The Impact of Origin and Safety Attributes on Vietnamese Consumers' Preferences for Organic Oranges: A Choice Experiment Approach

Nhat Bach Ho
An Giang University, Vietnam National University, Ho Chi Minh City, Vietnam.
*Dut Van Vo**
School of Economics, Can Tho University, Vietnam.

Abstract

𝕿he objective of the research is to examine the effects of product attributes on consumers' willingness to pay (WTP) for organic oranges in the Mekong Delta and estimate the consumers' WTP for each attribute. The study used survey data from 413 households in the Mekong Delta from March 2022 to July 2022. The choice experiment method (CE) was employed to analyze consumers' willingness to pay. The results show that the factors that positively influence consumers' level of WTP for organic oranges include organic material, the label of organic certification, product traceability, eco-label, and quality grade. In addition, the price has a negative influence on consumers' WTP. Besides, consumers prefer imported fruits over domestically grown fruits. By leveraging the discrete choice theory and the stimulus-organism-response (SOR) model, the study developed a theoretical model about the effects of product attributes on consumers' WTP for organic oranges in a transition economy. Additionally, our study also affirms that the SOR model serves as a useful structure to describe the process that leads to the final purchase decision. In the case of organic fruit buying behavior, the research focuses on how different stimuli, such as price and quality attributes, affect the activation and cognitive processes in the "black box" of consumers and ultimately lead to a particular product choice.

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* **Corresponding author**: Email: vvdut@ctu.edu.vn

1. Introduction

Consumers have become increasingly skeptical about their food choices due to frequent food scandals. Public opinion often reflects people's concerns regarding product quality and health safety. As a result, there has been a recent surge in consumer interest in organic food, which is seen as a clean, safe product produced in accordance with organic standards. Vietnamese consumers, like those around the world, consider organic products to be superior in terms of safety, taste, nutrition, and environmental values when compared to conventionally grown products. The rise of the middle and upper classes in Vietnam is creating a strong push for the organic product consumption market. This emerging consumer trend cannot be denied and is becoming a part of Vietnamese people's consumption patterns. Organic agricultural products are becoming more prevalent in Vietnamese cuisine, and the demand for organic vegetables, in particular, is on the rise. In addition, organic agriculture in Vietnam is on the rise. The total area of organic agricultural land in Vietnam in 2022 is about 174,351 hectares (an increase of 47% compared to 2016); organizations and individuals participating in organic agricultural production and business are increasingly numerous, with about 17,174 organic agricultural production units and about 555 processing units; export turnover reaches about 335 million USD/year, an increase of more than 418% in the annual export value of organic products in the period 2010-2016 with rapid growth in both scale and output as well as value and variety of organic products (Thuy et al. 2023). It is for these reasons that Vietnam has become a potential market for organic products. Nonetheless, there are several obstacles to purchasing organic products, including their high prices, a lack of market information, and distrust in product quality (Hai et al., 2013), thus the organic food market in Vietnam is presently quite small and fragmented, largely driven by consumer demand for organic products. As such, consumer preferences and behavior have a significant impact on the future of organic agricultural production in the country. Therefore, it is crucial to examine the preferences and consumption patterns of consumers regarding organic products.

Research on preferences, as well as WTP for organic food, has attracted the attention of many scholars around the world in the current period, most commonly studying in Europe (Denver et al., 2019; Kokthi et al., 2021; Mazzocchi et al., 2019), next in the Americas (Cai et al., 2019; Maples et al., 2018; Smith et al., 2021), and even in African countries (Adams et al., 2018) and Asia (Bhattarai, 2019; Wang et al., 2019). In general, behavioral models analyzed by the expressed preference method based on the random utility theory (RUT) that are widely applied and cited in the current period have provided an overview of the purchasing decision-making process through choice behavior, as well as WTP for organic products. Empirical studies have shown that modern behavioral research models have better predictive capabilities and are widely applied in many empirical studies in various organic commodity groups such as organic fruits (Kokthi et al., 2021; Cai et al., 2019; Wang et al., 2019), organic vegetables (Adams et al., 2018; Nandi et al., 2017; Jin et al., 2017), organic meat (Hempel & Hamm, 2016), organic eggs (Kvakkestad et al., 2018; Gerini et al., 2016), seafood (Nguyen et al., 2015), and processed foods/beverages (Smith et al., 2021; Denver et al., 2019; Kvakkestad et al., 2018). Studies using CE are based on the theoretical foundations of discrete choice theory (DCT) and RUT with two main statistical estimation methods: (1) the conditional logit model (CL) (Smith et al., 2021; Skreli et al., 2017; Meas et al., 2015; Rousseau & Vranken, 2013) and (2) the mixed logit model (MXL) or random parameter logit (RPL) (Cai et al., 2019; Mazzocchi et al., 2019; Maples et al., 2018; Kvakkestad et al., 2018;

Jin et al., 2017; Hempel & Hamm, 2016). In addition, some studies apply CE with the latent class analysis (LCA) model to segment product markets organically (Denver et al., 2019; Skreli et al., 2017; Nguyen et al., 2015). However, research on WTP for organic products in Vietnam's emerging economy, especially in the Mekong Delta, is limited. Most of the scholars focus on studying the behavioral intention to buy organic food based on theoretical models of cognitive approaches such as the theory of reasoned action (TRA) or theory of planned behavior (TPB), as well as the use of multiple linear regression (MLR) (e.g., Van Nguyen, 2023; Khoi & Van Tuan, 2022; Pham, 2020) or structural equation modeling (SEM) (e.g., Mai, 2023; Le & Nguyen, 2022; Linh & Minh, 2022; Nguyen & Truong, 2021; Nguyen et al., 2021; Thuy et al., 2021; Nguyen et al., 2019; Tuyet et al., 2019) to test theoretical models and analyze influencing factors. SEM is a suitable structural equation model to analyze the causal and complex relationships between individual structures. The advantage of SEM is that it allows many dependent and independent variables in the model. This makes SEM a preferred method for quantitative testing of theoretical models, but SEM is only suitable for analyzing the influence of factors on WTP, not the amount of WTP expressed numerically (monetary value). Therefore, it is difficult for SEM to calculate a specific price for each product attribute. Most notably for new products that are ready to hit the market. Meanwhile, CE not only allows testing of research hypotheses but is also used to estimate WTP for each organic attribute of a product as well as determine the average price that consumers are willing to pay (Hempel & Hamm, 2016), which is an important indicator to assess customer demand. Therefore, if the focus of the study is on the WTP level (specific amount), auction or CE would be more suitable methods (Eichhorn & Meixner, 2020). For the above reasons, we use the CE to evaluate the impact of organic product attributes on WTP, as well as determine specific prices for each scenario of the product that consumers are willing to pay.

This study is expected to contribute to consumer behavior literature in twofold. First, the study adds empirical evidence as well as confirms the rationality of DCT. This study aims to comprehensively understand consumer behavior in Vietnam by taking into account all available consumption options and evaluating each alternative. Consumers are expected to maximize their benefits when making choices based on expected outcomes. The study will provide new insights into how origin and food safety attributes affect Vietnamese consumer preferences and will serve as a platform for future research in customer behavior literature. Second, the study leverages the two theoretical frameworks of DCT and the SOR model of Kotler et al. (2020) to better analyze the value of the attributes and consider them a stimulating factor affecting consumer behavior, as well as the expected benefits that consumers evaluate in the DCT. In doing so, we test the models throughout using the unique experiment dataset in the Mekong Delta. Our empirical results boost empirical evidence to shed light on the effects of organic food attributes on customer preferences when explaining customer behavior in an emerging economy country.

Both academic and practical aspects show that studying the above issue for all organic products in the entire market in a country is an ambition that is difficult to achieve. For that reason, studying consumer behavior for a typical product group, such as organic fruit, may be more feasible and appropriate from both academic and practical perspectives. The study chose organic oranges for three reasons. First, oranges are a suitable product to produce and develop strongly with the available resources of Vietnam, especially in the Mekong Delta region. Second, in recent years, oranges are one of the fruit trees that play an important role in the group of perennial trees and have had "hot" growth; both acreage, productivity, and output have increased sharply in Vietnam. Third, practice shows that oranges are a fairly familiar fruit product sold in supermarkets,

markets, and fruit shops, as well as a popular imported fruit in the Vietnamese market that is favored by consumers.

2. Theoretical Framework and Hypotheses

2.1 Willingness to pay

The willingness of a person to engage in a particular behavior is shown by their behavioral intention. Its foundations lie in behavioral control, attitudes, and subjective norms. Prior intentions can be used to predict a behavior, such as WTP (Icek, 1991). In a general way, WTP is part of customers' behavioral intentions (Zeithaml et al., 1996). The idea of WTP has many distinct applications. Davcik & Sharma (2015) claimed that WTP is a concept that assesses a person's perception of a brand's value and quality because higher prices reflect higher value and better quality, or, to put it another way, the ability to pay more for a specific brand or product compared to other competing brands or products (Netemeyer et al., 2004). WTP is measured in the amount or percentage of extra money paid for a product with superior features compared to the normal price. Therefore, WTP is evaluated as a metric, measuring the demand for new products compared to conventional products (Krystallis et al., 2006; Krystallis & Chryssohoidis, 2005). With the above role, WTP is commonly used in research on consumer behavior and demand for products with environmentally friendly features or good health properties (Krystallis et al., 2006).

2.2. Discrete Choice Theory

Through a review of studies, most of the studies evaluating WTP use DCT theory based on the theory of consumer behavior of Lancasters (1966) and the random utility theory (RUT) of Thurstone (1927). The theory of Lancasters (1966) also known as the theory of multi-attribute utility, argues that utility derives from the quality of the product provided rather than the quantity of the product consumed, as assumed in classical microeconomics. Human behavior is rational, and people will choose products based on the principle of maximizing utility. According to Train, (2003), RUT states that individual consumer utility consists of two parts: observable and unobservable. The observable and measurable portion of the consumer's evaluation of the product's attributes (V). The unobservable part is random and depends on the individual's preferences (ε). According to RUT, a decision-maker (n) is faced with a choice among (j) alternatives. The decision-maker will receive a certain level of utility from each alternative. The utility function (U_{nj}) of an individual n when consuming product j can be sketched as the following equation (1):

$$U_{nj} = V_{nj} + \varepsilon_{nj} \tag{1}$$

Researchers often assume that the observed portion of utility (V) is linearly related to the level of product characteristics (Train, 2009). The linear equation for utility can be written as:

$$V_{nj} = \text{ASC} + \beta_1 Z_1 + \beta_2 Z_2 + \beta_3 Z_3 + \ldots + \beta_k Z_k \tag{2}$$

Where k is the order of attributes. The β coefficient can be positive or negative due to each product's attributes and assessment based on each individual's subjective preferences. The Alternative Specific Constant (ASC) is the utility from the j option, which is the utility that is not determined by the attributes.

DCT is highly regarded because it inherits theoretical foundations suitable for individual decision-making, is easy to apply in many fields, and has proven to be highly predictive. DCT has advantages such as implicit pricing for product attributes, welfare impact for various scenarios, and measurement of customer needs. Therefore, DCT is widely applied in the fields of business and marketing, such as predicting behavior, market demand, identifying potential markets, and designing optimal products. According to DCT, studies assume that a consumer will indicate that he or she will purchase a presented product if and only if the utility derived from its purchase is greater than the utility obtained from another alternative product, or they won't buy it. Therefore, studying the organic properties of fruit is very important in determining consumer purchasing preferences and determining WTP.

2.3. Stimulus-Organism-Response model of consumer behavior

The SOR model is a structural model of consumer behavior, described by Kotler et al. (2020). The SOR model describes the association between inputs (stimulus), processes (organism), and outputs (response). The observable variables are stimulus and response, while the unobservable are what happens inside the subject or so-called "consumer black box" (Hempel & Hamm, 2016).

Figure 1: SOR Model Adopted from Kotler et al. (2020)
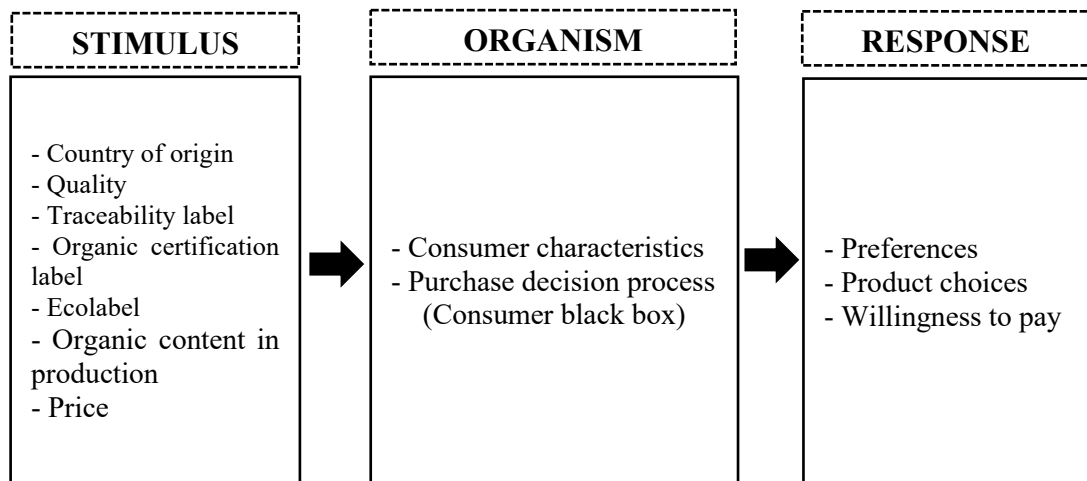
Source: Adopted from Kotler et al. (2020)

According to the SOR model (Figure 1), the formation of consumer behavior goes through three stages: internal and external stimulus, psychological activity, and consumer response. First, stimuli are organic fruit attributes used to differentiate products in CE. Second, socio-economic environmental factors such as socio-demographic factors or consumer characteristics can influence the decision of each individual to participate in the study. Third, the feedback is reflected in the purchase decisions of CE. The choices in the test reveal the product alternatives preferred by consumers and the price they would pay for them (Hempel & Hamm, 2016).

2.4. Research hypothesis

This study analyzes consumer preferences and estimates the WTP for organic oranges for the attributes of product quality, country of origin, traceability, organic labeling, eco-labeling, organic content in products, and price through research hypotheses.

2.4.1. Product quality affects willingness to pay

Studies have proven that organic product attributes related to product quality, such as palatability, taste, appearance, nutrition, color, packaging, and size, are the main factors that create the usable value of organic products. In general, the results of studies show that taste (product palatability) strongly influences consumer preferences (Cai et al., 2019; Kokthi et al., 2021; Smith et al., 2021). Consumers' WTP a premium price for organic products is related to freshness (Owusu & Anifori, 2013; Gerini et al., 2016; Wang et al., 2019; Kokthi et al., 2021), product appearance being more appealing (Gerini et al., 2016; Wang et al., 2019), or product quality indicators influencing purchasing decisions more (Mazzocchi et al., 2019).

Research on the basis of shape, color, freshness, juiciness, gloss, taste, intensity, and fruit size to divide different product quality classes. Quality value is the consumer's assessment of the excellence or superiority of a product, which is related to the degree of utility that the consumer seeks (Sweeney & Soutar, 2001). Based on the above arguments, the author proposes the following hypothesis:

Hypothesis 1. Quality grade has a positive effect on consumers' WTP for organic oranges.

2.4.2. Origin affects willingness to pay

Origin is becoming an urgent requirement for goods, especially agricultural products and food. Many countries require goods to demonstrate not only the place of final processing but also the entire process from fishing, growing, and breeding to harvesting, preliminary processing, and transportation in a transparent manner. In fact, on the market, there are still products of unknown origin, even counterfeited ones, that cause confusion for consumers. This not only creates a risk to consumers' health but also causes a loss of consumer confidence.

Most studies show that when consuming organic food, consumers prefer and are willing to pay premium prices for locally sourced organic products than for products originating from other regions or imported (Cai et al., 2019; Denver et al., 2019; Smith et al., 2021). This could be explained by geographical proximity having greater implications for consumers. Product value can be increased in production by highlighting geographical features in the marketing of organic products (Denver et al., 2019). A well-known region of origin for a product is also a very important quality indicator when consumers choose to purchase organic products (Wang et al., 2010; Skreli et al., 2017). In addition, the traditional origin of the region-specific varieties also positively affects WTP (Dinis et al., 2011). Some studies show that origin is a signal related to food quality and safety. Therefore, consumers are willing to pay premium prices for products of clear origin (Cai et al., 2019; Smith et al., 2021). Consumers not only prefer to consume domestically produced products to stimulate the development of local producers, but they also take into account negative external influences in the transportation process that can influence their consumption decisions (Rousseau & Vranken, 2013). Products produced close to home are better quality, safe, and transparent (Hempel & Hamm, 2016). This can be understood as the further away geographically, the more consumers perceive risks in the product supply chain, such as damage in transportation, storage, and sales. It is from the above argument that the following hypothesis is proposed:

Hypothesis 2. Domestically produced organic oranges positively affect consumers' WTP.

The above empirical studies clearly show that the attribute of origin has a significant influence on the WTP of organic food consumers. However, how to convey that origin information to consumers is another matter. Research results by Loureiro and

Umberger (2007) confirmed the importance of traceability labeling when considering the relationship between consumer preferences and WTP. Traceability is a signal related to food quality and safety (Loureiro & Umberger, 2007). Traceability labels allow consumers to easily obtain information directly upstream from the final product to the place of origin. Implementing traceability will help consumers learn information about products through each stage of the production, processing, and distribution process. Increasing product origin information contributes to creating confidence for consumers. Based on that, consumers will feel more secure as well as have a more positive attitude towards choosing and consuming products. Based on the above arguments, the study proposes the following hypothesis:

Hypothesis 3. Traceability labels positively affect consumers' WTP for organic oranges.

2.4.3. Organic content affects willingness to pay

The study aims to find out the preferences of Mekong Delta consumers for fruits that are 100% organic or just organic, as well as estimate the specific WTP for each percent of organic content in the product. Depending on the organic content in the production process, the expert organizations grant the relevant organic product label accordingly. This study designed organic levels according to United States Department of Agriculture (USDA) standards into a CE to make it easier for consumers to perceive and choose. Of the many organic certifications, the USDA's is the most reliable one, with the most stringent requirements for ingredients. Accordingly, the USDA (2022) strictly regulates the use of logos and words on products, specifically as follows: "100% organic" means that the product is made from 100% certified organic ingredients. Labeling a product "organic" means that it is at least 95% made from certified organic ingredients. Of course, the remaining ingredients will be tested to ensure safety for users. "Made from organic products" means that the product has at least 70% certified organic ingredients.

Research predicts that an increase in the organic content of products, or in other words, a decrease in the content of banned substances in the organic production process, will increase consumer choice. Some studies have proven that the reason why consumers look to organic products is because of the perception that the use of pesticides or chemicals that ensure production standards according to organic methods will avoid adverse effects on health. Health or knowledge of pesticide/chemical residues in products also positively affects WTP (Adams et al., 2018; Kvakkestad et al., 2018; Bhattarai, 2019; Cai et al., 2019; Denver et al., 2019). Based on the above arguments, the author proposes the following hypothesis:

Hypothesis 4. The organic content in the product positively affects consumers' WTP for organic oranges.

2.4.4. Organic certification affects willingness to pay

Some empirical studies show that consumers are especially interested in these certifications. Some research and focus consider the appearance of organic certification labels on products as one of the important factors that consumers are interested in buying organic products. That is, products that have been recognized by reputable expert organizations to meet organic standards will increase consumer confidence, preference, and WTP (Akgüngör et al., 2010; Mazzocchi et al., 2019; Wang et al., 2019). Based on the above arguments, the author proposes the following hypothesis:

Hypothesis 5. Organic certification has a positive effect on consumers' WTP for organic oranges.

2.4.5. Ecolabel affects willingness to pay

Some studies show that integrated pest management programs and biodiversity conservation activities to reduce adverse environmental impacts have a positive impact on awareness and WTP for organic products (Mazzocchi et al., 2019; Smith et al., 2021). Environmental concerns are an important reason for buying organic products. Consumers believe that conventional production methods with the use of pesticides and chemicals are harmful to the surrounding environment, and they desire healthier and more natural foods grown in an eco-friendly manner (Kvakkestad et al., 2018; Maples et al., 2018). The role of ecolabel certification (the manufacturer's product certification as an environmentally friendly product) has a positive influence on the WTP of organic products (Jin et al., 2017). Based on the above arguments, the study proposes the following hypothesis:

Hypothesis 6. Ecolabel has a positive effect on consumers' WTP for organic oranges.

2.4.6. Price affects willingness to pay

Price sacrifice is most related to consumers' perceptions of value (Zeithaml, 1988). Price is a factor that influences consumers when purchasing a product. Consumers often care about the price of the product they buy. They will have difficulty in deciding to choose a product if the price is too high. Many empirical studies applying CE consider price as an important variable to determine the WTP for product attributes. Studies have confirmed that an increase in price is an important reason for reducing the probability that WTP or price negatively affects consumers' WTP for organic products (Bhattarai, 2019; Mazzocchi et al., 2019; Wang et al., 2019). Therefore, the expected sign is negative, meaning that the higher the price, the lower the consumer's WTP.

Hypothesis 7. Price has a negative effect on consumers' WTP for organic oranges.

3. Research Methodology

3.1. Sample

The stratified sampling method was used based on two criteria: average monthly income per capita and total retail sales of goods and consumer service revenue at current prices of the region to ensure representativeness of the research sample. The current situation shows that the organic agricultural product consumption market in Vietnam is mainly concentrated in large cities, through modern sales channels, serving a small market share of middle- and high-end customers (Communist Party of Vietnam, 2022). According to the General Statistics Office (2021a), the average monthly income per capita of people in the Mekong Delta region of Vietnam (including 13 provinces/cities) in 2020 was about 4 million VND on average. In addition, An Giang, Kien Giang, Dong Thap provinces, and Can Tho City are the four provinces/cities with the highest total retail sales of goods and consumer service revenue at current prices compared to other provinces and cities in the Mekong Delta region (General Statistics Office, 2021b). For that reason, Can Tho city and Kien Giang province were selected from the high-income group, while An Giang and Dong Thap provinces represent the lower-than-average income group of the Mekong Delta region. The study conducted a survey by direct interview technique of 440 households in four provinces/cities. Each area selected 110 households in the center of the cities to survey.

The study conducted a survey using face-to-face interview techniques through questionnaires (CE) for 440 individuals who regularly make decisions to buy food for their families (excluding individuals who buy food for other purposes, such as business).

These individuals are living in the central areas of the selected cities: Ninh Kieu and Binh Thuy districts (Can Tho city), Rach Gia city (Kien Giang province), Long Xuyen city (An Giang province), and Cao Lanh city (Dong Thap province). Data was collected from March to July 2022. The information collected includes basic household information, household fruit consumption status, health risk awareness, environmental risk awareness, and questions related to the CE model- organic orange choice behavior. The data collection process was carried out in 3 steps:

Step 1: Contact specialized officers and local officers in each region to grasp the situation and select survey locations corresponding to each city. Finally, the author will directly contact the selected local officers to grasp the field, determine, and register the survey schedule.

Step 2: Conduct a pilot interview with 171 households in the Mekong Delta. In particular, pay attention to the suitability of the proposed prices and product attributes in the model to serve as a basis for proposing selection scenarios in CE. Adjust the questionnaire to suit reality.

Step 3: Conduct formal interviews based on location and sample size of households with percentage of households in each area. The interviewers are selected and trained properly. With the support of introduction and guidance from specialized staff and local staff, interviewers approach respondents by going to households in densely populated areas and conducting direct interviews with respondents after screening for suitability and voluntary participation. Each direct interview with households lasts about 30 minutes. Each respondent participating in the CE will receive a respondent incentive of 100,000 VND. Interviewers will collect basic demographic information and respondents' awareness of health and environmental issues. The important role of the interviewer is to clearly introduce food safety issues, benefits of organic fruits, and the concept of organic orange product attributes as well as choice scenarios in CE. From there, it creates favorable conditions for respondents to easily perceive and express their preferences through their choices.

The data, after filtering out invalid and incomplete answer sheets, collected 413 valid responses, representing a response rate of 93.86%. The sample is differentiated according to some demographic characteristics, which are detailed in Table 1.

Table 1: Socio-Demographic Characteristics of the Sample

No	Demographic characteristics	Frequency	% of total	Mean	Standard deviation	Min.	Max.
1	**Gender**						
	Male	82	19.85				
	Female	331	80.15				
2	**Education**						
	High school and below	84	20.34				
	Above high school	329	79.66				
3	**Career**						
	Officer	63	15.25				
	Private company	48	11.62				
	Housewife	142	34.38				
	Business	89	21.55				
	Retirement	5	1.21				
	Other	66	15.98				
4	**Marital status**						
	Single	93	22.52				
	Married	320	77.48				
5	**Age** (The age of the respondent)			39.06	10.29	21	56

No	Demographic characteristics	Frequency	% of total	Mean	Standard deviation	Min.	Max.
6	**Family size** (Total number of members living in the household)			4.46	1.67	1	16
7	**Dependent people** (Number of members under 16 years old and over 60 years old living in the household)			1.22	1.3	0	7
8	**Income** (million VND/month) (Total monthly income of all household members)			23.17	16.17	8	100

Source: Compiled from survey data

3.2. Choice Experiment Design

The results of bibliometric analysis of published studies using VOSviewer software (qualitative research) show a close relationship between product quality, health and environmental issues, food safety, certification, labeling, origin, price, consumer characteristics, and WTP for organic food (Nhat & Dut, 2023a). The study is based on an overview of existing empirical studies combined with in-depth interviews with 15 experts in the field of organic production and business to identify attributes and levels (Louviere et al., 2000).

Therefore, in the choice experiment, the study used seven attributes: country of origin, product quality class, traceability, organic certification, ecolabel, organic content, and price per kilogram of organic oranges. In particular, the proposed price of organic oranges is based on a survey of the average price of Sanh oranges commonly sold at supermarkets such as Bach Hoa Xanh, Win-Mart, Coop-mart, MM Mega, and traditional markets. Combined with reference to the daily listed prices on the market information page of the Department of Agriculture and Rural Development from March 2021 to April 2021, the results of consulting experts and piloting 171 households in the Mekong Delta from April to June 2021 (Nhat & Dut, 2023b). Table 2 presents the attribute levels.

Table 2: Attributes and Expectations

No	Attributes	Level	Measure	Description	The expected effect on WTP	Reference sources
1	Quality grade	Grade 1 Other Grade	1 0	Grade 1 oranges have better shape, color, sweetness, gloss, taste, and richness than other types.	+	Hempel and Hamm (2016); Cai et al. (2019); Denver et al. (2019); Smith et al. (2021)
2	Country of origin	Domestic Import	1 0	Oranges are produced domestically or imported from other countries (Australia/USA)	+	Kokthi et al. (2021); Smith et al. (2021); Cai et al. (2021); Wang et al. (2019); Mazzocchi

No	Attributes	Level	Measure	Description	The expected effect on WTP	Reference sources
						et al. (2019).
3	Traceability	Yes No	1 0	Information about the origin of the product can be traced.	+	Cai et al. (2019); Hussein & Fraser (2018); Loureiro & Umberger (2007)
4	Certification label	Organic	1 0	Certification of the quality standard is certified organic.	+	Mazzocchi et al. (2019); Wang et al. (2019); Jin et al. (2017)
		Ecolabel	1 0	The ecolabel is an official symbol that shows that a product has been designed to be less harmful to the environment.	+	Cai et al., 2019; Kvakkestad et al. (2018); Jin et al. (2017)
5	Organic content	70% 95% 100%	70 95 100	According to USDA standards, there are three levels for organic products: 100% organic, 95% organic, and 70% organic	+	Smith et al. (2021); Mazzocchi et al. (2019); Maples et al. (2018); Jin et al. (2017)
6	Price	60 75 90 105	60 75 90 105	Suggested price per kilogram of organic oranges 04 suggested prices: 100%, 150%, 200%, 250% respectively compared to regular oranges sold in the market. (30,000 VND/kg) Unit: 1,000 VND	-	Bhattarai (2019); Cai et al. (2019); Denver et al. (2019); Mazzocchi et al. (2019); Wang et al. (2019); Maples et al. (2018); Kvakkestad et al. (2018)

Source: Compiled by the authors

Design profiles of choices and choice sets. This means considering the selection of combinations of attributes and attribute levels in the study. In each episode, there are 3 choices, corresponding to two types of safety oranges described by attributes with

different degrees of intensity, along with a "status quo" option, which means the consumer chooses to buy a common orange. The "status quo" is that consumers buy the type of oranges commonly consumed in daily life, oranges of Vietnamese origin, grade 1 quality, no certification, and no traceability label, with a price of 30,000 VND/kg. This last option gives the buyer the right not to buy any safety oranges in the basket because it doesn't match the consumer's preferences. "adding this" last option makes CE closer to reality.

The design has 2 x 2 x 2 x 3'x 4 x 4 = 384 possible choices from combinations of attributes and levels. SPSS 20.0 software with the orthogonal design method (OD) was applied to create 16 choice sets that were randomly assigned to 4 versions of the survey (blocks). Each survey session has 4 cases to choose from (Appendix 1).

3.3. Data Analysis Methods

The analysis of consumer preferences for each product attribute is based on random utility theory and applies the CL introduced by McFadden (2001) based on a model similar to logistic regression. The difference is that all individuals are subjected to different situations before expressing their choice (a binary variable as the dependent variable). Instead of having one row for each individual, as in the classical logistic model, there will be one row for each category of the variable of interest for each individual. When researching oranges preferred by consumers, there are three types of oranges (normal oranges, oranges A, and oranges B), each with their own attributes (price, quality, certifications, organic content, traceability, and country of origin), but an individual can choose only one of the three oranges.

The CL model characteristics are appropriate when the explanatory variables are different among the choices. The utility function (U_{ij}) of individual I when consuming product j has been presented in the form of equations (1) and (2). In practice, we cannot know the unobserved part ($\varepsilon_{ij} \forall j$) of their probability distribution. Therefore, researchers treat the unobserved portion (residual) as a random variable. In the most basic case, the random part ε_{ij} is assumed to follow an independent and identically distributed extreme value (IID) for every choice j. This assumption means that the random portion of the choices is uncorrelated and that they have equal variance. The CL model is widely used, but it has some well-known limitations of being unable to explain the heterogeneity of preferences among respondents (unless it involves observables) and the Independence of Irrelevant Alternatives (IIA) that can lead to unrealistic predictions (Train, 2009; Hole, 2013).

The MXL, also known as the RPL, extends the CL by allowing one or more estimated parameters to be random variables with probability distributions, meaning that the estimated coefficients of some parameters are different across individuals (Hole, 2013). MXL relaxes the IIA assumption of the multinomial model (Train, 2009). In addition, MXL also takes into account the heterogeneity in individuals' preferences, meaning that the beta coefficients of some attributes of the alternative are different across individuals (Hensher & Greene, 2003).

Recently, researchers have argued that in addition to preference heterogeneity, there is also heterogeneity in error variance of choices (scale heterogeneity) in CE (Gu et al., 2013). According to Wrightet al. (2018), error variance heterogeneity is a common problem in CE. Therefore, the study uses the Generalized Multinomial Logit (GML) model instead of the MXL to accommodate both preference and scale heterogeneity (Fiebig et al., 2010; Greene & Hensher, 2010; Gu et al., 2013). That is, the choice behavior of some customers is more random than that of some other customers (Fiebig et al., 2010).

In the GML model developed by Fiebig et al. (2010), the utility equation is presented as follows:

$$U_{njt} = \beta_n x_{njt} + \varepsilon_{njt} \tag{3}$$

Where x_{njt} is a vector of observed attributes of choice j in situation t and β_n is a vector of parameters that characterize the chooser. β_n depends on a fixed vector, a scalar parameter ς (with $\varsigma \in [0,1]$), a random vector η_n, and σ_n is the individual-specific scale of idiosyncratic error.

CE allows calculating the WTP for changes in product/service attributes. GML with heterogeneity of β_n, the price estimation coefficient is γ_n (p is the price attribute), and the scale parameter is σ_n.

$$U_{njt} = \beta_n x_{njt} - \gamma_n \, p_{njt} + \varepsilon_{njt}/\sigma_n \tag{4}$$

According to Fiebig et al. (2010), the usual way is to normalize formula (4) by setting $\sigma_n = 1$ for all individuals n, and the willingness to pay for 1 additional unit of attribute k (the marginal rate of substitution of attribute k and the price attribute) is:

$$MWTP = \beta_{nk}/\gamma_n \tag{5}$$

4. Research results and discussion

4.1. Choice Experiment result

The study uses the GML model to test the influence of product attributes on the WTP of organic oranges in households. The data in Table 3 describe the consumer decision statistics when choosing orange A, orange B, and regular orange in each choice set at CE. For example, Appendix 1 is 01 option that consumers have to choose from.

Table 3: Descriptive Statistics of Consumer Choices in CE

Choice	n	Ratio (%)
Oranges A	654	39,6
Oranges B	448	27,1
Normal oranges	550	33,3
Total	**1652**	**100**

Source: Analysis from survey data of 413 respondents

The analysis results from Table 4 show that the log-likelihood value in Model 3 is larger than that of Models 1 and 2. The statistically significant likelihood ratio test (LR test) shows that Model 3 has an improved fit and results when compared with Models 1 and 2 (Hensher et al., 2005). The AIC and BIC indices of the GML model also significantly improve the CL and MXL models. Therefore, the analysis results of the GML model with interaction variables will be used to analyze the next steps in the CE model.

Table 4: Swait - Louviere LR test

No	Item	Model 1. CL with interactive variable	Model 2. MXL with interactive variable	Model 3. GML with interactive variable
1	Log-likelihood	-1587.3536	-1429.3253	-1420.1189
2	LR chi2	454.30***	316.06***	
3	Wald chi2			36.06***
4	AIC	3204.707	2900.651	2884.238
5	BIC	3302.33	3037.322	3027.417
6	LR test: Model 1 & 2		316.06***	
7	LR test: Model 1 & 3			334.47***
8	LR test: Model 2 & 3			18.41***
9	n	4,955	4,955	4,955

Note: *** **, * indicate statistical significance at the 0.01 level; 0.05 and 0.1 respectively.*
Source: Analysis from survey data of 413 respondents

CE model estimates provide insights into consumer preferences for organic oranges, depending on product attributes. The WTP for each attribute is calculated to find the answer to each previously explained hypothesis.

Table 5: GML Model Estimates

No	Variable	Coefficient	Std. error	T-value	P-value
	Mean				
1	Country of origin	-1.5639***	0.320676	-4.88	0.000
2	Quality grade	0.473923**	0.209302	2.26	0.024
3	Organic certification label	2.220579***	0.452427	4.91	0.000
4	Traceability label	1.744581***	0.380973	4.58	0.000
5	Eco-label	1.152491***	0.269466	4.28	0.000
6	Organic content	0.017**	0.008478	2.01	0.045
7	Price	-0.07426***	0.014892	-4.99	0.000
8	ASC	6.097886***	1.841386	3.31	0.001
9	ASC*Income	1.93^{e-05}**	7.94^{e-06}	2.44	0.015
10	ASC*Education	0.10226**	0.049414	2.07	0.039
11	ASC*Age	0.011385	0.019756	0.58	0.564
12	ASC*Dependent people	-0.0399	0.093975	-0.42	0.671
13	ASC*Family size	0.120468	0.113646	1.06	0.289
14	ASC*Health risk perception	0.24033**	0.102526	2.34	0.019
15	ASC*Environmental awareness	0.137148	0.089806	1.53	0.127
	Standard deviations (SD)				
1	Country of origin	-0.00606	0.220972	-0.03	0.978
2	Quality Grade	-1.2679***	0.348228	-3.64	0.000
3	Organic certification label	0.407074	0.363517	1.12	0.263
4	Traceability label	0.833932***	0.31825	2.62	0.009
5	Eco-label	0.635511	0.405699	1.57	0.117
6	Organic content	0.039771***	0.007064	5.63	0.000
	tau	-0.85097***	0.18467	-4.61	0.000

Note: *** **, * indicate statistical significance at the 0.01 level; 0.05 and 0.1 respectively.*
The sign of the estimated standard deviations is irrelevant: interpret them as being positive.
Source: Analysis from survey data of 413 respondents

The GML model has been set to a fixed price coefficient, and the remaining coefficients are normally distributed. There are several reasons to keep the price coefficient fixed. The first is that GML models tend to be unstable when all coefficients are allowed to fluctuate, as Ruud (1996) notes. This instability can be eliminated by fixing the price coefficient. Second, if the price factor is allowed to vary, then the WTP distribution is the ratio of the two distributions, which is often inconvenient to evaluate. With a fixed price factor, the WTP for an attribute is distributed in the same way as the property's coefficient. The third problem is the choice of distribution applied to the valuation factor; the normal distribution is not exact because the price coefficient cannot be negative (Train, 2009).

The results of GML show that the coefficients of the attributes of price, ecolabel, organic certification label, traceability label, and country of origin are all statistically significant with 99% confidence. Thequality grade and organic content attribute coefficient of oranges are statistically significant with 95% confidence. It shows that the attributes put forth in the hypotheses influence the consumer's WTP with high confidence.

The coefficient of organic content, ecolabel, organic certification, traceability label, and product quality grade bearing a positive sign (+) shows that organic oranges carrying the above attributes will increase their utility to consumers. In other words, these attributes increase consumers' preferences as well as the WTP of organic oranges. Conversely, a negative coefficient of the price variable (-) means that the higher the price increases, the more useful it will be for consumers to buy organic oranges or for consumers to avoid consumption. In particular, the negative coefficient of the country-of-origin variable shows that consumers prefer imported oranges over domestic ones. Imported oranges from more advanced countries such as Australia or the US will increase the consumers' willingness to pay a premium.

The ASC coefficient, which is a threshold value for organic orange selection relative to a consumer's usual orange selection threshold value, is usually not of concern unless probabilities are estimated (Gujarati, 2011). The results of the GML with the interaction variable show that the variables of education level, income, and perceived health risk in the model are the factors that affect the probability of households in the Mekong Delta choosing organic oranges. The coefficients of the variables interacting with ASC are positive (+) and significant at the 5% level of significance.

The results showed that when choosing organic oranges, about 62.74% of consumers preferred Grade 1 oranges (better quality, more attractive appearance, more delicious); 95.6% of consumers preferred oranges with traceability labels; and about 66.63% of consumers preferred the organic content in organic farming to be as high as possible. These numbers were calculated using the formula $100 \times \Phi(-b_k/s_k)$, where Φ is the cumulative normal distribution and b_k, s_k are the mean and standard deviation of the kth coefficient, respectively (Hole, 2007). One of the reasons why about 37% of consumers are not willing to pay for organic oranges of Grade I quality may be that they assume that the characteristics of organic fruits grown using natural methods (no chemicals, pesticides, etc.) are of lower quality than conventionally grown fruits. Similarly, about 33% of consumers believe that organic fruits do not necessarily have to comply with the maximum standards for organic content in cultivation. Consumer preferences for country of origin, organic certification, and ecolabel are heterogeneous (standard deviation coefficients are not statistically significant). In addition, the ***tau*** statistic, which measures the heterogeneity of variance of choices, is statistically significant at the 1% level. This implies that some customers' choice behavior is more random than others (Fiebig et al., 2010). These results demonstrate that customer

preferences are heterogeneous and random in each individual's organic fruit purchasing behavior.

The next objective of the study is to determine the specific price for each attribute expressed in the marginal WTP of consumers when buying organic oranges with the presence of the above attributes. From there, determine the importance and influence of each attribute in organic oranges.

Table 6: Prices Consumers are Willing to Pay for Organic Oranges

No	Attribute	WTP (VND)
1	Country of origin	**-21,061*****
		(-25,993 – -16,129)
2	Quality grade	**6,382****
		(1,425 – 11,340)
3	Traceability label	**23,494*****
		(18,092 – 28,896)
4	Organic certification	**29,904*****
		(24,505 – 35,304)
5	Ecolabel	**15,520*****
		(10,399 – 20,642)
6	Organic content	**228.941****
		(16.163 – 441.719)

Notes: ***, **, * indicate statistical significance at the 0.01, 0.05 and 0.1 level respectively
Source: Analysis from survey data of 413 respondents

The data analyzed in Table 6 shows that WTP consumers add an amount for each organic attribute present in the product. However, this depends on consumer preferences and the importance of attributes. For organic oranges, WTP consumers add an average of 6,000 VND/kg (95% confidence interval, ranging from 1,000 VND/kg to 11,000 VND/kg) to their purchase of Grade 1 organic oranges.

As for the traceability label on organic oranges, it helps consumers better understand information about the production and transportation processes in the product supply chain. They are willing to pay an average of about 23,000 VND/kg (99% confidence interval; WTP ranges from 18,000 VND/kg to 29,000 VND/kg). The results of the country-of-origin attribute analysis show that the WTP has a negative sign (-), meaning that if the organic oranges are imported from Australia or the US, consumers are willing to pay a higher average price of about 21,000 VND/kg (99% confidence).

Consumers are willing to pay an average of 30,000 VND/kg more (99% confidence interval; extra WTP ranges from 24,000 VND/kg to 35,000 VND/kg) for an orange with a certified organic label recognized by prestigious organizations in the world, specifically in the USDA organic standard introduction research. In addition, they are willing to pay an additional 15,000 VND/kg (99% confidence interval, ranging from 10,000 VND/kg to 20,000 VND/kg) for ecolabel certification.

Besides, the attribute that consumers are very interested in and willing to pay for is the organic content in production. Organic content is the percentage of qualified raw materials used to produce organic products. The production process does not use artificial flavors, preservatives, or colors; does not use pesticides, chemical fertilizers, or growth hormones; and does not use genetically modified substances or sources. Consumers are willing to pay an average of 200 VND more to increase 1% of organic content or organic ingredients in the orange production process (95% confidence interval; additional WTP ranges from 16 VND to 450 VND).

The implicit prices of the attributes calculated from Table 6 do not provide a compensating surplus. Estimating the overall WTP for a change from the current situation requires more substantial calculations. One of the strengths of the CE method is that the estimated coefficients of the attributes can be used to estimate the economic value of a wide range of proposed scenarios in which the attributes can be combined (Jin et al., 2006).

Table 7: WTP for Scenarios of Oranges

Scenarios	Attributes					WTP (VND/Kg)
	Country of origin	Quality grade	Traceability label	Certification label	Organic content	
Normal orange (Status quo)	Vietnam	Grade 1	-	-	-	30,000
Orange 1	Vietnam	Grade 1	-	Eco	95%	119,000
Orange 2	Australia/USA	Other	-	Eco	70%	132,000
Orange 3	Australia/USA	Other	Yes	Eco	70%	155,000
Orange 4	Vietnam	Other	Yes	Eco	70%	134,000
Orange 5	Australia/USA	Other	-	Organic	95%	152,000
Orange 6	Australia/USA	Other	Yes	Organic	95%	175,000
Orange 7	Vietnam	Grade 1	-	Organic	70%	132,000
Orange 8	Australia/USA	Grade 1	-	Eco	100%	144,000
Orange 9	Vietnam	Other	Yes	Organic	100%	155,000
Orange 10	Australia/USA	Grade 1	Yes	Organic	70%	176,000
Orange 11	Vietnam	Other	-	Eco	70%	111,000
Orange 12	Australia/USA	Grade 1	-	Organic	70%	153,000
Orange 13	Vietnam	Other	-	Organic	100%	132,000
Orange 14	Vietnam	Grade 1	Yes	Organic	70%	155,000
Orange 15	Australia/USA	Grade 1	Yes	Eco	100%	167,000
Orange 16	Vietnam	Grade 1	Yes	Eco	95%	145,000

Source: Analysis from survey data of 413 respondents and OD results

The results of Table 7 indicate that in order to obtain utility in a changing situation, with the quality improvement from conventional oranges to organic oranges with new useful attributes, WTP must increase the level corresponding to each scenario. In other words, these are marginal estimates, showing the magnitude of the WTP for a change from the current situation. Overall, the mean WTP for organic oranges for the 16 designed scenarios is around 146,000 VND/kg, ranging from about 111,000 VND/kg to 176,000 VND/kg depending on the level of attributes.

4.2. Discussion

Recent WTP studies often rely on DCT to explain consumer behavior. This study has extended the DCT with the CE to explain more clearly the value and rationality of the SOR model when applied to the organic fruit industry in the context of a developing country like Vietnam. The research results fill the academic gap by demonstrating the heterogeneity in preferences (Train, 1998; Mazzanti, 2003) and the randomness in customer choice behavior (Fiebig et al., 2010; Greene & Hensher, 2010; Gu et al., 2013). Therefore, researchers need to pay attention to this feature to have deeper discussions on the unobservable part (ε) in the utility function (U_{ij}) that Train (2009) mentioned in RUT. It is also the difference in taste that is closely related to the consumer "black box" mentioned in the SOR model (Kotler et al., 2020).

In practice, our results are like the studies on WTP for organic food in other countries. The study reaffirms the direct impact of product quality on consumer choice. The better the quality of oranges, the more it positively affects consumer preference. This result has also been found in a number of recent studies, such as taste strongly influencing consumer preferences (Kvakkestad et al., 2018; Cai et al., 2019; Luu, 2019; Wang et al., 2019; Kokthi et al., 2021; Smith et al., 2021), consumers of WTP premium prices for organic produce are related to freshness (Gerini et al., 2016), high nutritional value (Luu, 2019; Wang et al., 2019; Kokthi et al., 2021), product appearance (Gerini et al., 2016; Wang et al., 2019; Dang & Doan, 2024) or the decision to buy organic products is strongly influenced by product quality indications (Mazzocchi et al., 2019). Thus, product quality is also one of the factors that manufacturers need to pay attention to improve product value and attract customers.

Research results also show that consumers care about traceability in organic orange consumption; similar to some studies (Loureiro & Umberger, 2007; Hussein & Fraser, 2018; Cai et al., 2019) which suggested that labeling of origin for organic products makes sense and that consumers are willing to pay more for products with traceability labels. In particular, in recent times, many studies in emerging economies such as Vietnam have demonstrated the important and positive impact of traceability labels on willingness to pay for organic vegetables (Tran et al., 2022) and organic fruits (Dang & Doan, 2024). Traceability labels are very important for production and business activities, especially for agricultural products, because counterfeit products, goods of unclear origin, and poor quality are increasingly appearing across the market. We can determine that the traceability label is not only to satisfy the information needs of consumers, increase competition, and stimulate purchasing behavior, but also a tool to help protect business reputation effectively while conveying the message of the producer to the consumer.

The research results show that there is a difference compared with most of the previous studies examined when analyzing consumers' preferences for products of local origin or from other regions. Most studies show that when it comes to organic food consumption, consumers prefer and are willing to pay more for locally sourced or domestically produced products than for products from other regions or imports (Hempel & Hamm, 2016; Palma et al., 2016; Cai et al., 2019; Denver et al., 2019; Smith et al., 2021). Some of the reasons they prefer to consume locally produced products are not only to stimulate the development of local producers but also because of the geographical distance that can cause the negative external effects of transportation (Rousseau & Vranken, 2013), and they believe that products produced near their home will be of higher quality, safer, and more transparent (Hempel & Hamm, 2016). In contrast, Mekong Delta consumers prefer and are willing to pay more for organic oranges originating from advanced countries such as Australia or the USA than for domestic oranges. This shows that an undeniable feature in the way of consumption of a part of the Vietnamese people is the mentality of favoring foreign goods, and they may believe that foreign fruits are reliable in terms of food safety and quality. Maybe consumers don't really trust domestic manufacturers enough. This is similar to the results of Bui (2018) when studying the consumption behavior of Vietnamese consumers towards imported food and beverage products from three countries: Thailand, Japan, and the United States. Recently, research on consumer preferences for fruits originating from foreign countries (China, France, the United States, and New Zealand) also showed that country of origin image information has a significant influence on the consumption of imported products (Dang & Doan, 2024). Customers can use this country-of-origin information for their purchasing decisions, and it can also serve as a signal for consumers to evaluate product quality (Parkvithee & Miranda, 2012).

Products that are labeled as organic, meaning products that have been recognized as organic by reputable expert organizations, will increase consumer confidence, increase preference, and WTP. Research results show that Vietnamese organic food consumers are very interested in organic certification labels, and they are willing to pay more for certified organic products (Anh et al., 2020; Dang & Doan, 2024). As many previous studies have shown, the emergence of organic certifications creates more confidence in food safety, which has a positive impact on the WTP for organic food (Mazzocchi et al., 2019; Wang et al., 2019). Consumers are more interested in organic products because of their health and safety values than conventional products. This can be considered one of the indispensable core attributes for organic products.

The analysis results show that consumers are willing to pay more for a product that meets the standards and has a higher organic content. The research results are similar to some recent studies that have identified the reason why consumers look to organic products because of their perception of the use of pesticides/chemicals to ensure production standards. According to the method of production, organic will avoid adverse health effects, or knowledge of pesticide/chemical residues in products also positively affects WTP (Adams et al., 2018; Kvakkestad et al., 2018; Bhattarai, 2019; Cai et al., 2019; Denver et al., 2019).

The analysis results also show that the positive role of the ecolabel (the manufacturer's product certification as an environmentally friendly product) has an influence on the WTP of organic oranges. This result was also found in the study of Jin et al. (2017) on consumers in Beijing, China, as well as in the study of Anh et al. (2020) on Vietnamese consumers. In recent years, many studies have confirmed the importance of environmental factors in affecting the behavior of those consuming organic products. Consumers perceive conventional production methods with the use of pesticides and chemicals as damaging to the surrounding environment and desire healthier and more natural foods grown in an eco-friendly manner (Kvakkestad et al., 2018; Maples et al., 2018; Nandi et al., 2017).

As predicted, the significant and negative parameter estimates on the price variable indicate that respondents are less likely to buy organic oranges as the price of oranges increases, all other things being equal. The results of many recent studies also show that high prices are the main barrier that makes organic products less attractive to consumers (Cai et al., 2019; Denver et al., 2019; Mazzocchi et al., 2019; Wang et al., 2019). It can be inferred that the low buying rate of organic products by consumers in the Mekong Delta may be influenced by their price. Almost all studies on willingness to pay in Vietnam show that price is a major obstacle in consumers' purchasing behavior for organic products (Anh et al., 2020; Tran et al., 2022; Dang & Doan, 2024).

Research results show that consumers are very concerned about product quality when buying organic products. However, organic fruits are characterized by being chemical-free, so from the growing stage to the finishing and preservation stages, the products are often not eye-catching and uneven in size, affecting product quality. Therefore, we recommend that organic agricultural producers need to research, select, adjust crop varieties, cultivation methods, and cultivation techniques suitable to the natural conditions of each ecological region and, at the same time, apply new science and technology to the production process. This helps crops have fewer pests and diseases, thereby minimizing negative impacts on product quality.

Besides, packaging strategies also need to be given proper attention. Quality and packaging materials are also very important to ensure the product is not damaged during transportation, storage, and display. In addition to the product protection function, packaging also plays an important role in conveying attractive and reliable information

to consumers, such as origin, ingredients, uses, production date, certification labels, recommendations for use, etc.

Practice also shows that the product life cycle of fruit is very short in the market, especially organic fruit that quickly withers and deteriorates during storage or display. According to Dixie (2005), the current period of changes in food marketing in developing countries tends to resemble changes seen in developed countries. People have less time to prepare meals but have more money to pay for processed foods. Therefore, choosing appropriate distribution channels plays an important role in this issue. Processing businesses (such as canning, freezing, drying, juice processing, packaging, and ready-to-eat food processing), resorts, restaurants, and fast-food chains can become wholesale buyers.

A traceability system needs to have links between units in the chain to bring benefits to participating parties and increase transparency, thereby enhancing the reputation of products on the market. For that reason, the stage of selecting members to participate in the organic fruit supply chain plays an extremely important role in the success or failure of building a perfect traceability system in particular and an organic production model in general.

Imported fruits, especially those imported from countries with developed technology such as the US, Australia, New Zealand, Japan, Korea, etc., are mentioned as a quality indicator in fruit consumption. These are countries with advanced growing and harvesting methods, ensuring product quality and safety. Experience from many other countries, history, and natural conditions are factors that cannot be ignored when considering the image and perception of a country. We recommend learning from some countries around the world, such as France, South Korea, Japan, and Thailand, that have used rural agricultural tourism to add value to products. This is one possible way to promote local organic agriculture at its best.

Organic certifications have a positive impact on consumer preferences. This is an important attribute that consumers are willing to pay the highest price for when buying organic products. Therefore, we propose solutions that can promote consumer acceptance and purchase behavior for organic products. Components in the distribution channel implement communication strategies to clearly inform about the health and environmental benefits of organic products through communication channels, community events, and seminars; use famous certification organizations to increase product credibility. In addition, policymakers need to encourage the formation of consumer groups interested in organic food, help share information and experiences, as well as organize events and agricultural fairs for consumers to have the opportunity to experience and learn about organic products to increase consumer awareness.

However, achieving true organic certification will take a lot of time, money, and very complicated procedures, especially the process of maintaining certification after it has been achieved. In particular, the study found that approximately 33% of consumers have a preference for not necessarily adhering to the maximum organic content standards in the growing process. Certifications with lower organic standards may be suitable for this customer segment. Therefore, the first thing is to identify the target market for the supply chain to decide to respond to. For example, if we are only interested in the domestic market or in the Southeast Asia region, Vietnamese or ASEAN organic standards are enough. Unless higher certifications from the US, Europe, Japan, Australia, etc. provide us with better new markets, or more potential market segments, or we wish to open expanding export markets, these certifications may need more attention.

Certified organic fruit often brings higher prices to sellers, although research results also show that most consumers are often sensitive to the price of organic fruit when purchasing. Price is one of the important factors affecting consumers' purchasing

decisions. Therefore, organic fruit supply chain components must be flexible and maintain reasonable prices to maintain consumer satisfaction. Promotions and discounts should be implemented by businesses to attract customers who intend to buy organic products. The government should consider the findings when introducing measures to support sustainable agriculture and the viability of local economies.

5. Conclusion

The study findings indicate that attributes of country of origin, quality level, traceability label, organic certification label, eco-label, organic content in the product, and price influence consumers' preferences and WTP. Notably, price is a major barrier affecting the consumption of organic oranges. Consumers in the Mekong Delta, Vietnam, are willing to pay the most for oranges labeled as organic and tend to prefer imported oranges from countries with advanced agriculture over domestic oranges.

We extend the theory based on DCT with the CE method to explain more specifically the rationality of the SOR model when applied to a specific organic fruit industry in the context of a transition economy country such as Vietnam. The results of the study show that consumers' WTP is highly heterogeneous and random (Gu et al., 2013). This implies that the components in the organic fruit supply chain will not be suitable when providing a uniform organic orange to all consumers. This is the basis for organic fruit producers and traders to design and price optional or multi-option fruits to satisfy the different demands of each consumer in different situations.

Balderjahn (2003) considered estimates of WTP to be necessary to develop an optimal pricing strategy. Such estimates can be used to forecast market reactions to price changes and to model demand functions. Furthermore, this understanding will inform policymakers about the future of agricultural markets in Vietnam and help them better prepare for the making of sustainable agricultural policies.

Although this study makes valuable contributions, it is important to note additional limitations. First, the experiment was conducted in a hypothetical situation, and respondents did not actually purchase the organic oranges they chose in the experiment. Further studies should equip interviewers with additional tools such as samples and sample products that are as close to the real market as possible to make choice experiments easier and more effective. Second, the study only selected one organic orange product representing the organic fruit industry to analyze consumer behavior. Further studies could group other items when applied to increase generalizability. Finally, the study spanned a long period of time, so the base price for the product taken at a previous point in time to design the choice prices in the experiment may have fluctuated, although not significantly, but still affected the WTP estimation results to some extent.

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APPENDICES

Appendix 1: Sample Example of One of the Choices (choice sets)

The following attributes will vary with different levels of management	Oranges A	Oranges B	
Country of origin	Vietnam	Australia/USA	I do not choose to buy oranges A and oranges B. I only want to buy the oranges I am currently consuming.
Quality grade	Other Grade	Grade 1	
Traceability label	Yes	No	
Certification	Eco-label	Organic	
Organic content in the product	95%	100%	
Price	60, 000 VND/kg	90,000 VND/kg	
I will choose: 01 unique option	☐ **Orange A**	☐ **Orange B**	☐ **Common Oranges**

Source: OD analysis results

Appendix 2: Consumers' Awareness of Health Risks for Fruit

No	Item	Measure	Code
1	The current fruit-growing and harvesting process in most gardens does not meet standards due to growers abusing chemicals and pesticides during the production process and controlling the amount of preservatives before and after harvest. Chemical residues negatively affect consumers' health.	0 – 2	health1
2	Growing fruit with toxic chemicals causes many related diseases, such as high blood pressure, heart attack, cancer, food poisoning, typhoid, diarrhea, etc.	0 – 2	health2
3	The origin of fruit is currently not guaranteed, due to the frequent smuggling of poor-quality fruit across the border. In particular, smuggled fruits originate from China.	0 – 2	health3
4	Poor-quality fruits are now also used to process other products such as jam, dried fruit, fruit juice, etc., causing many impacts on consumers' health.	0 – 2	health4
5	Certified fruits (Viet Gap, Global Gap, Organic, etc.) are safer to consume and contain fewer health risks.	0 - 2	health5

Source: Compiled by the authors

Appendix 3: Consumers' environmental awareness

No	Item	Measure	Code
1	Consuming fruits produced using organic methods helps protect the surrounding environment more than conventional methods.	0 – 2	enviro1
2	The effects of synthetic chemicals in agricultural production cause environmental pollution.	0 – 2	enviro2
3	The effects of synthetic chemicals in agricultural production cause soil destruction and water pollution.	0 – 2	enviro3
4	The effects of synthetic chemicals in agricultural production kill microorganisms.	0 – 2	enviro4
5	Organic production is more animal-friendly than conventional production.	0 - 2	enviro5

Source: Compiled by the authors