Exploring the determinants of consumers' adoption of online grocery shopping using the Theory of Planned Behavior: An empirical study

Marianthi Giannakopoulou*, Stavroula Ioannou*,
Andreas Stylianou*, Georgios Adamides*

Abstract

Consumer adoption of online grocery shopping has been gradually increasing over the past two decades. This article examines the behavioral model of consumers and the factors that influence adoption of online grocery shopping of the typical adopter profile in Cyprus. Using data from 302 respondents of an online survey, it was found that 45.7% have purchased groceries online. Our research has shown that perceived behavioral control carries more weight than intention in explaining online grocery shopping behavior, and that two antecedent constructs —attitude and subjective norms— have direct influence on intention for online grocery shopping. From a managerial perspective, these findings provide insights to retailers, marketers and policymakers in enhancing the knowledge of this emerging online service. From a theoretical point of view, this study contributes to the limited existing research in the Euro-Mediterranean region, linking consumer behavior to the adoption of online grocery shopping.

Keywords: Online grocery shopping, Consumer adoption, Consumer behavior, Theory of Planned Behavior.

1. Introduction

Information technology has changed the way people communicate, socialize, learn, and consequently even how they do shopping (Alaimo *et al.*, 2022). The global food and grocery retail market was valued approximately at USD 12.29 trillion in 2020, and is projected to be worth USD 17.29 trillion by 2027 (Research and Markets, 2022). In a survey of 30,000 respondents from 63 countries, carried out in 2016 by the Nielsen Group, showed that 24% have purchased groceries online, specifically packaged grocery food, and 21% have purchased fresh groceries (Nielsen, 2017).

Technological advancement has become an indispensable part of life. According to recent reports, globally 5.3 billion people use the internet, that is the equivalent of 65.4% of the world's total population (Shewale, 2023). Moreover, there are 7.4 billion mobile-phone subscriptions (Nielsen, 2017), hence one might describe today's consumers as more "connected" than ever before. According to the Cyprus

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* Agricultural Research Institute, Nicosia, Cyprus.
Corresponding author: gadamides@ari.moa.gov.cy

Statistical Service, in 2021 Internet access in households reached 93.4% compared to 92.8% in 2020 (CYStat, 2021). The Cyprus Statistical Service also reports that 80% of households have access to a personal computer (desktop, laptop or tablet) and a computer is found in almost all (95.4%) households with dependent children. Furthermore, 22.7% of all enterprises stated that due to the Covid-19 pandemic the enterprises initiated or increased their efforts to sell goods or services via the Internet (websites, apps).

Online grocery shopping (OGS) is an alternative way of buying food and other household necessities using a web-based shopping service, instead of the traditional in-store grocery shopping. Online grocery shopping is been promoted as an alternative, additional way to alleviate issues to food access faced by the elderly, disabled, residents in areas with limited access to grocery shops (Rogus *et al.*, 2020). In a previous study, carried out in Cyprus in 2006, it was found that only 14% of the respondents had purchased groceries online, indicating that Cypriot consumers were quite unfamiliar with OGS (Adamides *et al.*, 2006). However, findings from the current survey have shown that 45.7% of the respondents have bought groceries online and in fact 72.6% of them agree that purchasing groceries online is an easy/ straightforward process. Hence, Cypriot consumers are now much more familiar with online grocery shopping than 15 years ago.

The aim of this study is to investigate consumers' adoption of online grocery shopping and the behavioral model of Cypriot consumers, along with their demographic and household characteristics. This study started in 2021 (Summer-Autumn), during the Covid-19 pandemic, where several measures were in place (since 2020) to limit the spread of the virus (e.g., restriction of free movement). In the context of a pandemic, online grocery shopping can offer interesting benefits to consumers, including social distancing, home delivery and time savings. The associated measures introduced in Cyprus, and worldwide, caused several severe economic and societal disturbances, leading to an expansion of e-commerce in general, and accelerating its adoption. Subsequently, the online grocery retail expanded during the pandemic (Dannenberg *et al.*, 2020; Jensen *et al.*, 2021; Jribi *et al.*, 2020).

The Theory of Planned Behavior (TPB), developed by Ajzen (1991), argues that human actions and therefore human behavior are directly influenced by the individual's intentions to adopt a behavior as well as the actual control of the behavior. Essakkat *et al.* (2021) states that intentions are assumed to capture the motivational factors that affect their behavior; they show how hard people are willing to try and how much effort they are planning to exert to perform a behavior. As a general rule, the stronger the intention to engage in a behavior, the more likely should be its performance (Ajzen, 1991). According to the TPB, three conceptually independent factors determine Behavioral Intentions, viz. a) the Attitude towards the behavior, b) Subjective norm and c) Perceived Behavioral Control (PBC). More specifically, attitude towards a behavior refers to individual's positive or negative evaluation of performing a behavior. Subjective norms refer to the social pressure that an individual perceives from "important others", for instance his/her parents, friends, to perform a certain behavior. Perceived behavioral control, as described above, represents the perceived ease or difficulty of adopting a behavior and it is assumed to reflect individual's experience and the obstacles he/she encountered in respective previous behavior. In general, a person's intention to perform a behavior becomes stronger when: a) he/she positively evaluates the behavior in question, b) he/she believes that others important to him approve of his decision, and c) he/she feels in control of the factors influencing it. Essakkat *et al.* (2021), notes that the TPB distinguishes between behavioral intention and actual behavior. The TPB is one of the most utilized and discussed theoretical models for predicting intentions and behavior (Jensen *et al.*, 2021; Sentosa & Mat, 2012; Strydom, 2018; Topa & Moriano, 2010). Each of the latent variables (Behavioral Intention, Attitude towards a Behavior, Subjective Norms and Perceived Control of Behavior) reveals a different aspect of an individual's behavior and can be a target for intervention. Therefore, the collection of the above information is deemed necessary and constitutes a good basis for investigating the perceptions of
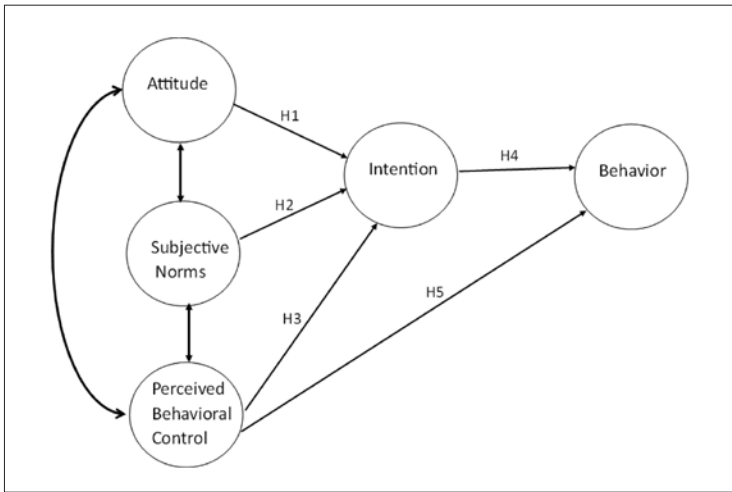
Figure 1 - The Theory of Planned Behavior (adapted from Ajzen, 1991), along with research hypotheses.

Cypriot consumers towards online grocery shopping. Figure 1 shows the theoretical framework of the TPB model as described above and adopted in this study. The hypotheses established in this study are as follows:

- Hypothesis 1 (H1). A positive attitude towards online grocery shopping has a positive and direct effect on the intention to OGS.
- Hypothesis 2 (H2). Subjective Norms, i.e., beliefs and expectations from immediate family and close friends towards OGS has a positive and direct effect on the intention to OGS.
- Hypothesis 3 (H3). OGS perceived behavioral control has a positive and direct effect on the intention to OGS.
- Hypothesis 4 (H4). Intention to OGS has a positive and direct effect on OGS behavior.
- Hypothesis 5 (H5). Perceived behavioral control has a positive and direct effect on OGS behavior.

The remainder of this paper is structured as follows: In the next section, a literature review on online grocery shopping and consumer characteristics is provided. Then, the methodological steps, data collection and analysis are described in detail. Next, the main results of the study are provided and discussed. The paper provides new empirical evidence on the understanding of the determinants of online grocery shopping in Cyprus and concludes with suggestions for future work.

2. Literature review

A bibliographical survey in Scopus for the period 2000 until 2023 resulted merely in 21 articles related to the query ("theory of planned behavior" OR "TPB" AND "online grocery"). The analysis of the search results shows a steady increase in the number of published studies on the subject of online grocery shopping, especially since 2018. Most studies were carried out in Denmark, followed by Brazil, Canada, Germany, the United Kingdom and the United States. In this sense, this study provides additional, more recent information for the Euro-Mediterranean region, using as a case study the Republic of Cyprus.

Etumnu *et al.* (2019), examined the drivers of online grocery shopping in the United States and explored linkages between consumer demographics and their perceptions towards OGS. They hypothesized that specific socio-demographics (e.g., age, children in the household) affect the tendency to shop groceries online, and that consumers who do OGS have favorable perceptions about OGS compared to in-store grocery shopping (e.g., convenience). They concluded that younger people, irrespective of their gender, residency, and their previous online shopping experience, are more likely to shop groceries online.

Van Droogenbroeck and Van Hove (2017), using logistic regression analysis, examined the

impact of both personal and sociodemographic variables of consumers in Belgium and the effects on the adoption of online grocery shopping. They found that the higher the educational level of the respondents, the more likely were to adopt OGS, while gender was non-significant. They concluded with suggestions, for example that supermarkets should target households with young children and highly educated full-time working parents, as for those groups of consumers the probability to adopt OGS is significantly higher. In addition, supermarkets should focus on providing solutions (e.g., develop websites with a clear layout, sufficient but concise product information, as well as a logical and fast ordering process) for poor-time consumers, because time saving is an important reason for adopting OGS.

Driediger and Bhatiasevi (2019), used the Technology Acceptance Model to identify differences in the acceptance of online grocery shopping in the context of developing countries (e.g., Thailand). They found that perceived usefulness is very likely to develop intentions to use OGS. They also found a positive relationship between perceived ease of use and perceived usefulness, meaning that consumers who find OGS easy to use, are more likely to perceive it as useful. Furthermore, they found a positive relationship between perceived ease of use and intention to use. In terms of gender, perceived enjoyment and perceived ease of use was higher for females. With regard to perceived usefulness towards intention to use, they found that OGS effectiveness and efficiency were more appealing to the higher income respondents. There were no significant differences between married and single respondents, and likewise, the size of the household did not seem to have any significant differences in their acceptance and behavior.

A recent study, conducted in the Middle East North Africa (MENA) region, including Mediterranean countries such as Egypt, Algeria, Tunisia and Morocco, showed that during the Covid-19 pandemic there was an increase of 33% of online grocery shopping (Minawi, 2020). Likewise, in Lebanon, Ben Hassen et al. (2022), also found a change in the grocery shopping behavior with a rise in online shopping, as consumers were trying to avoid in-store shopping, however not as much as in the MENA region. This may be attributed to the country's (Lebanon) weak digital infrastructure, which as noted, the Internet infrastructure was sorely inadequate.

In Italy, Dominici et al. (2021), explored the effects of socio-demographics and situational factors that influence individuals' likelihood to buy food online. The results, from respondents who participated in the Italian National Institute of Statistics multipurpose survey "Aspects of Italian Daily Life", indicated that young (age range 35-54), well-educated, female, living in a small family, with good or adequate overall economic condition were more likely to adopt online food purchasing. Another study (Maltese et al., 2021), examined the consumers' preferences for e-grocery in two major cities in Italy (Rome and Milan) in 2018. Results from this study showed that pricing or timing strategies (e.g., reduction in the delivery fees), can steer consumers towards ordering grocery online, preferably having them delivered at home. Alaimo et al. (2022) used Partially Ordered Set (POSET) to measure customer satisfaction in Italy, for online food shopping, during the Covid-19 pandemic. They found that the ease of use of online tools and websites, with which consumers searched and obtained product information, the attractiveness of the user interface and the security perception all had a strong impact on the overall user satisfaction. They concluded that a high level of consumer satisfaction, positively influences the intention to purchase food products (e.g., groceries) online.

Goethals et al. (2012), examined the perceptions of French consumers towards e-grocery retailing. They found no statistical significance between men (16%) and women (18%); however, they did find significant evidence (p=0.001) depending on consumer's age. Specifically, 32% of consumers age 30-45 years and 20% of those between 45 and 60 years have bought groceries online, while only 10% of consumers age 20-30 and none of consumers older than 60 did their grocery shopping online.

Shih-Chih and Shing-Han (2010), attempted to develop an integrated model, combining the concepts of Technology Readiness (TR) and

TPB, in order to predict and explain consumers' adoption and continued use of e-services. The study took place in Taiwan and the sample consisted of 405 undergraduate students. The findings of the study showed that attitude towards the behavior and perceived behavioral control were two important factors that influenced consumers' intention to adopt e-services, while subjective norms did not influence consumers' intention to continue using e-services. Moreover, consumers' technological readiness had a strong influence on attitude, subjective norm and perceived behavioral control. Therefore, personality traits, as measured in the TR, had a significant impact on technology adoption and users seemed to view the adoption of technology services more openly and positively, and were less likely to focus on its negative aspects.

In a more recent study conducted among older adults in the United States, Wu and Song (2021), proposed an integrated model based on the Technology Acceptance Model (TAM) and the TPB to predict older adults' attitudes and intentions towards online shopping. Two main characteristics of this demographic population, namely perceived lack of mobility and perceived social isolation were used as external variables to better predict their online shopping behavior. The sample consisted of 366 US adults born in or before 1965. According to the results of the study, perceived lack of mobility in shopping was positively related to perceived usefulness, but not to perceived ease of use of online shopping. In other words, older adults who have difficulty with shopping mobility did not find it easy to make online purchases. Moreover, perceived ease of use influenced perceived usefulness of online shopping and these two variables influenced attitudes towards online shopping. Perceived usefulness, perceived behavioral control and attitudes were positively related to the intention to continue shopping online. In addition, perceived social isolation of the target group was negatively related to perceived behavioral control, but positively related to subjective norms. Older adults who lack social connections may believe that they did not have enough resources to do a particular task, but may be more concerned about the views of significant others about online shopping and may have felt more pressure to cope with those views.

Blomqvist *et al.* (2015), examined consumer attitudes towards online grocery shopping. The purpose of that study was to investigate whether consumers' positive attitudes towards OGS influence their intention to purchase groceries online. The study was conducted in Sweden, which is considered one of the most developed e-commerce markets in Europe. In order to test the relationship between consumers' attitudes and intentions, the TPB was used as the underlying theoretical model. The results of the research confirmed the appropriateness of the TPB as a framework for describing the relationship between consumers' attitudes and behavior towards OGS. Moreover, the subjects in the sample appear to have favorable attitudes towards OGS. Finally, the results showed that there was a strong positive correlation between consumers' positive attitudes towards online grocery shopping and their intention to adopt such behavior.

In Spain, Elghannam and Mesias (2019) investigated consumers' perceptions of the potential use of social media, to create online, short food supply chains. The results shed light on what consumers perceive as opportunities or barriers to such short food supply chains, that are found on social media. Foremost, 51% of respondents found the idea of using social media networks for online food shopping to be good, useful, practical and innovative, while a smaller proportion (49%) found the idea strange and risky. As for the incentives that motivate consumers to buy food online, firstly, it is trust in the brand and the company or even a good previous experience with the same company. Another important issue highlighted by participants was their demand for products with quality guarantees and that the products comply with regulations and standards. Furthermore, it was found that a competitive price (lower than that of a conventional chain) or the availability of products not available on the local market, would also motivate consumers to buy food online. Another interesting result was that of delivery service, as consumers consider that secure platforms as well as efficient delivery systems are a key motivation to accept this kind of online transactions.

Based on the findings of the literature review, it appears that relevant research in the Mediterranean region is scarce. Thus, this study aims to fill this gap. The application of TPB in this research will contribute to the collection of useful information for understanding the behavior of Cypriot consumers towards online grocery shopping.

3. Methodology

This study was based on an online survey in Cyprus using a structured, self-administered questionnaire, adapted from previous studies (Ajzen, 1991; Symeou, 2017). The questionnaire was posted online using Google Forms between July and September 2021, during the Covid-19 pandemic and the related 'stay at home' lockdown and other related measures to prevent infection in Cyprus. The choice of online survey was selected because it is cheap, easy to set up, convenient to the participant (in terms of time and place), and do not require a physical contact between the interviewers and the respondents, that was a concern (and restriction) during the Covid-19 outbreak.

The survey population consisted of primary household grocery shoppers (i.e., person primarily responsible for most of the grocery shopping in their household) aged 18 and over, living in Cyprus. The sampling method used was the proportionate stratified random sampling and the required sample size was determined to 284 persons with a 5% margin of error and a 95% confidence level. The stratification variable was the respondents' district of residence; specifically, five strata were created based on the five districts of the Republic of Cyprus as follows: Nicosia, which represented 39% of the sample and total population, Limassol, 28%, Larnaka, 17%, Paphos, 11%, and Famagusta, 5%. Prior to the survey being administered to the general public, a pretest (pilot study) of 18 respondents was conducted with the goal to increase the validity and reliability of our testimonial survey evidence. Measurement scales were constructed on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree).

Attitude towards OGS was measured by three items representing respondents' overall evaluation of the attractiveness towards carrying out OGS. Specifically, it was measured by respondents' level of agreement to the following statements: (1) online grocery shopping makes me feel safer because of the coronavirus pandemic; (2) by buying grocery products online, I avoid commuting and the hassle of shopping at peak times; and (3) by buying grocery products online, I save valuable time in my transactions, making quick and easy comparisons of prices and information about the various products.

Subjective Norms was measured by obtaining the respondents' level of agreement to the following three statements: (1) most people who are important to me and my family would appreciate the fact that I buy grocery products online; (2) most families that are important to my family buy grocery products online on a regular basis; and (3) generally, my wider environment expects me to buy grocery products online.

Three variables that represented respondents' opinions of the convenience of online grocery shopping as well as potential difficulties associated with it were used to gauge Perceived Behavioral Control. A 5-point Likert scale measured respondents' level of agreement to the following statements: (1) if I wanted to buy grocery products online, it would be an easy task for me; (2) it is easy to find all the grocery products I need online; and (3) I believe I have the money needed for delivery of the products.

Intention to OGS was measured by obtaining the respondent's response to the following two items: (1) the next time I will buy grocery products, it is very likely that I will do it online, and (2) I intend to start/continue buying grocery products online on a regular basis.

As objective measurement of behavior can be difficult (Fishbein & Ajzen, 2011), previous research mainly used subjective self-reported data, apart from assessment scales (Ajzen, 2019). In this context, researchers have used other subjective measures such as frequency data for doing a given behavior (Ajzen, 2019; Mirkarimi *et al.*, 2016), time spent engaging in a particular behavior (Ajzen, 2020; Prapavessis *et al.*, 2015), and simple binary assessments (use/non-use) (Lai & Chen, 2011; Tzeng *et al.*, 2022). In this study, behavior was measured by two items rep-

resenting respondents' actual behavior towards OGS: (1) have you ever purchased grocery products online (binary, yes or no), and (2) how often do you purchase grocery products online on a five-point Likert scale (frequency, 1 = never; 5 = very often).

Data analyses were conducted using the open-source statistics program JASP (version 0.17.2.1). JASP was used for descriptive analysis to find out the demographic characteristics of the sample. Cronbach's α was adopted to test the unidimensional internal consistency (reliability) of the measurement items scales (Attitude, Subjective Norms, Perceived Behavioral Control, Intention, and Behavior). Values of α above 0.60 are considered satisfactory (Field & Miles, 2009). Confirmatory factor analysis (CFA) fit indices e.g., Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA), were used to evaluate the goodness-of-fit of a specified model to the observed data, followed by using Structural Equation Modelling (SEM) to test the hypothesized relationships among study constructs. The SEM module in JASP is based on Yves Rosseel's R package lavaan (Rosseel, 2012).

Structural equation modelling is a powerful multivariate data analysis research technique that is widely used in many fields of study to verify complex phenomena (Kang & Ahn, 2021; Sentosa & Mat, 2012; Xia & Yang, 2019). It is the combination of factor analysis and multiple regression analysis and it is used to analyze structural relationships between measured variables (indicators) that can describe the corresponding factor (latent variables). In the case of the TPB model, latent variables are: Attitude towards the behavior, Subjective Norms, Perceived Behavioral Control, Intention and Behavior.

4. Results

4.1. Descriptive statistics

Table 1 displays sample averages for several demographic and household variables. A total of 364 questionnaires were finally collected, with 302 of the respondents indicating that they were the primary household grocery shopper, while

Table 1 - Survey sample demographics (n = 302).

Variable	Mean ± SD or Percentage
Age	41.71 ± 9.59
Gender	
Male	32.56
Female	67.44
Educational level	
Primary education	0.66
Secondary education	89.07
Tertiary education	10.27
Marital status	
Married	73.18
Not Married	19.87
Other	6.95
Occupation	
Private sector employee	36.75
Public sector employee	47.02
Other	16.23
Monthly income (€)	
Up to 1,000	8.94
1,001 – 2,000	24.50
2,001 – 3,000	29.47
3.001 – 4,000	22.51
More than 4,000	14.57

regional (district of residence) quotas were met. These 302 questionnaires were taken into consideration for further analysis, since when respondents answered "No" to the first question, whether they were the primary household grocery shopper, the interview was terminated. The respondents' median age was 41, which is in line with that of Cyprus population, viz., 37.7 (Eurostat, 2021). At 67.4%, women are dominating, which seems to be in accordance with various studies (Driediger & Bhatiasevi, 2019; Frank & Peschel, 2020; Jribi *et al*., 2020), implying that the grocery shopping is a task performed mainly by women.

4.2. Theory of Planned Behavior constructs measurements

Descriptive statistics of the questionnaire items used as measurement variables are shown in Table 2, including the mean values of Attitude, Subjective Norms, Perceived Behavioral Control, Intention, and Behavior constructs.

Table 2 - Descriptive statistics of the questionnaire items (latent variables).

Construct / Questionnaire item	Mean	Standard Deviation
Attitude		
AT1: Online grocery shopping makes me feel safer because of the coronavirus pandemic.	3.49	1.34
AT2: By buying grocery products online, I avoid commuting and the hassle of shopping at peak times.	2.98	1.26
AT3: By buying grocery products online, I save valuable time in my transactions, making quick and easy comparisons of prices and information about the various products.	3.63	1.22
Cronbach's α = 0.87		
Subjective Norms		
SN1: Most people who are important to me and my family would appreciate the fact that I buy grocery products online.	3.01	1.19
SN2: Most families that are important to my family buy grocery products online on a regular basis.	2.25	1.11
SN3: Generally, my wider environment expects me to buy grocery products online.	2.12	1.23
Cronbach's α = 0.82		
Perceived Behavioral Control		
PBC1: If I wanted to buy grocery products online, it would be an easy task for me.	3.98	1.14
PBC2: It is easy to find all the grocery products I need online.	3.13	1.19
PBC3: I believe I have the money needed for delivery of the products.	3.63	1.17
Cronbach's α = 0.64		
Intention to use		
ITU1: The next time I will buy grocery products, it is very likely that I will do it online.	2.57	1.24
ITU2: I intend to start/continue buying grocery products online on a regular basis.	2.65	1.36
Cronbach's α = 0.85		
Behavior		
BEH1: Have you ever bought grocery products online?	0.46	0.50
BEH2: How often do you buy grocery products online?	2.21	1.18
Cronbach's α = 0.62		

Our sample appears to have favorable attitude towards online grocery shopping (Mean >2.5). In terms of subjective norms, the social environment of the sample seems to be weakly supportive of online grocery shopping. Regarding perceived behavioral control, the sample does not appear to face any significant barrier to online grocery shopping and does not consider the cost of product delivery as being high. Similarly, the sample's intentions for online grocery shopping are supportive. Concerning the behavior of the sample towards the OGS nearly half of the participants (45.7%) indicated that they have made grocery purchases online. Of those, 24.17% have purchased fruits and vegetables, 21.52% dairy products, 44.7% canned food, and 23.84% frozen food. It is interesting to mention that none of the respondents has purchased meat products online. Moreover, the great majority of the respondents (75.75%) stated that they use the grocery store's website to purchase groceries online.

In addition to the theory-related information, respondents were asked several other questions (Table 3) in order to better understand Cypriot consumers' behavior towards online grocery shopping. In this sense, participants believe that additional information about products, such as expiry date, origin, and ingredients would increase their willingness to online grocery shopping. Furthermore, it is essential to have a daily picture, particularly for fresh products, so that consumers know what they are purchasing. Moreover, lower prices of products available online compared to the corresponding prices of

Table 3 - Other related questions towards OGS.

Questionnaire item	Mean	Standard Deviation
It is more likely to buy groceries online from services that are located in Cyprus than abroad	3.64	1.35
I would buy groceries online, provided that the delivery time was met	3.32	1.27
I would buy groceries online, provided that additional information was provided (e.g. expiry date, ingredients, country of origin)	3.54	1.30
I would buy groceries online, provided I had a daily picture of the products that are in the store (especially fresh produce)	3.67	1.29
I would buy groceries online, if accessing and using the respective website was an easy process for me	3.38	1.38
I would buy groceries online, if I was offered lower product prices compared to the corresponding product prices in retail stores	3.84	1.26
I would buy groceries online, if I found product offers	3.82	1.25
I would buy groceries online, if I felt there was security in the transaction	3.51	1.35
I would buy products online, which are not available in the local market	3.79	1.28
I would buy products online if there was a home delivery service in my area	3.57	1.33
I would buy products online knowing that there is a refund if you don't receive the correct product	3.87	1.29

products in the retail store, as well as offers on online products seem to influence consumers' decision to buy groceries online. In addition, home delivery time, as well as the ease of use of the website and transaction security appear to play an important role in online grocery shopping. Among the additional questions, getting a refund option in case consumers don't receive the right product ranked first.

4.3. *Structural equation modelling analysis*

We use structural equation modelling analysis to determine the relative contributions of Attitudes, Subjective Norms, and Perceived behavioral Control to the prediction of Intentions and the relative contributions of Intention and Perceived Behavioral Control to the prediction of Behavior.

As suggested by Anderson and Gerbing (1988), this study uses a two-step approach. Firstly, the reliability of the scales was tested and evaluated. Secondly the model was analyzed in order to test the structure and to evaluate the model's ability to predict a certain outcome.

Measurement Reliability and Validity

As mentioned in the Methodology part, Cronbach's alpha was calculated to evaluate the internal reliability of the questionnaire. The value of *a* was found to be 0.88 and thus exceeded the recommended threshold of 0.7, as suggested by Nunnally (1967).

Confirmatory Factor Analysis (CFA) has been administered in pursuance of testing the measurement model. The results of the CFA indicate that each item loaded on its respective underlying concept (Table 4). As recommended by Kang and Ahn (2021), the model fit indices also suggest that the measurement model was a good fit to the data (χ^2 = 152.48, df=55, p<0.001, Comparative Fit Index [CFI]=0.94, Tucker-Lewis Index [TLI]=0.92 Root Mean Square Error of Approximation [RMSEA] =0.08).

Testing of the Structural Equation Model

The SEM model (Figure 2) describes well our data as suggested the model fit statistics [(χ^2(302) =203.19, df=70, p<0.001); CFI=0.92; TLI=0.91; RMSEA=0.08]. Our model explains 45% of the variance in consumers' Intention

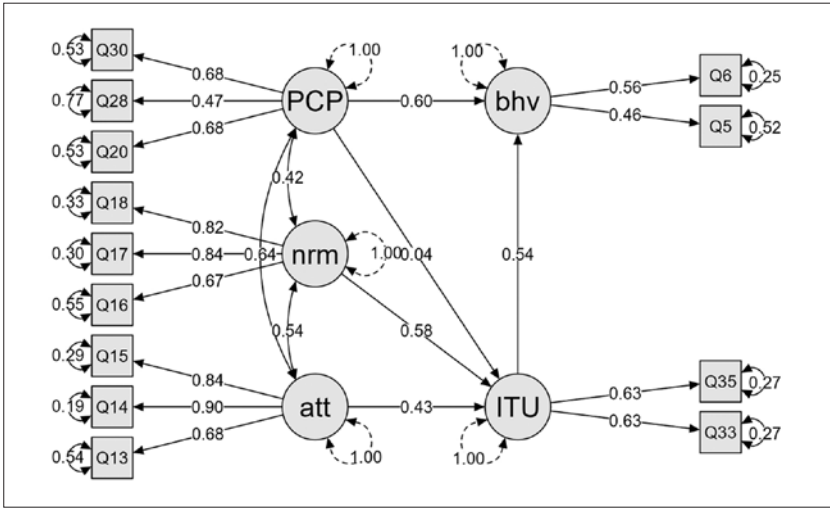Figure 2 - Path diagram of the TPB fitted to the raw latent variables.

5. Discussion

to OGS (R^2=0.45) and 56% of the variance in consumers' Behavior to OGS (R^2=0.56). This is expected, because as explained by Chandon *et al*. (2005), consumers' self-reported purchase intentions do not perfectly predict their future purchase behavior. Similarly, Sheeran (2002), noted that the gap between intentions and behavior is not negligible, as a meta-analysis indicated that on average, intentions explain 28% of the variance in future behavior. In addition, Sheppard *et al*. (1988), in a meta-analysis of 87 behavior studies found a frequency-weighted average of 0.53 with wide variations across measures of intentions and types of behavior. The regression coefficients and results of hypotheses tests are shown in Table 4.

Our data confirm that the TPB model is appropriate for examining the behavioral model of the Cypriot consumer in terms of online grocery shopping. Thus, the information collected through this model effectively describes the various aspects and perceptions of Cypriot consumers regarding online grocery shopping.

Cypriot consumers' Subjective Norms and Attitude towards OGS influence their Intentions to buy groceries online, but this is not the case for the Perceived Behavior Control. However, Perceived Behavioral Control affects their actual Behavior. Likewise, Behavioral Intentions to OGS are likely to translate into actual Behavior.

Table 4 - Parameter estimates for applying the TPB.

Path (hypothesis)	Path Coefficients	Std Error	$Pr(>|z|)$	Result of Hypothesis test
Attitude → Intention (H_1)	0.43	0.12	<0.001	Statistically significant
Subjective Norms → Intention (H_2)	0.58	0.10	<0.001	Statistically significant
Perceived Behavioral Control → Intention (H_3)	0.04	0.12	<0.77	Not statistically significant
Intention → Behavior (H_4)	0.54	0.10	<0.001	Statistically significant
Perceived Behavioral Control→ Behavior (H_5)	0.60	0.14	<0.001	Statistically significant

Fitting the TPB model to the survey data shows that Subjective Norms (β=0.58) have greater influence than Attitude (β=0.43) or Perceived Behavioral Control (β=0.04) on Intention to OGS. The results suggest that Attitude (z-value=3.471, p<0.001) and Subjective Norms (z-value 5.49, p<0.001) have a relatively strong and significant relationship and support H1 and H2, Intention for OGS.

Perceived Behavioral Control (β=0.04, p=0.77) shows insignificant effect on Intention and thus rejects H3. With R^2 = 0.45 the three variables Attitude, Subjective Norms, and Perceived Behavioral Control together account for 45.9% of the variance in Intention to online grocery shopping. Both Intention to online grocery shopping (β=0.54, p<0.001) and Perceived Behavioral Control influence OGS behavior (β=0.60, p<0.001) and have a significant effect on OGS; thus, supporting H4 and H5.

The results of this study also suggest that Perceived Behavioural Control carries more weight (β=0.60) than Intention (β=0.54), in explaining online grocery shopping behavior. This is in line with other studies (Blitstein *et al*., 2020; Driediger & Bhatiasevi, 2019), where the behavior is more likely to be affected by other functional factors such as the availability of resources (e.g., internet access) and access to services (e.g., delivery in remote areas). The significance of Perceived Behavioral Control as the construct with the largest effect on online grocery shopping behavior in the TPB model, confirms that people should feel in control of their ability to online grocery shopping. More specifically, similar to other studies findings, it should be easy to find all the grocery products that one needs online, it should be convenient for them to have access to online services for the purchase of grocery products, and finally, home delivery services should be affordable (Alaimo *et al*., 2022; Loketkrawee & Bhatiasevi, 2018; Rogus *et al*., 2020; Wang *et al*., 2023).

Furthermore, Attitude and Subjective Norms have direct influences on online grocery shopping Intention. Among these relationships, Subjective Norms indicates more importance than Attitude in determining behavioral intention to online grocery shopping. Similar to other empirical studies (Shih-Chih & Shing-Han, 2010), our research has shown that Subjective Norms have a positive and direct impact on Intention, compared to Attitude. In other words, the effect of "word-of-mouth" or "social pressure" have significant influence on shaping behavioral intention, which is in accordance with findings in a social media consumer related study (Elghannam & Mesias, 2019).

6. Conclusion

Online grocery shopping has grown in the past decade as a way to satisfy increased demand for convenience (Rogus *et al*., 2020) and the level of satisfaction (Alaimo *et al*., 2022) among consumers. Despite its fast growth rate in the past few years, primarily possibly due to Covid-19 pandemic related movement restrictions, online grocery shopping has ever gained little attention so far. It is notable that in Cyprus, the previous study on this topic occurred in 2006. This paper fills this research gap and opens a discussion about consumer behavior and online grocery shopping strategies. As reported earlier by Giannakopoulou *et al*. (2022), age and family income are key drivers of online grocery shopping. Decreasing age and increasing monthly family income were associated with an increased likelihood of online grocery shopping. Furthermore, our analysis enriches the literature on the consumers' profile characteristics of the adoption of online grocery shopping, especially in the Euro-Mediterranean region. This study provides new empirical evidence on the understanding of the determinants of online grocery shopping in Cyprus.

Big life changes (e.g., Covid-19 pandemic [Alaimo *et al*., 2022]) and transitions (e.g., caring for a sick relative or the birth of a child (Blitstein *et al*., 2020)), may trigger an initial adoption of a behavior (i.e., online grocery shopping), given the higher demand for social distancing, convenience and/or time-saving features. As noted by Goethals *et al*. (2012) and Frank and Peschel (2020), convenience and time saving aspects are also possible drivers for adopting online grocery shopping, especially for households with full-time employment and presence of young

children. Before the Covid-19 pandemic, only 7% of grocery retail sales worldwide involved e-commerce channels. During the peak of the pandemic (March-April 2020), the e-commerce share of grocery retail grew to 10%, while a recent study (Coppola, 2021), showed that the current share of global e-commerce penetration for online grocery shopping was valued at 9%. As suggested by Tyrväinen and Karjaluoto (2022), the managerial implications from such findings (e.g. perceived usefulness and attitude) can help retailers in improving their online grocery shopping services.

Another contribution of this research was the investigation of consumers' attitude towards online grocery shopping, the factors that enable online grocery shopping, behavioral intention and related social norms. As noted by Irianto (2015), attitude refers to "the extent to which an individual has good or bad evaluation or assessment on the concerned behavior". Results from Hansen (2008), showed that personal value affect consumers' attitude towards online grocery shopping. Our research has shown that Perceived Behavioral Control carries more weight than Intention in explaining online grocery shopping behavior, and that two antecedent constructs (Attitude and Subjective Norms) in TPB have direct influences on Intention for online grocery shopping.

One of the limitations of this study, as noted by several researchers, is that consumers' self-reported purchase intentions do not perfectly predict their future purchase behavior and the gap between intentions and behavior is not negligible (Sheeran, 2002). As suggested by Ajzen (1991), to improve behavioral predictions one should measure intentions after changes have occurred (e.g., follow-up research in the post-Covid era). This is a subject of a future research.

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