption characteristic which was significantly negatively associated with attitudes (β = -0.076) and purchase intentions (β = -0.033) towards online food shopping. Perceived product risk is an item related to innovation adoption characteristics which showed a significant negative effect for both attitudes (β = -0.035) and purchase intentions (β = -0.037).Related to the food choice motives, e-commerce food choice motives show a positive effect on attitudes (β = 0.105) towards online shopping, as well as generic food choice motives (β = 0.067). The last effect that was measured was that local food perception was significantly negatively associated with purchase intentions (β = -0.026) towards online food shopping.

The in-sample predictive power of the pooled model (R^2) indicated that the different constructs explain 57.3% of the variance in consumers attitudes and 71.0 % of the variance in consumers purchase intentions when shopping for groceries online. Across the country samples, the constructs explain between 48.4 % and 64.4 % of the variance in attitudes and between 66.8 % and 76.9 % of the variance in purchase intentions.

Figure 2: Significant paths identified from the analysis of the pooled sample from Belgium, France, Spain, The UK and Croatia using standardised regression weights.

Source: Authors own work

The significance of the standardised path coefficients from the PLS-SEM for all the individual models is presented in Figure 3. Appendix 2 provides the representation of each model and path coefficients. The effects of attitudes, perceived convenience and subjective norms on purchase intentions showed consistent patterns across the individual countries. Regarding perceived complexity, the UK shows similar behaviour for both attitudes and purchase intentions, while this effect holds in France and Spain only for attitudes. The effect of perceived product risk on purchase intentions holds for Belgium, Croatia and France, while the effect on attitudes only holds for the pooled sample. The effect of e-commerce food choice motives on attitudes show similar behaviour across different countries except for Belgium. Generic food choice motives shows an effect for attitudes in Belgium, France and the UK. Regarding local food perceptions, the effect on purchase intentions is only supported in the Belgian model, while the UK holds an additional significant effect for local food perception on attitudes.

Figure 3. Test results of the hypothesis in the study

Source: Authors own work

4.3. Segmentation analysis

The significant constructs resulting from the models of the pooled sample, i.e. perceived complexity, subjective norms, perceived convenience, perceived product risk, e-commerce related food choice motives, generic food choice motives and local food perceptions, were used

as segmentation variables. The segmentation analysis resulted in a five-segment solution. Table 2 indicates the size and mean value per segmentation variable for the pooled sample and the significant differences across the five segments for socio-demographic characteristics.

Segment 1, the 'Digital Pioneers', has the lowest score for perceived complexity and perceived product risk, and the highest score for perceived convenience. This segment has the highest score the generic and e-commerce food choice motives, and local food perception. The digital pioneers contained 22.7 % of the pooled sample and have a male majority (51.6 %) with an average age of 42.45, and 59.9 % being highly educated. This segment comprises small household sizes, and middle to high incomes. They are mainly Croatian (23.3 %), French (21.8 %) or from the UK (22.1%). This segment has the most experience with shopping for groceries online (75.4 %) and has the strongest preference to have local food available when shopping online (95.2 %).

Segment 2, the 'Complexity-Averse', is characterized by the highest scores for subjective norms and perceived complexity, and similar to segment 1 has the highest score for perceived convenience and local food perception. This indicates that they have a social environment supportive of online food shopping and acknowledge the advantages online food shopping can have in their daily life. They see the value of online shopping as their food choice motives have relatively high scores, and hold strong values for local food, but simultaneously find online food shopping too complex to adopt it. This segment contained 14.0 % of the pooled sample and had a male majority (51.9 %). The average age in this segment is 36.85, which is significantly the youngest age category over the total sample. Similar to segment 1, the Complexity-Averse contain many highly educated people (67.1%) and rather smaller household sizes. This segment has the most people with the highest income of all segments (25.8 %). There is an underrepresentation of Croatians (12.9 %) in this segment. The majority have shopped for groceries online before (56.4 %) and strongly prefer to have local food options available when shopping online (94.4 %).

Segment 3, 'Cautious Consumers', has relatively high scores for local food perceptions and both food choice motives. They have a low score for subjective norms, and their scores for perceived complexity and perceived product risk reflect neither an aversion for complexity or product quality risks. The cautious consumers contained 19.5 % of the pooled sample and the majority of this segment is female (56.8 %). Their average age is 41.43, and the household size tends to represent slightly larger household sizes compared to other segments. They represent a low-middle income group of which the majority (52.3 %) have bought groceries online while representing a large fraction of consumers who are familiar with online shopping but never bought groceries online before (42.4 %). They are mainly Croatian (26.4 %) and Spanish (24.1 %) consumers. Finally, amongst this segment, 66.0 % of consumers live within 10 minutes walking from the nearest store.

Segment 4, the 'Sceptical Shoppers, scores the lowest for the generic food choice motives, they do not really believe that online groceries can offer them the same value as traditional stores. They find online food shopping quite complex but are especially held back by the perceived product risk. They do not fully see the advantages related to convenience and the opinions of their social environment are mixed. This segment contained 30.0 % of the pooled sample and had a male majority (53.9 %). The average age in this segment is 42.62, and they mainly live in households of 1-2 people (50.0%) with a large proportion having a low-middle-income and an above average representation of low education (45.4 %). They are mainly from Belgium (25.7%) and France (26.4%), and the majority has either never shopped for groceries online (48.0 %) or never online at all (11.0 %).

Segment 5, the 'Opponents', has the lowest scores for subjective norms, perceived convenience, and food choice motives related to e-commerce advantages. This indicates that this segment sees the lowest relative advantage in online grocery shopping, and it does not fit their lifestyle nor is adopting online grocery shopping stimulated by their social environment. This group represented 13.8 % of the pooled sample and had the oldest average age (50.41) with a male majority (54.3 %), a lower educational level (50.1 %) and representing households of four or more people (39.1 %). They are mainly Belgian (22.9 %), French (21.2 %) or from the UK (21.4 %) and representing low-mid income households. The majority of consumers in this segment have never shopped for groceries online before (58.5 %) and 14.0 % have no experience at all with online shopping. Finally, this segment also represents the lowest preference to purchase local food online (83.5 %).

Table 2. *Results of the segmentation analysis*

5. Discussion

This study investigated the influence of innovation adoption characteristics, food choice motives and local food perceptions in an attitude-intention model to predict the adoption behaviour of online grocery shopping in Europe. Significant relationships were identified, highlighting especially the importance of perceived convenience and subjective norms in shaping these factors across multiple countries, followed by influential factors such as perceived complexity and perceived product risk.. An overview of the hypotheses and their outcomes can be found in Table 2.

Our findings suggest that perceived subjective norm and perceived convenience (i.e. perceived compatibility and relative advantage) are the strongest predictors for adopting online food shopping, similar to the study of Frank & Peschel (2020) and Wang & Scrimgeour (2022). Notably, perceived complexity has a minor impact on consumer adoption of online grocery shopping, consistent with findings by Wang & Scrimgeour (2022). As consumers' experience with online food shopping has increased, it is plausible that this factor now exerts only a minor effect. Research indicates that as individuals become more experienced, using similar technologies becomes easier (Andika et al., 2022). Similarly to perceived complexity, perceived product risk also shows relatively small effect sizes which also could be attributed to increased familiarity with online grocery shopping. Nevertheless, perceived product risk was only implemented as a single item in the model. Previous research on online grocery shopping assessed perceived risk, of which perceived product risk is one item, and found that the importance of perceived risk is small or even negligible in this context (Driediger & Bhatiasevi, 2019; Hansen, 2005). Given the effect of perceived product risk as an item alone in the model in this study, further research should investigate the effect of perceived product risk based on multiple items since the lack of physical interaction with the product and whether or not the ordered goods will meet consumers' expectation is a common worry about online food shopping (Schmid & Axhausen, 2019).

Based on the significant effects of the pooled sample, five distinct consumer segments were identified: 1. The 'Digital Pioneers, 2. The 'Complexity-averse', 3. The 'Cautious Consumers', 4. The 'Sceptical Shoppers' and 5. The 'Opponents'. The segment which has the most experience in online grocery shopping, and the highest average scores for the determinants of adoption is the Digital Pioneers. Further research could explore how to sustain their engagement by optimising their consumer experience through advanced features and targeted promotions.

The Cautious Consumers and Sceptical Shoppers segments could be effectively targeted by addressing subjective norms, as their lower scores on this factor contrast with the large effect size observed in the attitude-intention model. This suggests that even a modest increase in subjective norms could significantly boost their purchase intentions for online food shopping. The notable differences in the average scores of subjective norm between those more likely to adopt online food shopping (i.e. digital pioneers and complexity-averse segments) and those less likely to adopt underscore the critical role of social influence. For adopters, social network support likely reinforces positive attitudes and strengthens their intention to shop online, while the absence of such support among non-adopters perpetuates their reluctance to adopt this behaviour. If both 'Digital Pioneers' and the 'Complexity-Averse' segment continue using online grocery shopping, they would represent 41.3% of the surveyed population, potentially exerting a strong influence on the subjective norms of others.

Additionally to subjective norms, the 'Sceptical Shoppers' require motivation related to convenience, and perceived advantages to sustain their engagement. This group scores particularly low on generic food choice motives, suggesting they may doubt whether online grocery shopping can meet their basic food quality standards. The 'Opponents' represent the segment which has the most difficulties with adopting online grocery shopping, with overall low scores for the determinants and a high score for perceived complexity. Since they only represent 13.8 % of the surveyed population it might be more productive to focus any marketing efforts on the other segments.

The demographic profiles of consumer segments most inclined to adopt online grocery shopping tend to be younger consumers who are highly educated and have middle-to-high household incomes which is in line with with earlier findings (Frank & Peschel, 2020; Hansen, 2005; Van Droogenbroeck & Van Hove, 2017; Wang & Scrimgeour, 2022). It is remarkable that both Digital Pioneers and Complexity-Averse segments represent consumers with smaller household sizes, while previous studies identified larger household sizes to be related to the use of online grocery shopping (Van Droogenbroeck & Van Hove, 2017; Wang & Scrimgeour, 2022). In terms of age, the Opponents, i.e. those least likely to adopt online grocery shopping, comprised consumers with the oldest age with an average age of around 50 years old. These findings are in line with earlier studies (Goethals et al., 2012; Van Droogenbroeck & Van Hove, 2017; Wang & Scrimgeour, 2022). Remarkably, the segments which represent the oldest (the Opponents) and the youngest (the Complexity-Averse) consumers both have the highest scores for perceived complexity, which contradicts earlier assumptions that older consumers were less likely to use online grocery shopping because of technology aversion (Goethals et al., 2012). Similar results have been found in the study of Van Droogenbroeck & Van Hove (2017), suggesting that further research is needed into what divides consumers of different ages over online grocery shopping. Regarding gender, there is both for those most and least likely to adopt online food shopping a slight male majority which confirms recent findings that women are increasingly active in online purchasing, particularly in grocery retailing (Dominici et al., 2021). The female majority for the Cautious Consumers, which have high values for perceived product risk and food choice motives, is in line with the findings of Lin et al. (2021) stating that women might attach more value to product characteristics.

One of the drivers of this study was to investigate whether local food perceptions are influential in the decision-making process as this could be an avenue to enhance the potential of online grocery shopping (Barska & Wojciechowska-Solis, 2020; Samoggia et al., 2021). In the attitude-intention model, this study identified a small, negative effect on purchase intentions. This indicates that consumers who think highly of local food might have a lower intention to purchase groceries online as this might not align with their values. Nevertheless, the consumer segmentation showed that the segments most likely to adopt online grocery shopping i.e. Digital Pioneers, Complexity-Averse and Cautious Consumers, all have high average scores for local food perceptions. This shows that even though it might not directly increase the adoption of online grocery shopping, there is a clear market for selling local food online as this is highly valued by the consumers who are most likely to adopt online grocery shopping.

Implications and further research

These findings provide valuable insights for marketers and policymakers to develop targeted strategies that address the diverse needs and preferences of European consumers, ultimately enhancing the adoption and growth of online grocery shopping. This study extends the theoretical understanding of consumer behaviour in online food shopping by assessing the integration of local food perceptions into the innovation adoption framework. It highlights the multi-faceted nature of consumer decision-making. To enhance adoption, online grocery platforms should prioritize improving perceived convenience and aligning their services with consumer lifestyles. Given the significant influence of subjective norms, it is crucial to promote online food shopping at the community level to highlight its benefits, which could be facilitated by the creation of online food hubs (Kaiser et al., 2020).

This study used a linear attitude-intention model to predict behaviour, acknowledging its limitations. Such models offer only a partial explanation of actual consumer behaviour, which is often shaped by contextual and personal factors not captured by these models (Fischer, 2017). Despite these limitations, the model provides valuable insights into perceptions of online grocery shopping across a broad spectrum of European consumers.

By tailoring strategies to specific consumer segments, online grocery marketers can better meet the diverse needs of European consumers, boosting adoption and market growth. Policymakers should support initiatives that enhance online grocery accessibility and trustworthiness, strengthening shorter food supply chains (Berti & Mulligan, 2016; Sgroi & Marino, 2022). However, digitalising the food market should be done carefully, ensuring sustainable development of both rural and urban areas through offering both online and offline services, and focussing on increasing market access for small and medium-sized producers (Sgroi & Marino, 2022).

6. Conclusion

This study provided a detailed examination of the factors driving consumer adoption of online grocery shopping across Europe, integrating innovation adoption characteristics, food choice motives, and local food perceptions. The findings underscore the importance of perceived convenience and subjective norms as primary drivers of adoption. The segmentation analysis identified five distinct consumer groups, each with unique characteristics and varying levels of experience in online grocery shopping. Notably, the 'Digital Pioneers' and 'Complexity-Averse' segments show the highest potential for continued engagement, suggesting that targeted

strategies addressing their specific needs could further enhance market penetration. The research also explores the role of local food perceptions, finding that while these do not directly increase online grocery adoption, there is a significant market opportunity for local producers within online platforms. This insight is particularly valuable for developing marketing strategies that resonate with consumers' values.

In conclusion, this study extends the theoretical understanding of online grocery shopping behaviour and offers practical implications for marketers and policymakers. By addressing the identified factors and tailoring strategies to distinct consumer segments, stakeholders can effectively foster the growth of online grocery shopping in Europe. Future research should continue to explore the evolving dynamics of this market, particularly concerning emerging trends and technological advancements.

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