Research Paper

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Research on factors affecting consumer decision on purchasing organic agricultural products in Danang, Vietnam

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The study analyses the factors that influence consumer decisions on purchasing organic agricultural products in Danang. By synthesising previous research, the authors established Ordinal Logistic Regression (OLR) through survey questionnaires for 300 consumers in Danang in March 2019. The empirical model shows that there are eight factors, which have significant positive impacts on the consumer decisions to purchase organic agricultural products, including (i) the quality of products; (ii) trademarks, product labels; (iii) advertising, media, cultural factors; (iv) the understanding of the consumers about products of organic agriculture; (v) the convenience of the point of sale; (vi) income of consumers; (vii) psychological factors (attitudes, interests, taste, age, gender, etc.); (viii) the consumer's career. The research also found two factors negatively affecting consumer decision, including (i) the value-added tax for the import of organic agricultural products; (ii) the age of the consumer. Based on quantitative results, the study proposes recommendations to promote the purchase of organic agriculture products in Danang.

1. Introduction

Safety and quality are two of the most important issues for consumers when choosing food products, especially agricultural products. An abundance of agricultural products is currently offered on the market, many of which are products of unknown origin and production processes that are not controlled. Such products may harm the environment, may not meet food hygiene and safety standards, and may adversely affect consumers' health. Therefore, organic agricultural products are a necessary and timely next step in Vietnam's agricultural development to meet today's consumers' needs.

Eco-products are becoming more popular on the market and are more widely available to consumers. This market is predicted to grow further in the future, especially in Danang. Danang is one of the largest cities in Vietnam and thus faces numerous issues with city development. Food safety plays an essential role in modern life. More and more citizens are concerned about their health in connection to food purchases, especially agricultural foods. It is essential to research factors influencing decision-making for organic food in this city. Since consumers today have an increasing awareness of health and environmental protection, they realise that organic agricultural products (OAPs) bring ecological benefits and provide the body's nutrients. However, there is still a discrepancy between the purchase of organic agricultural products and the purchase of other conventional products, indicating that consumer behaviour does not reflect consumers' growing awareness.

According to the International Federation of Organic

Agricultural Movements (IFOAM), organic agriculture is a production system that sustains soil health, ecosystems and people. It relies on ecological processes, biodiversity, and cycles adapted to local conditions, rather than inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and to promote fair relationships and high quality of life for all involved. For this reason, organic products are also called natural foods or healthy foods.

2. Literature Review

2.1. Organic Product

Following United State Department of Agriculture (USDA) and monitored by the National Organic Program (NOP), Organic products are classified into four types depending on the percentage of contained organic components: (i) "100% organic"; (ii) "Organic" means the product contains more than 95% organic matter; (iii) "Made with organic ingredients" is a product with at least 70% organic matter; (iv) "Some organic ingredients" has less than 70% organic component.

Organic products are often called natural products due to the important role in maintaining a balanced ecosystem and protecting the health of microorganisms in the soil through cropping, processing, distribution and consumption (Lijuan, 2003). Strictly accredited organic products positively affect consumers' health by reducing the risk of poisoning, certain types of cancer or disease. Besides, without additives like unnatural components, artificial preservatives, pesticide residue, and growth stimulants, organic products are safe and nutritious. Moreover, organic agriculture reduces earth and water pollution since chemicals are prohibited (Mishra & Sharma, 2010).

Currently, the production of organic agricultural products in Vietnam have been deployed in the 33 provinces and cities across the country. The area of organic agriculture in 2016 had increased 3.6 times than in 2010 to approximately 77,000 ha. However, this is only a small fraction compared to the 50.9 million hectares of organic agriculture globally and the 11.53 million hectares of agriculture in Vietnam. Therefore, besides organic agricultural products of domestic origination, imported products also tend to increase to meet consumers' needs from Danang city.

2.2. Consumer Behaviour

Theories of consumer behaviour are central factors in establishing a reasonable model for purchase decisions of organic agricultural products. Fishbein and Ajzen (1967) indicated through the Theory of Reasoned Action (TRA) that intention is the most prominent motivation of behaviour. Behaviour is influenced by attitudes (positive or negative) and subjective norms or the awareness of the appropriate manner. Through this research, they proposed the Theory of Reasoned Action model:

In 1991, Ajzen continued completing the TRA and gave birth to the Theory of Planned Behaviour (TPB). He added a factor influencing the intention of consumers: Perceived Behavioural Control, which refers to people's perceptions of their ability to perform a given behaviour. The addition had contributed to complete the TRA, which became the most popular research theory to explain human behaviours (Ajzen, 1991).

Phillip Kotler (1967), with the research "Marketing management" pointed out that the consumers' decision took a 5-step process: (i) Problem recognition; (ii) Information search; (iii) Evaluations of alternatives; (iv) Purchase decision; (v) Post-purchase behaviour.

2.3. Framework of Research Model

The Ordinal Logistic Regression (OLR) model was constructed with a dependent variable Y and independent variables X_i to analyse the factors affecting Danang's consumer purchasing decisions of organic agricultural products. The dependent variable Y (the consumer decisions on purchasing organic agricultural products) is measured with a 5-levelled scale. Y is collected through the observed variables (items) Q1 and Q2 in the questionnaire. The Ordinal Logistic Regression model has accredited the influence of 12 independent variables affecting the decision of purchasing organic agricultural products.

In OLR model, the dependent variable Y is classified into 5 levels according to Likert: (1) Never; (2) Rarely; (3) Sometimes; (4) Often; (5) Always. If Pr is the pos-

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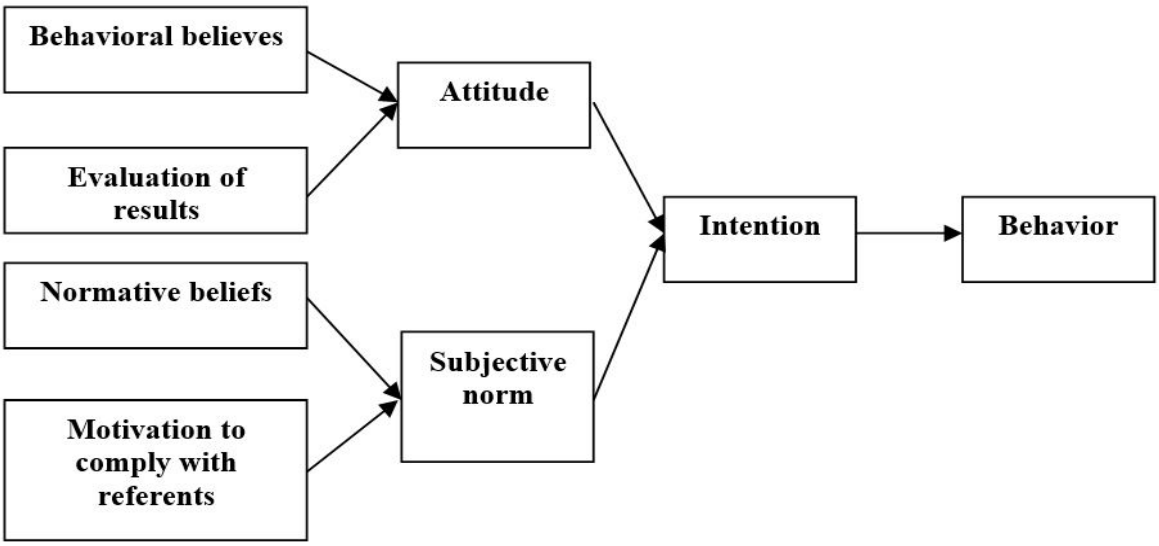

Figure 1. The Theory of Reasoned Action by Fishbein and Ajzen (1975)

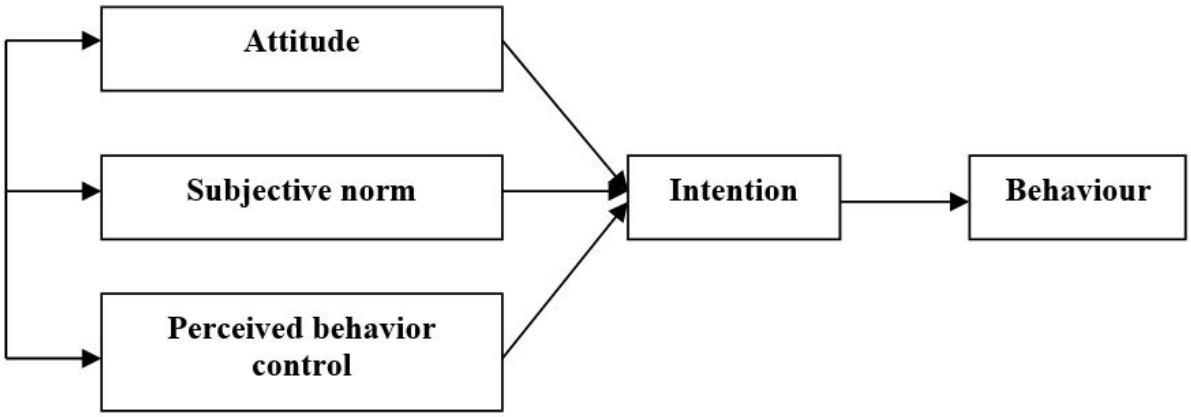

Figure 2. The Theory of Planned Behaviour by Ajzen (1991)

sibility of a specific variable, then Pr ($Y_i \leq j$) is the possibility that $Y_i \leq j$. The Odds coefficient is determined with the following formula:

$$\frac{\Pr(Y_i \leq j|X)}{\Pr(Y_i > j|X)} = \frac{\Pr(Y_i \leq j|X)}{1 - \Pr(Y_i \leq j|X)} \quad (1.1)$$

With $$\Pr(Y_i \leq j|X) = \sum_{m=1}^{j} \Pr(Y_i = m|X) \quad (1.2)$$

And we have the OLR model:

$$\ln\left[\frac{\Pr(Y_i \leq j)}{1 - \Pr(Y_i \leq j)}\right] = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \cdots + \alpha_{12} X_{12} + u_i$$

This model is called the Logistic distribution function. In this function, the model uses the Maximum Likelihood estimations method to estimate the coefficient α_i. The independent variables (from X_1 to X_{12}) are estimated through the items Q3 to Q36 using the Likert scale. The factors affecting the decision of consumers on purchasing the organic agricultural products in Danang are listed in the following sections.

Quality of the product (X_1): Quality is the way consumers perceive a product through quality indicators (Olson, 1977) as basic internal attributes (characteristics, shapes, dimensions) and external attributes (prices, brands, origin, point of sale).. Concepts of quality include several sensory features related to organic products, such as taste, experience and enjoy-

ment (Kulikovski & Agolli, 2010). According to the largest natural food supermarket in the United States, in 2014, WholeFoods conducted a consumer survey of other reasons for buying organic foods. They found that 32% believed that organic food tastes better than conventional counterparts, and 42% believed that organic food has a higher quality than non-organic products. However, in some studies, besides the strong correlation of the intention to buy organic food to the environment, health and safety, the regression results are not statistically disproving the correlation between factors. There are relationship between the quality and intention of buying organic foods at supermarkets and shops in Kluang district, Johor, Malaysia (Wee et al., 2014). The correlation between X_1 and Ln (Odds) is expected positive (+) and coefficient $\alpha_1 > 0$.

Brand and label on the product (X_2): Brand and label are also significant factors to consider when purchasing OAP. Products from famous brands are perceived as more trustworthy, and the label guarantees that the products are organic Hughner et al., 2007). The correlation between X_2 and Ln (Odds) is expected positive (+) and coefficient $\alpha_2 > 0$.

Knowledge about organic products (X_3): People will never buy products without awareness about them. This full awareness of OAPs is determined through certain aspects. Aspects include knowledge about the qualification and process to produce the products and information on its origin and main functions. Consumers need relevant information when deciding to buy products. According to Gracia et al. (2007) quoted by Kristýna Olivová (2011), "Product knowledge is an important factor because it is a way for consumers to distinguish organic foods from conventional foods and thereby form a positive attitude, awareness and quality related to products." Many studies have demonstrated that knowledge of organic foods positively affects consumer intent (Truong et al., 2012; Nguyen , 2011; Olivová, 2011). Therefore, it can be said that knowledge of organic foods positively influences the intention to consume organic foods. The correlation between X_3 and Ln (Odds) is expected positive (+) and coefficient $\alpha_3 > 0$.

Trend of consuming organic products (X_4): Nowadays, trends have become a key factor influencing consumers' mentality, also known as "herd mentality". The effect of trends on consumers' purchasing decision is measured with certain aspects such as people's awareness of the trend; whether the decision depending on trends; whether consumers chose the product regardless of their demand being met; and quality. In Asia, a few studies also highlight this emerging issue.

Shu et al. (2012) used open questionnaires on the attitude of organic food consumers living in Korea and showed that consumers have a positive attitude towards organic food. Interviewees believe that organic food improves health, and they can eat it without fear because organic food is safe for the human body. Research by Ueasangkomsate & Santiteerakul (2016) on attitudes and intentions of organic food consumption in Thailand through 316 questionnaires using random sampling method to find the relationship between food safety and intentions Buy organic food for sustainable development. Hwang (2016) collected data from elderly consumers using online survey methods, and participants of 222 university employees at a university in Midwest, USA, which confirmed the relationship between food safety and the intention to buy organic food. In contrast, a study by Michaelidou & Hassan (2008) that surveyed consumers in supermarkets and retail shops in Scotland concluded that the interest for food safety and hygiene did not directly affect consumers' intention to buy organic products.

Most studies explain the intention to buy organic foods, confirming the main driving force to be food safety. The correlation between X_4 and Ln (Odds) is expected positive (+) and coefficient $\alpha_4 > 0$.

Marketing and advertisement (X_5): This factor directly impacts the consumers' knowledge about OAPs as advertisement provides complete and positive information. Mass media works because it has the potential to spread information quickly. DeFleur et al. (1998) claim that no one can deny the influence of media in changing human behaviour and perceptions. With skilful marketing strategies, advertisements always catch one's interests and create demand for the products. The correlation between X_5 and Ln (Odds) is expected positive (+) and coefficient $\alpha_5 > 0$.

Cultural factors (X_6): Culture is a spiritual value which is deeply rooted in society and is interconnect-

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ed to every thought and behaviour of individuals. The effects of cultural factors are evaluated by how the culture and awareness of protecting the environment also impact the purchasing decision. Environmental factors, such as soil pollution, the use of artificial fertilisers in agriculture, and herbicides and pesticides in agriculture, have been recognised to negatively impact the environment and human health (Suh et al., 2012).

Thai consumers intend to buy organic food, but the level (1.2% is not high enough to encourage companies to invest this industry , a study conducted with more than 300 questionnaires identified five factors of strong attitude. There is a strong correlation with the intention to buy organic foods and environmental concerns preceded by issues of food health and safety (Ueasangkomsate & Santiteerakul, 2016b). Another study investigated the intent-behaviour gap of Malaysian organic food consumers based on TPB behavioural theory and the 5-step decision-making process with 288 questionnaires collected (ratio 96%). They discovered that the intention to buy organic food was affected by perceived food safety, health, environment and animal welfare (Wee et al., 2014). The correlation between X_6 and Ln (Odds) is expected positive (+) and coefficient $\alpha_6 > 0$.

Psychological factors (X_7): Psychology is emphasised as one of the most important factors. It subjectively directs people's point of view. Subjective standards have been shown to positively influence intention and thereby affecting behaviour (Ajzen, 1991). The subjective standard is the pressure that society places on each person when considering whether to perform a behaviour. Other studies have also confirmed there are positive effects between the subjective standard and the intention to buy organic foods (Nguyen , 2011; Effendi et al., 2002; Suh, 2009; Olivová, 2011; Mingyan Yang, 2014). The influence of psychological factors is evaluated with aspects such as consumers' emotion; interests; family and friends' advice; belief in quality and usefulness of the product, and trends. The correlation between X_7 and Ln (Odds) is expected positive (+) and coefficient $\alpha_7 > 0$.

Rate of value-added tax (VAT) on organic agricultural products (X_8): Tax is a government's tool to adjust the macroeconomy, it directly affects the demand-supply of OAPs in the market (Lohr, 2001). For example, VAT will increase OAPs' price in the market, which influences the supply, thus affecting the demand, specifically the consumer purchase decisions of OAP. The correlation between X_8 and Ln (Odds) is expected negative (-) and coefficient $\alpha_8 < 0$.

Price (X_9): Organic agricultural products' prices are usually higher than other products. It is clear that high cost is a reason why consumers choose not to purchase organic agricultural products. Some studies in North America show that consumers are willing to pay a high price for organic products. Buzby & Skees (1994), found that the majority of respondents were willing to pay more to buy grapefruit with low pesticide residue, and about 5% of consumers said they were even willing to pay double the price for a safer grapefruit. Research by Padel et al. (2005) dealt with organic products, mainly vegetables and fruits in the UK. After surveying 181 consumers, they found that price is a barrier but not an absolute barrier, and instead, it is a factor that complicates the buying decision process. They think that consumers consider price to be a problem when buying, but they also perceive it as "any money" (Kulikovski & Agolli, 2010). The influence of price is determined by customers' consideration about OAP prices; an expectation of a reduction in the price of the OAP; the OAP's price stability. The correlation between X_9 and Ln (Odds) is expected negatively (-) and coefficient $\alpha_9 < 0$.

Retail outlets location (X_{10}): This factor affects the cost and time to buy the OAP. The factor is judged by convenience while shopping and spending time to buy the product. Dettmann & Dimitri (2007) explain that supermarkets have noticed the rapid growth of organic products and have included them in their distribution systems. The presence of organic food in supermarket chains and retail stores has increased the accessibility of products to consumers. Yes, organic food is not present continuously; no goods are a major barrier to consumers' purchase intentions. The correlation between X_{10} and Ln (Odds) is expected positively (+) and coefficient $\alpha_{10} > 0$.

Consumers' income (X_{11}): Income directly influences the consumers' ability to afford the OAP and fulfils the consumer demand. While the intention is the prerequisite, the buying ability for a product is the sufficient condition (Jim, 2008). The correlation between

X_{11} and Ln (Odds) is expected positively (+) and coefficient $\alpha_{11} > 0$.

The government's policies (X_{12}): The government has many macro tools to affect the macro and micro economy (Hughner et al, 2007). The correlation between X_{12} and Ln (Odds) is expected positively (+) and coefficient $\alpha_{12} > 0$.

3. Methodology

3.1. Object of research

- The theories about the main factors that affect the purchasing decisions of consumers for organic agricultural products in Danang.
- To estimate regression factors that affect the purchasing decisions of consumers for organic agricultural products in Danang from the OLR models.
- To draw recommendation and propose significant recommendations and solutions to support consumers, who have more knowledge of the organic agricultural products and come to exact decisions in choosing OAPs.

3.2 Subjects and scope of the study

Subjects: Analysis of the factors affecting consumer decisions to purchase organic agricultural products in Danang.

Scope of the study: Consumers that purchase and sell organic agricultural products in large supermarkets of all large districts, such as Hai Chau, Thanh Khe, Son Tra, Lien Chieu, Cam Le, Ngu Hanh Son district in Danang.

The study carries out the estimate, regression, and statistically significant tests for the number of factors impacting the customer decisions on purchasing organic agricultural products in Danang. After that, there are some possible recommendation and solutions are proposed from patterns and findings.

3.2. Research method

In implementing this study, the authors have used qualitative research methods such as dialectical materialism, historical materialism associated with the method of analysis, comparison, synthesis and chemical systems. Specifically, the research bases on the investigation method, a random survey by questionnaire investigation that the research team built, and using the software SPSS20 to analyse, estimate the multivariate regression model and Ordinal Logistic Regression method maximum matching, prediction and statistical hypothesis testing relevant to the model.

The researching method was based on a randomised survey method of 300 consumers who consume organic agricultural products. Through the questionnaire, scientific working groups built and used SPSS20 software to analyse and estimate a regression model and test the statistical hypothesis relevant to the model. The steps of quantitative analysis process include (1) Rudimentary accreditation by the Cronbach's Alpha reliability estimate; (2) the Exploratory Factor Analysis (EFA); (3) Ordinal Logistic Regression Analysis.

3.3. Data of research

The rudimentary research process was done with a quantitative method, including the theoretical model's research, the questionnaires and measure scale for 34 items based on Likert 5-levelled scale. After having modified and completed the questionnaire and experimented on ten consumers, the questionnaire was officially completed.

The authors suggest 34 items according to Likert 5-levelled scale and 4 qualitative questions. The study sample size was 300 (n = 300). Total surveys handed out were 310; the total surveys received was 300. The sample is representative and random for consumers in large districts of Danang, such as Hai Chau, Thanh Khe, Son Tra, Lien Chieu, Ngu Hanh Son, and Cam Le district.

4. Analysis and Results

4.1. Measure scale description and descriptive statistics of the study sample

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Table 1. Measure scale and Descriptive statistics

Group	Question	Scale	Valid percentage	Mean	Standard deviation
Organic products consuming status (Y)	Q1: Purchase and consume imported organic agricultural products	1-Never 2-Rarely 3-Sometimes 4-Often 5-Always	1- 23% 2- 35% 3-24% 4-17% 5- 3%	2.88	1.129
	Q2: Purchase and consume domestic organic agricultural products		1- 11% 2- 25% 3-24% 4-27% 5- 15%	3.33	0.996
Organic products' quality (X1)	Q3: OAP is hygiene and food safety.	1-Never 2-Rarely 3-Sometimes 4-Often 5-Always	1- 8% 2- 20% 3-24% 4-32% 5- 18%	3.93	1.022
	Q4: Quality of OAP meets consumers' demand		1- 04% 2- 22% 3-24% 4-30% 5- 22%	3.89	0.942
	Q5: Believe that the OAPs have been accredited		1- 07% 2- 19% 3- 24% 4-27% 5- 25%	3.85	0.962
Brand, label on the organic product (X2)	Q6: Take into account the brand name and label when purchasing decision.	1-Never 2-Rarely 3-Sometimes 4-Often 5-Always	1- 04% 2- 22% 3-24% 4-30% 5- 22%	3.55	1.064

Continue Table 1. Measure scale and Descriptive statistics

Group	Question	Scale	Valid percentage	Mean	Standard deviation
Brand, label on the organic product (X2)					
	Q7: Trust in the brand and label on the OAPs.		1- 04% 2- 22% 3-24% 4-30% 5- 22%	3.78	0.977
	Q8: The more famous brand, the more influence the OAPs has on the purchasing decisions.		1- 8% 2- 20% 3-24% 4-32% 5- 18%	3.82	1.011
Knowledge about organic products (X3)	Q9: Knowledge about standards and the process of OAPs cropping.	1-Very little 2-Little 3-Average 4-A lot 5-Very much	1- 11% 2- 25% 3-24% 4-27% 5- 15%	3.13	1.074
	Q10: Knowledge about origin of OAPs		1- 11% 2- 25% 3-24% 4-27% 5- 15%	3.13	0.988
	Q11: Knowledge about the functions of the OAPs.		1- 8% 2- 20% 3-24% 4-32% 5- 18%	3.82	1.041
Trend in consuming organic products (X4)	Q12: Awareness of the OAP trend in the market.	1-Never 2-Rarely 3-Sometimes 4-Often 5-Always	1- 11% 2- 25% 3-24% 4-27% 5- 15%	3.08	0.986

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Continue Table 1. Measure scale and Descriptive statistics

Group	Question	Scale	Valid percentage	Mean	Standard deviation
Trend in consuming organic products (X4)		1-Never 2-Rarely 3-Sometimes 4-Often 5-Always			
	Q13: Choose the OAPs depending on trends in the market.		1- 11% 2- 25% 3-24% 4-27% 5- 15%	3.02	1.112
	Q14: Choose the OAPs depending on trends although they do not fulfil consumers' demand.		1- 23% 2- 35% 3-24% 4-17% 5- 3%	2.68	1.333
Advertisement about the products (X5)	Q15: Choose the OAPs because of the advertisement.	1-Never 2-Rarely 3-Sometimes 4-Often 5-Always	1- 04% 2- 22% 3-24% 4-30% 5- 22%	3.17	1.154
	Q16: Believe in the advertisement about the OAPs.		1- 23% 2- 35% 3-24% 4-17% 5- 3%	2.78	1.242
	Q17: The products fulfil the demand as advertised.		1- 23% 2- 35% 3-24% 4-17% 5- 3%	2.74	1.199
	Q18: Aware of the OAPs due to friends and family.		1- 8% 2- 20% 3-24% 4-32% 5- 18%	3.32	1.543

Continue Table 1. Measure scale and Descriptive statistics

Group	Question	Scale	Valid percentage	Mean	Standard deviation
Advertisement about the products (X5)		1-Never			
	Q19: Sales' advice when shopping.	2-Rarely 3-Sometimes 4-Often 5-Always	1- 8% 2- 20% 3-24% 4-32% 5- 18%	3.35	0.982
	Q20: Aware of the OAPs due to studying and research.		1- 23% 2- 35% 3-24% 4-17% 5- 3%	2.78	1.156
Traditional factors (X6)	Q21: Choose the OAPs because of the traditional factors.	1-Never 2-Rarely 3-Sometimes 4-Often 5-Always		2.64	1.300
	Q22: Choose the OAPs due to environmental protection.			3.58	1.231
Psychological factors (X7)	Q23: Make the purchasing decisions due to feelings and interest.	1-Never 2-Rarely 3-Sometimes 4-Often 5-Always		3.49	1.225
	Q24: Make the purchasing decisions due to advices of family and friends.			3.48	1.223
	Q25: Make the purchasing decisions due to belief in quality and functions of the OAPs.			3.53	1.313
	Q26: Make the purchasing decisions due to trends in the society.			3.01	1.100
VAT rate on the organic products (X8)	Q27: VAT rate on the OAPs affecting the purchasing decisions.	1-Never 2-Rarely 3-Sometimes 4-Often 5-Always		3.54	1.57

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Continue Table 1. Measure scale and Descriptive statistics

Group	Question	Scale	Valid percentage	Mean	Standard deviation
VAT rate on the organic products (X8)					
	Q28: Expected VAT rate on the OAPs.	0% 2% 5% 10% 12%		1.307%	1.935
Prices of organic products (X9)	Q29: Consider the prices when choosing the OAPs.	1-Never 2-Rarely 3-Sometimes 4-Often 5-Always		3.74	1.088
	Q30: Expect a reduction in the price of the OAPs.			4.02	1.133
	Q31: The products' price shifts.			3.34	0.991
Retail outlets location (X10)	Q33: Take too much time to buy the products.	1-Never 2-Rarely 3-Sometimes 4-Often 5-Always		2.95	0.942
Income of the consumers (X11)	Q35: How much percentage of income spent on OAPs?	1-Very little 2-Little 3-Average 4-A lot 5-Very much		3.02	1.102
Government policies (X12)	Q36: Choosing the OAPs due to Government policies?	1-Never 2-Rarely 3-Sometimes 4-Often 5-Always		3.66	1.214

Source: Data collected form the SSPS 20 software

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4.2. Accredit the scale's reliability by Cronbach's Alpha reliability estimate

The Cronbach's Alpha reliability estimate is used to accredit the reliability of the items groups following independent variables in order to analyse the Exploratory Factor Analysis (EFA). Cronbach's Alpha reliability estimate is calculated and measured by the following scale:

So, the coefficient of Cronbach's Alpha was close to and greater than 0.6 level. There were 31 items with a coefficient of correlation greater than 0.3 level. The items with a coefficient of correlation less than 0.3 were temporary eliminated such as Q18, Q20, Q26, and Q31. Therefore, all 12 factors were evaluated to be reliable and useable. This is the precondition to analyse the Exploratory Factor Analysis (EFA) to group the items into general and significant factors affecting the organic products purchasing decision of consumers in Danang.

4.3. Analyse the Exploratory Factor Analysis (EFA)

Based on the Cronbach's Alpha results, reliability estimate and observable reliability with a coefficient of correlation less than 0.3 level were eliminated. The following 22 items were used to analyse main factors: Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q21, Q22, Q23, Q24, Q25, Q29, Q30.

Table 2. The Cronbach's Alpha reliability estimate

Order	Variables	Questions	Cronbach's Alpha	Evaluation
1	**(X1)**	Q3, Q4, Q5	0.74	Useful
2	**(X2)**	Q6, Q7, Q8	0.715	Useful
3	**(X3)**	Q9, Q10, Q11	0.689	Useful
4	**(X4)**	Q12, Q13, Q14	0.594	Useful
5	**(X5)**	Q15, Q16, Q17, Q18, Q19, Q20	0.691	Useful
6	**(X6)**	Q21	1	Useful
7	**(X7)**	Q23, Q24, Q25, Q26	0.762	Useful
8	**(X8)**	Q27	1	Useful
9	**(X9)**	Q29, Q30, Q31	0.669	Useful
10	**(X10)**	Q33	1	Useful
11	**(X11)**	Q35	1	Useful
12	**(X12)**	Q36	1	Useful

Source: Data collected through surveys in March 2019

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- Factors analysis in round 1: with KMO = 0.81 and 4 items are eliminated due to disqualification: Q8, Q11, Q12 and Q15.
- Factors analysis in round 2: with KMO = 0.799 and 2 items are eliminated due to disqualification: Q14 and Q22.
- Factors analysis in round 3: with KMO = 0.772 and all items are qualified, and 16 items (observable variables) are divided into 5-factor groups:

Through analysis, it is implied:

Firstly, Factor Loading, or the relationship of each variable to the underlying factor, is a very important coefficient that assures the EFA level of significance. With 300 observations, the factor loading should be greater than 0.55. Secondly, KMO (Kaiser-Meyer-Olkin) value is a factor used to consider how suited the data is for Factor Analysis; the KMO value should be no larger than 1 but no less than 0.5. The result shows that the KMO value is 0.722, which means the EFA analysis is suitable for observable variables. Thirdly, the Bartlett Test. H0: All population variances are equal to 0. H1: At least two are different. Due to the Chi-square which resulted in 1597.062, Sig = 0.000, the conclusion is that the observable reliability is related to each other.

Following Appendix A, the Average Variance Extracted is 67.122% (>50%), which means the five groups of factors explain 67.122% of the data changes; so that the scales are acceptable. The eigenvalue of the fifth group is 1.056 (≥ 1) and indicates that the changes explained by each factor are acceptable. The Rotated Component Matrix (Appendix B) suggests that among 22 items used to analyse the Exploratory Factor Analysis (EFA), six variables are eliminated (Q8, Q11, Q12, Q14, Q15 and Q22) due to factor loading values of less than 0.55. Therefore, the 16 qualified items divided into five groups that explain 67.122% of the changes of data are as follows:

- FT1 includes: Q3, Q4, Q5, Q7 explains 25.943% of the changes in data.
- FT2 includes: Q13, Q16, Q17, Q21 explains 14.421% of the changes in data.
- FT3 includes: Q6, Q23, Q24, Q25 explains 12.816% of the changes in data.
- FT4 includes: Q9, Q10 explains 7.34% of the changes in data.
- FT5 includes: Q29 and Q30, explains 6.602% of the changes in data.

4.4. Ordinal Logistic Regression (OLR)

Model 1 used the Ordinal Logistic Regression between the dependent variable Q1 (imported organic agricultural products purchasing decision of the consumers) and the following independent variables: FT_1, FT_2, FT_3, FT4, FT_5, Q_{27}, Q_{33}, Q_{35}, Q_{36}, Age, Gender, Work, Number. The Age variable is the variable that describes the age of consumers in 5 levels: Age= 1 means consumers are less than 30 years old; Age= 2 means consumers are less than 40 but older than 30 years old; Age= 3 means consumers are less than 50 but older than 40 years old; Age= 4 means consumers are less than 60 but older than 50 years old; Age= 5 means consumers are older than 60 years old.

Gender is the sex of the consumers with 2 levels: Gender= 1 means the consumer is male; Gender= 0 means the consumer is female. Meanwhile, work is the occupation of the consumers with 4 levels: Work= 1 means that the consumer is an officer; Work= 2 means that the consumer is staff such as accountant, sales, engineer and architect; Work= 3 means that the consumer is freelancer; Work= 4 means that the consumer is student and stay home mom. The number variable is the number of people in the consumers' family.

Table 3. KMO coefficient and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**Sig.**
Bartlett's Test of Sphericity	Approx. Chi-Square	1597.062
	Df	120
	Sig.	0.000

Source: Data collected from SPSS20 software

Firstly, Table 4 shows the final model had a 0.00 significance and a -2 Log-likelihood of 531.103 and a large Chi-square value. The H0 is denied at 1%. Therefore, the interaction between factors and Ln (Odds) exists.

Secondly, the model is suited with the data collected due to the Goodness-of-Fit (Deviance) value of 1.000 and Chi-square value of 515.453, considerably large (Table 5).

Thirdly, Model 1 indicates that the independent variables can explain most of the dependent variable changes (Q1). The Pseudo R-Square of Nagelkerke value of 0.72 means that 72% of the changes of Q1 are explained by the main factors. The Pseudo R-Square of McFadden was 0.384 and shows this is a good model (Appendix C).

Finally, OLR shows that the model is statistically significant with a 0.069 significance value of Q2 at the fourth scale (often), and there are differences in the purchasing decision between the level of Q2. Model 1, which implements the regression with Q1 and independent variables FT1, FT2, FT3, FT4, Age, Work, Q35 affects Ln (Odds) positively. However, Model 2 was not as good as Model 1 due to the smaller R2 value and factors such as Q27 (VAT), FT5 (factors related to price), Q33 (convenience in buying the product), Gender, and Number that do not have any effect on Ln (Odds).

5. Discussion and Recommendations

Based on the survey results of 300 samples and the Ordinal Logistic Regression analysis results, it is clear that the factors that influence the purchase decisions of consumers for organic agricultural products in Danang are statistically significant. These findings suggest it is necessary to enhance management and ensure the quality of organic agricultural products

Table 4. Model Fitting Information

Model	**-2 Log Likelihood**	**Chi-Square**	**Df**	**Sig.**
Intercept Only	877.147			
Final	531.103	346.044	89	.000

Source: Data collected from SPSS20 software

Table 5. Goodness of Fit

	Chi-Square	Chi-Square	Df	Sig.
Pearson	1307.656	895		.000
Deviance	515.453	895	89	1.000

Source: Data collected from SPSS20 software

Table 6. Pseudo R-Square

Cox and Snell	.684
Nagelkerke	.720
McFadden	.384

Source: Data collected from SPSS20 software

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supplied in Danang. Additionally, based on the coefficient of FT1 factor and items Q3, Q4, Q5 and Q7, recommendations should aim to some possible solutions that include coordinating closely to manage, inspect and overlook the OAPs bought in the local supermarkets of Danang by the market management Department of the local Administration, the Health Ministry and the Consumer Rights Protection Association. It has to guarantee and observe the announcement of national standards for such OAPs which were promulgated and came into force on 29 December 2017. Next, the General Customs Department and the Border Management Department should enhance to control and enforce the quality of imported OAPs.

Manufacturers and the OAP Manufacturers Association should be encouraged to commit and undertake organic products' quality with consumers. Agricultural affair department support technology for farmers related to Grow organic vegetable, fruit

Marketing and communication for the usefulness of OAPs in the media and educational programs should be supported. This recommendation is supported by the significant influence of both coefficients of factors FT2 and items Q13, Q16, Q17, Q21. Notably, the introduction of process and manufacturing system of OAPs in the local media and internet network would help in purchase-buying behaviour. In addition, it is necessary to encourage the advertisement for new products in the media and public areas and to communicate the OAPs knowledge of people. One opportunity would be educational programs for students in school and universities could accelerate the distribution of knowledge on organic foods' production and consumption. So, it is significant to improve awareness and shape the culture of fresh organic agricultural products to reflect production and consumption behaviours that protect the natural environment. Various communication instruments such as banners, slogans, and drawings must be applied through public campaigns for educational organisations, student clubs, television advertising, and large social networking sites (i.e., Facebook, Zalo). It is vital to use the media to advertise knowledge, standards and production processes, the effect and usefulness of the product for individuals, and social issues such as protecting the ecological environment. When consumers are fully aware of the benefits of organic agricultural products, they are likelier to change consumer habits and approach organic agriculture products because they recognise their value. Promoting OAPs' supply and demand makes the market more vibrant, expands production, and serves as the basis for the expansion of exports and the development of the national economy. The State should further encourage households without access to organic products to self-cultivate organic agricultural products at home and benefit from the surrounding soil resources. The fact remains that the current price of organic agricultural products is too high. Thus, it is essential to innovate the process and technology of current productions for organic agricultural products.

Public policy-making should promote a brand and label development for organic agriculture products. Based on the coefficient of factors FT3 and items Q6, Q23, Q24, Q25 in the OLR model, specific recommendations are suggested that for public policies to encourage the protection and development of big brands and labels of OAPs through strengthening the efficiency of legal regulations, supporting quality of human resources, prioritising access to credit funds, and stimulating farmers and producers to carry out projects of R&D about the rise of pests and disease resistance organisms, organic fertiliser, biological plant protection and botanical medicine. There are policies and regulations used to encourage the development of theoretical foundations which promotes more sustainable organic agricultural production. It is also useful to establish key organic agricultural products or input caters for organic production, which are implemented by priority policies in encouraging public and private investment in the field of agricultural production and rural development in Danang and northern provinces.

Besides, it is important to enhance the anti-phenomenon of counterfeit goods, counterfeit trademark, infringement of the rights of industrial property on trademarks, and labels to build the confidence of consumers for products of organic agriculture originated in the country. The State should strengthen the communication of the usefulness of organic agricultural products for personal health, eco-environment and sustainable development through the various channels including relatives, friends, colleagues, and neighbourhoods which could expand these distribu-

tion channels, and build and maintain the trust of consumers.

Moreover, it is essential to reform the value-added tax system for organic agricultural products. From our statistical analysis the items Q27 and Q28, the authors can be seen in the framework of the sample with 300 customers, the value of Q28 showed 98,4 % of consumers desire the VAT rate to be lower than 10%, particularly 40.7% of consumers (0% VAT rate), 13.3% consumers (1% VAT rate), 27.7% consumers (the VAT rate of 2%), 5.3% consumers (the VAT rate of 3%), 2.0 % consumers (the VAT rate of 4%), 9.3% consumers (the VAT rate of 5%). VAT policy is a macro-economic tool which manages the critical socioeconomic part of the government and is also a factor with vital influence on production-consumption. A reasonable VAT policy can create economic incentives to promote the production, marketing and consumption of organic agricultural products. So, it is necessary to carry out a policy of tax incentives through reduction of VAT rates in order to encourage investment in the production and consumption of OAPs, in particular, to propose a reduction of the VAT rate on OAPs from 5% to 2%.

This solution encourages the production and consumption of products and reduces the pressure on prices and removes the high price of organic food, which is a current access barrier to OAPs. Simultaneously, reducing or exempting the VAT rate for services and material inputs to manufacture OAPs, such as organic fertilisers, biological fertilisers, and organic microbiological preparations of plant protection can reduce manufacturing costs and product costs. Lower costs can create better conditions and increase consumer demand. In addition to the VAT, a corporate income tax policy which affects the benefits of producers and investors in the field of organic agriculture should also be reformed through a tax base and tax rate following to calculate tax for business activities related to this field and reduce import tax for material input such as: land rent fee, natural components Specifically, the State may apply a rate deduction for the type of corporate income tax in the short term, or accompanied by certain conditions for private organisations specialised in the production of organic agriculture.

Lastly, it is significant to improve consumers' understanding of organic agricultural products. Related to factors FT4 and items Q9, Q10, the authors also support the development of mass media communication to expand the consumer awareness in the field of national and international standards of OAPs, the process of OAPs cropping and origin of OAPs. Producers should enhance the ability to carry out consultancy activities on the nature and benefits of OAPs at the point of sale of organic agricultural products, such as supermarket systems in Hai Chau, Thanh Khe, Son Tra districts, and also implement measures for advertisements, leaflets, customer conferences, agriculture exhibitions to provide useful information about the manufacturing process and consumer benefits of organic agricultural products.

5.5 Conclusion

The research has achieved the target that finds eight significant factors positively affecting consumer decisions on purchasing organic agricultural products in Danang. Based on articles and research papers, this study has established a theoretical model of 12 factors with 36 items impacting consumer decisions on purchasing organic agricultural products. It has used a multivariable regression model of Ordinal Logistic Regression on 300 survey samples and identified eight major factors which have statistically significant effects, including (i) the quality of products; (ii) trademarks, product labels; (iii) advertising, media, cultural factors; (iv) the understanding of the consumers about products of organic agriculture; (v) the convenience of the point of sale; (vi) income of consumers; (vii) psychological factors (attitudes, interests, taste, age, gender, etc.); (viii) the consumer's career. Besides, the research also found two factors negatively affecting consumer decision: (i) the value-added tax for the import of organic agricultural products; (ii) the age of the consumer. In addition, the study proposes recommendations based on four coefficient factors and their relationship to various items derived from the results of the model. However, the regression model should continue to be studied to explain and detect new influencing factors.

Limitation: This study only focuses on Danang city, and therefore future research should expand into other regions of Vietnam.

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Conflict interest

The authors declare no conflict of interest. Besides, the funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, and in the decision to publish the results.

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APPENDIX

Appendix A. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.151	25.943	25.943	4.151	25.943	25.943	2.489	15.555	15.555
2	2.307	14.421	40.364	2.307	14.412	40.364	2.446	15.287	30.843
3	2.051	12.816	53.180	2.051	12.816	53.180	2.418	15.112	45.955
4	1.174	7.340	60.521	1.174	7.340	60.521	1.846	11.537	57.492
5	1.056	6.602	67.122	1.056	6.602	67.122	1.541	9.631	67.122
6	1.774	4.480	71.962						
7	1.704	4.402	76.364						
8	1.577	3.603	79.967						
9	1.559	3.491	83.459						
10	1.493	3.082	86.541						
11	1.473	2.959	89.500						
12	1.390	2.440	91.939						
13	1.368	2.299	94.238						
14	1.339	2.121	96.359						
15	1.303	1.896	98.256						
16	1.279	1.744	100.000						

Source: Date collected from SPSS20 software

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Appendix B. Rotated Component Matrix

	Component				
	1	2	3	4	5
Q3	.745				
Q4	.828				
Q5	.765				
Q6			.633		
Q7	.666				
Q8					
Q9					
Q10				.876	
Q13		.619		.808	
Q16		.705			
Q17		.790			
Q23			.668		
Q24			.662		
Q25			.744		
Q29					.728
Q30					.830
Q21		.769			

Source: Date collected from SPSS20 software

Appendix C. Parameter Estimates

	Estimate	Std. Error	Wald	Df	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
[Q1 = 1]	.346	3.542	.010	1	.922	-6.596	7.289
[Q1 = 2]	3.309	3.546	.871	1	.351	-3.642	10.260
[Q1 = 3]	6.431	3.571	3.244	1	.072	-.567	13.430
[Q1 = 4]	9.332	3.588	6.765	1	.009	2.300	16.363
[FT1=1.50]	.816	2.483	.108	1	.742	-4.051	5.684
[FT1=2.00]	-3.076	2.013	2.336	1	.126	-7.021	.869
[FT1=2.25]	-1.300	1.585	.673	1	.412	-4.407	1.807
[FT1=2.50]	.017	1.027	.000	1	.987	-1.996	2.030
[FT1=2.75]	-634	1.077	.346	1	.556	-2.745	1.478
[FT1=3.00]	177	1.039	.029	1	.865	-1.859	2.212
[FT1=3.25]	-578	.956	.365	1	.546	-2.452	1.296
[FT1=3.50]	033	1.043	.001	1	.975	-2.012	2.077
[FT1=3.75]	2.184	.953	5.252	1	.022	.316	4.051
[FT1=4.00]	3.604	.998	13.033	1	.000	1.647	5.560
[FT1=4.25]	1.254	.907	1.911	1	.167	-.524	3.032
[FT1=4.50]	2.283	.925	6.088	1	.014	.470	4.097
[FT1=4.75]	2.302	.918	6.291	1	.012	.503	4.100
[FT1=5.00]	0a	.	.	0	.	.	.

Continue Appendix C. Parameter Estimates

	Estimate	Std. Error	Wald	Df	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
[FT2=1.00]	5.975	3.691	2.621	1	.105	-.1.259	13.209
[FT2=1.25]	2.569	2.106	1.488	1	.222	-1.558	6.697
[FT2=1.50]	2.929	2.228	1.728	1	.189	-1.437	7.295
[FT2=2.00]	1.239	2.042	.368	1	.544	-2.764	5.241
[FT2=2.25]	2.610	1.888	1.911	1	.167	-1.091	6.311
[FT2=2.50]	3.731	1.912	3.808	1	-051	-.016	7.478
[FT2=2.75]	4.032	1.933	4.352	1	-037	-244	7.819
[FT2=3.00]	3.401	1.912	3.163	1	-075	-.347	7.149
[FT2=3.25]	2.089	1.916	1.189	1	.276	-1666	5.843
[FT2=3.50]	2.652	1.855	2.043	1	.153	-.985	6.288
[FT2=3.75]	1.397	1.956	.510	1	.475	-2.437	5.230
[FT2=4.00]	2.266	2.026	1.251	1	.263	-1.704	6.237
[FT2=4.25]	-146	2.165	.005	1	.946	-4.388	4.097
[FT2=4.50]	3.532	1.923	3.372	1	.066	-.238	7.302
[FT2=4.75]	.744	4.190	.034	1	.853	-7.438	8.987
[FT2=5.00]	0a	.	.	0	.	.	.
[FT3=1.25]	10.887	2.340	21.640	1	.000	6.300	15.473
[FT3=1.75]	4.430	1.565	8.010	1	.005	1.362	7.498
[FT3=2.00]	3.823	1.344	8.092	1	.004	1.189	6.458
[FT3=2.25]	2.986	1.092	7.470	1	.006	.845	5.127
[FT3=2.50]	4.265	1.131	14.226	1	.000	2.049	6.481
[FT3=2.67]	-15.246	.000	.	1	.	-15.246	-15.246
[FT3=2.75]	4.423	1.036	18.223	1	.000	2.392	6.454
[FT3=3.00]	3.517	1.011	12.114	1	.001	1.537	5.498
[FT3=3.25]	4.172	1.012	17.001	1	.000	2.189	6.155
[FT3=3.50]	1.882	1.020	3.404	1	.065	-.117	3.881
[FT3=3.75]	3.068	1.077	8.122	1	.004	.958	5.178
[FT3=4.00]	2.873	1.120	6.576	1	0.10	.677	5.068
[FT3=4.25]	2.298	.971	5.598	1	.018	.394	4.202
[FT3=4.50]	793	.987	.646	1	.421	-1.141	2.278
[FT3=4.67]	0a	.	.	0	.	.	.
[FT3=4.75]	957	.985	.944	1	.331	-.973	2.887
[FT3=5.00]	0a	.	.	0	.	.	.
[FT4=1.00]	-2.445	1.629	2.252	1	.133	-5.639	.748
[FT4=1.50]	-3.735	2.666	1.962	1	.161	-8961	1.491
[FT4=2.00]	-3.229	1.054	9.391	1	.002	-5.294	-1.164
[FT4=2.50]	-2.308	.966	5.372	1	.020	-4.260	-356
[FT4=3.00]	-1.700	.967	3.091	1	.079	-3.596	.195
[FT4=3.50]	-1.125	1.044	1.161	1	.281	-3.172	.921
[FT4=4.00]	-.227	1.054	.046	1	.830	-2.293	1.839
FT4=4.50]	-1.662	1.074	2.394	1	.122	-3.767	.443
[FT4=5.00]	0a	.	.	0	.	.	.

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Continue Appendix C. Parameter Estimates

	Estimate	Std. Error	Wald	Df	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
[FT5=1.50]	1.270	1.581	.646	1	.422	-1.828	4.369
[FT5=2.00]	1.121	.874	1.644	1	.200	-.593	2.835
[FT5=2.50]	.166	.741	.050	1	.822	-1.287	1.620
[FT5=3.00]	-.927	.638	2.111	1	.146	-2.178	.324
[FT5=3.50]	-.649	.673	.929	1	.335	-1.969	.671
[FT5=4.00]	.230	.593	.151	1	.698	-.933	1.394
[FT5=4.50]	.076	.574	.018	1	.895	-1.049	1.202
[FT5=5.00]	0a	.	.	0	.	.	.
[Q27=1]	-1.231	.718	2.939	1	.086	-2.639	.176
[Q27=2]	-.738	.540	1.869	1	.172	-1.795	.320
[Q27=3]	-.1450	.521	7.750	1	.005	-2.471	-429
[Q27=4]	-.273	.531	.261	1	.067	-1.313	.768
[Q27=5]	0a	.	.	0	.	.	.
[Q36=1]	.555	.793	.489	1	.484	-1.000	2.109
[Q36=2]	.070	.567	.015	1	.902	-1.042	1.181
[Q36=3]	-.254	.496	.263	1	.608	-1.226	.718
[Q36=4]	.431	.527	.670	1	.413	-.601	1.464
[Q36=5]	0a	.	.	0	.	.	.
[Gender=0]	-.156	.360	.189	1	.664	-.862	.549
[Gender=1]	0a	.	.	0	.	.	.
[Age=1]	-3.610	1.282	7.931	1	.005	-6.123	-1.098
[Age=2]	-1.756	1.285	1.868	1	.172	-4.275	.762
[Age=3]	-2.645	1.366	3.747	1	.053	-5.323	.033
[Age=4]	-2.131	1.279	2.776	1	.096	-4.639	.376
[Age=5]	0a	.	.	0	.	.	.
[Work=1]	2.720	.624	18.990	1	.000	1.496	3.943
[Work=2]	2.599	.526	24.457	1	.000	1.569	3.630
[Work=3]	3.893	.791	24.210	1	.000	2.342	5.443
[Work=4]	0a	.	.	0	.	.	.
[Number=1]	-.277	2.998	.099	1	.926	-6.153	5.599
[Number=2]	-1.572	2.501	.395	1	.530	-6475	3.330
[Number=3]	-.333	2.439	.019	1	.892	-5.133	4.448
[Number=4]	-.400	2.405	.028	1	.868	-5.133	4.313
[Number=5]	-.278	2.425	.013	1	.909	-5.032	4.476
[Number=6]	.736	2.434	.091	1	.762	--4.034	5.506
[Number=7]	1.677	3.499	.236	1	.627	-5.083	8.436
[Number=8]	0a	.	.	0	.	.	.
[Q35=1]	.056	.828	.005	1	.946	-1.568	1.680
[Q35=2]	.011	.587	.000	1	.985	-1.139	1.161

Continue Appendix C. Parameter Estimates

	Estimate	Std. Error	Wald	Df	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
[Q35=3]	1.629	.526	9.577	1	.002	.579	2.661
[Q35=4]	.432	.553	.611	1	.434	-.651	1.516
[Q35=5]	0a	.	.	0	.	.	.
[Q33=1]	1.181	.882	1.791	1	.181	-.549	2.910
[Q33=2]	1.677	.627	7.159	1	.007	.449	2906
[Q33=3]	1.779	.635	7.858	1	.005	.535	3.023
[Q33=4]	.979	.674	2.108	1	.146	-.342	2.301
[Q33=5]	0a	.	.	0	0	.	

Source: Data collected from SPSS20 software

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