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Contingent valuation versus choice experiment: estimating the willingness to pay for organic oranges in Vietnam

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Abstract

Purpose – The study estimates the willingness to pay for organic oranges and identifies its influencing factors among consumers in the Mekong Delta, Vietnam.

Design/methodology/approach – The study used survey data from 413 households in the Mekong Delta from March 2022 to July 2022. The choice experiment (CE) and contingent valuation method (CVM) were employed to analyze consumers' willingness to pay (WTP). STATA 17 software was used to analyze research data in the logit model and mixed logit model.

Findings – The research results from the CVM approach show that a number of demographic characteristics have a direct impact on WTP, such as education, educational attainment, family size, the presence of children and the elderly in the household, food safety and environmental awareness. The CE model shows product attributes that influence consumers' WTP, such as country of origin, traceability, quality grade, organic certification, ecolabel and organic content. Both approaches show that price is the main barrier to organic orange consumption.

Research limitations/implications – The study surveyed four large cities in four provinces representing the Mekong Delta region.

Practical implications – Our study helps administrators have a deeper insight into consumer preferences and behavior, specifically the factors that affect consumers' WTP, an important indicator of demand for the success of manufacturers and marketers in developing as well as improving marketing strategies. Knowledge of a product's WTP on behalf of (potential) customers plays an important role in many areas of marketing management, such as pricing decisions or new product development.

Author contributions: All the authors collaborated in the development of all the parts of this work and in the paper elaboration with similar levels of effort. In particular, Nhat Bach Ho performed the empirical study and carried out the data analysis. Dut Van Vo has focused on the theoretical background of the study, applied the method. Chris Rowley contributed interpreting the results and developing the discussion and conclusions of the paper. All authors commented on previous versions of the manuscript, read and approved the final manuscript.

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Social implications – 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. Develop organic agriculture to both protect human health, protect the living environment and protect the soil from degradation, ensuring sustainable agricultural production. This is also one of the measures to help people stay away from diseases to limit the social burden.

Originality/value – The study confirms that both CVM and CE models can be used to estimate WTP. However, CVM fits the overall WTP estimate, while CE is more appropriate when estimating WTP for individual scenarios through combining attributes with different levels.

Keywords Choice experiment, Contingent valuation method, Mekong delta, Organic oranges, Willingness to pay

Paper type Research paper

1. Introduction

In recent years, Vietnam has continuously imported pesticides in increasing numbers. The amount of plant protection drugs imported ranges from 70,000–100,000 tons per year, with a commercial value of an estimated 700–800 million USD per year. If all these drugs were sprayed on a field, on average, each hectare would have 10 kg of pesticides (National Assembly of the Socialist Republic of Vietnam, 2020), evidence of the dependence on pesticides in agricultural production. Food is an indispensable source of nutrients, however, the main issue consumers have is unclean food, including no guarantee of quality, safety in processing, or cleanliness in terms of production and many are looking for organically produced, clean and safe products. Vietnamese consumers often view organic products as superior in terms of safety, taste, nutrition and environmental value over conventionally grown alternatives. Therefore, buying organic food has become the choice of middle and upper-class consumers and concerns about food safety, along with a growing middle class, have made Vietnam a potential market for organic food.

Therefore, in order to have a deeper insight into consumer behaviors, specifically the factors affecting consumer WTP, an important demand indicator is the basis for the success of manufacturers and marketers when developing and improving appropriate marketing strategies and programs. Knowledge of a product's WTP on behalf of (potential) customers plays an important role in many areas of marketing management, such as pricing decisions or new product development (Breidert *et al.*, 2006). In recent years, WTP has become a commonly used concept in the study of consumer behavior and intentions towards the organic food sector and academic interest in this subject has grown globally, with empirical studies on WTP for organic products in advanced economies like the US and Europe, as well as in developing countries like Asia and Africa, being the most widely cited (Nhat and Dut, 2023a). There are many different approaches to the concept of WTP. Davcik and Sharma (2015) state it assesses an individual's perception of the value and quality of a brand because higher prices reflect higher value and better quality and is frequently employed in studies on consumer behavior and the desire for goods with healthy or environmentally friendly qualities (Krystallis *et al.*, 2006). There are various applications for theoretical frameworks of consumer behavior integrated with statistical methods, two of the most common are CE (Smith *et al.*, 2021; Cai *et al.*, 2019; Denver *et al.*, 2019; Mazzocchi *et al.*, 2019) and CVM (Kokthi *et al.*, 2021; Bhattarai, 2019). CE is a pricing method based on a statement of preferences (SP), and was developed from the foundations of multi-attribute utility theory (Lancaster, 1966) and random utility theory (Thurstone, 1927). The advantages of CE include estimating implicit prices for attributes and welfare impacts across multiple scenarios and this is commonly applied in business and marketing fields, such as predicting market behavior and demand, identifying potential markets and designing optimal products. CVM is also based on revealing preferences to measure WTP where the researcher determines the demand function for goods by building hypothetical markets (Arrow *et al.*, 1993). The most important

difference between CVM and CE is that CVM is more suitable for evaluating a good as a whole, while the CE is more likely to be required when the concern is focused on the individual characteristics of the product.

However, research on the WTP of organic products in the Mekong Delta, Vietnam is limited. Most scholars focus on researching behavioral intentions to buy organic food based on cognitive behavioral theoretical models such as Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB) and using Multiple Linear Regression (MLR) like Nguyen and Trang (2021), and Loan and Hien (2021), or Structural Equation Modeling (SEM) like Thi *et al.* (2022), and Linh and Minh (2022) to analyze influencing factors and evaluate the level of impact of these factors. According to Eichhorn and Meixner (2020), if the focus of the research is WTP (monetary value), then auctioning or experimental design would be more appropriate methods. Various empirical studies have shown that small fluctuations in prices and corresponding consumer behavior can have a significant impact on sales and profits (Marn *et al.*, 2003). Balderjahn (2003) considers estimates of WTP to be necessary to develop an optimal pricing strategy as such estimates can be used to forecast market reactions to price changes and model demand functions.

The objective of this study was to analyze consumers' preferences and estimate their WTP for organic oranges. Each approach to measuring WTP, with different conceptual bases and methodological implications, was presented differently in the relevant literature. This study provided empirical evidence of these competitive approaches and discussed the obstacles and problems associated with their application in measuring WTP. It was performed because there is an urgent need to establish a strong scientific foundation in the field of WTP for organic fruit.

2. Literature review

Many scholars have demonstrated the relationships between WTP for organic products and organic product quality such as shape, color, taste, nutritional content, health and environmental-related issues, cleanliness, food safety, certifications, labeling, origin, price and consumer characteristics (Nhat and Dut, 2023a).

First, several previous studies have proven that organic product attributes are related to product quality, namely appearance, color, flavor, taste and the ability to satisfy consumer desires such as North American consumers preference for the taste and appearance of fresh pawpaw fruit (Cai *et al.*, 2019). Research by Kokthi *et al.* (2021) showed that Albanian consumers were willing to pay a higher price for organic fruits and vegetables depending on the attributes of nutritional value, freshness and taste, supporting the assertion that taste and deliciousness have a positive influence on consumers' ability to pay high prices (Smith *et al.*, 2021; Mazzocchi *et al.*, 2019). In addition, research by Wang *et al.* (2019) and Rousseau and Vranken (2013) also showed that taste and appearance significantly positively affects the WTP for organic fruit.

Second, most studies conducted on organic products across various marketplaces indicated that WTP is positively impacted by the origin of locally produced (or domestic) products. For example, consumers in the US are willing to pay a higher price for wines made from locally grown apples than for wines made from conventionally grown apples of unknown origin (Smith *et al.*, 2021). Similarly, as mentioned above, Cai *et al.* (2019) found that origin is the factor that most strongly influences demand, and North American consumers are willing to pay a higher price for domestically produced pawpaw fruit. Locally produced organic products appeal to a large segment of Danish consumers willing to pay a premium for sausages made from livestock raised locally or domestically (Denver *et al.*, 2019). In addition, Loureiro and Umberger (2007) showed that origin labeling and traceability positively affect preferences, as well as the WTP level, of consumers in the US.

Third, numerous studies have shown how WTP for organic foods is impacted by issues related to food safety and health. Kokthi *et al.* (2021) found that Albanian consumers are willing to pay more for the health-related benefits associated with purchasing organic vegetables and fruits. This is similar to research by Bhattarai (2019) showing that consumers' experience of vegetable-borne diseases in the Kathmandu valley, Nepal is one factor influencing willingness to pay high prices for organic vegetables. Research by Wang *et al.* (2019) in China showed the probability of consumer willingness to pay more for organic fruit increases with concern about product safety issues as they view organic and pesticide-free food as healthier and of higher quality and over those produced conventionally (Cai *et al.*, 2019). Wang *et al.* (2019) showed the most important factor influencing consumers' WTP for fresh organic apples is apositive attitude toward the organic label as organic certification is an important attribute in purchasing choices (Mazzocchi *et al.*, 2019).

Fourth, many consumers tend to consume healthier, more natural foods grown in environmentally friendly ways and believe traditional production methods using chemicals and pesticides harm the environment. For example, Smith *et al.* (2021) found that agricultural management practices, such as integrated pest management programs, have a positive impact on consumer perceptions and WTP. Consumers in Montefano, Italy were especially interested in the wine biodiversity protection certification label and were willing to pay a high price for it (Mazzocchi *et al.*, 2019). In addition, research by Jin *et al.* (2017) showed that eco-labeling is a primary concern of Beijing residents.

Fifth, the majority of CVM research views consumer demographics as the primary variable influencing WTP (Bhattarai, 2019; Wang *et al.*, 2019). Based on the CE model, these factors are investigated as well as interaction variables to examine relationships with WTP and evaluate different responses to the same stimulus (Kvakkestad *et al.*, 2018; Mazzocchi *et al.*, 2019).

Finally, an extensive amount of research has demonstrated that price rises either negatively affect customers' WTP for organic products or are a significant factor in decreasing the probability of WTP (Bhattarai, 2019; Mazzocchi *et al.*, 2019; Wang *et al.*, 2019; Cai *et al.*, 2019).

3. Methodology

3.1 Sample

The study conducted a survey by direct interview technique with the selected method of random stratified sample between March and July 2022 of 413 households in four cities in the Mekong Delta: Can Tho City, Rach Gia City, Long Xuyen City and Cao Lanh City. Respondents were knowledgeable and regularly made decisions to buy food for their families (excluding individuals who buy food for other purposes such as business or housekeeping staff) and agreed and confirmed their interview participation. The study only reported general information in the form of statistics. The data collection process was carried out in two steps. First, we contacted specialized officials and local government officials to understand the situation and select survey locations corresponding to each city and, after receiving approval, we registered the area and survey schedule. Next, we conducted formal interviews with households following the recommendation of local specialized officials. Each face-to-face interview with households took from 45 to 60 min and the interviewer collected basic information about demographics and awareness of health and the environment. The primary interviewer role was to introduce the concept of organic orange attributes as well as the selection scenarios in the CVM and CE. From there, favorable conditions were created for respondents to easily perceive and express preferences.

3.2 The contingent valuation method

The basic theory of the CVM approach was proposed by Hanemann and Kanninen (1998). Since the study chose the single-bounded dichotomous choice question format, the logit method is used for analysis with the estimation formula as follows:

$$Logit\,(WTP) = Ln\left(\frac{pr(Yes)}{1 - pr(Yes)}\right) = \beta_0 + \beta_1 X_1 + .. + \beta_k X_k \quad (1)$$

The variables in the CVM are shown in Table 1.

3.3 The choice experiment method

In the CE, the study used seven attributes: quality grade, traceability label, origin, organic certification label, eco-label, organic content and price. Research using these attributes based on in-depth interviews with experts and sample interviews with 171 consumers (Nhat and Dut, 2023b), as well as a review of experimental studies, showed these are important attributes when buying organic products. Organic orange attributes are shown in Table 2.

The study has five attributes with two levels, one attribute with three levels and one attribute with four levels. The design has 2 x 2 x 2 x 2 × 2 × 3 x 4 = 384 alternatives. To create a statistically optimal design, the study used the orthogonal design tool (OD) using SPSS 20 software. The design results formed 16 choice sets that were randomly assigned to four questionnaire versions. Each questionnaire had four choice cases and each choice had three alternatives. Table 3 shows an example of a consumer choice.

The utility function for a representative consumer can be integrated into a systematic component or observable component and a random component or unobservable component by the analyst. The observable part was measured based on the consumer's evaluation of product characteristics (V), and the unobservable part was random and depends on the

No.	Variable	Measure	Description
1	WTP	Yes = 1 No = 0	WTP for organic oranges at different prices
2	Income	Million VND/ month	Total income of all family members in 1 month
3	Dependent person	–	Presence of children under 16 years old and elderly people over 60 years old in the household
4	Age	–	Age of the respondent
5	Education	Get value from 1–18	Education level of the respondent
6	Family size	–	Total number of family members
7	Food safety awareness[#]	0–10	Total score from food safety questions
8	Environmental awareness[#]	0–10	Total score from environmental questions
9	Price (Bid)	60 75 90 105	Suggested price per kg of organic oranges Unit: 1,000 VND

Note(s): [#]: Respondents were asked five questions about awareness. If the respondent answers "I know a lot" about the issue mentioned, he or she will receive 2 points. If the respondent answers "I know little" about the issue mentioned, he or she will receive 1 point. If the respondent answers "I don't know" about the issue mentioned, he or she will receive 0 points

Source(s): Compiled by the author

Table 1.
Variables in the CVM

No.	Attribute	Level	Measure	Description
1	Quality grade	Grade 1	1	Grade 1 oranges have better shape, color, sweetness, gloss, taste and richness than other grades
		Other Grade	0	
2	Country of origin	Domestic	1	Oranges are produced domestically or imported from Australia/US
		Import	0	
3	Traceability	Yes	1	Traceability labeling
		No	0	
4	Certification label	Organic	1	Certified organic products
			0	
		Eco-label	1	Labeling certifies that products are produced with less harm to the environment
			0	
5	Organic content	70%	70	Percentage of organic content in each product
		95%	95	According to USDA standards
		100%	100	
6	Price	60	60	Suggested price per kg of organic oranges
		75	75	
		90	90	
		105	105	

Source(s): Compiled by the author

Table 2. Organic fruit attributes in the CE

The following attributes will vary with different levels of management	Organic oranges A	Organic oranges B	
Country of origin	Vietnam	Australia/US	I do not choose to buy organic oranges A and organic oranges B; I only want to buy the oranges I am currently consuming
Quality grade	Grade 2	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: 1 unique option	*☐ Organic Orange A*	*☐ Organic Orange B*	*☐ Common Oranges*

Source(s): Orthogonal design results (OD)

Table 3. Sample example of one of the choices

individual's preferences (ε). The utility function (U_{nj}) of an individual n when consuming product j can be presented as an equation:

$$\mathrm{U_{nj}} = \mathrm{V_{nj}} + \varepsilon_{\mathrm{nj}} \tag{2}$$

This study analyzed a mixed logit model (MXL), with the hope of reducing bias and obtaining more accuracy in the research results. The choice probability function is presented as follows:

$$P_{nj} = \int \left(\frac{e^{\beta' x_{nj}}}{\sum_{j'=1}^{J} e^{\beta' x_{nj'}}} \right) f(\beta) d\beta \tag{3}$$

where (β) is the density function of the number β, the MXL model is essentially the weighted average of the MNL at different values of β, with the weights being the probability density function (β). This makes β distinct for each individual n (βn).

After estimating the parameters, the marginal value of a change in a single attribute is equal to the marginal rate of substitution between the non-monetary attribute parameter and the monetary attribute.

$$\text{MWTP} = -\frac{\beta_{Non-monetary\ attribute}}{\beta_{monetary\ attribute}} \tag{4}$$

4. Result

4.1 Estimation results from CVM

Table 4 shows the results of the total number of consumers both willing and unwilling to pay at the four proposed prices.

The results of Table 5 show that the log-likelihood value in Model 2 is larger than in Model 1. The Swait-Louviere log likelihood ratio test was used to select the appropriate model.

Table 4. Number of respondents willing and unwilling to pay for organic oranges

			Willing to pay		Unwilling to pay	
No.	Price	*n*	Frequency	Ratio %	Frequency	Ratio %
1	60,000	120	88	73.33	32	26.67
2	75,000	97	52	53.61	45	46.39
3	90,000	101	51	50.5	50	49.5
4	105,000	95	15	15.79	80	84.21
	Total	413	206	49.88	207	50.12

Source(s): Analysis from survey data of 413 respondents

Table 5. Results of the CVM

	Model 1		Model 2	
Variable	Coefficient	Standard error	Coefficient	Standard error
Price	−0.0509569***	0.0066708	−0.0535277***	0.0073478
Income			0.0000409***	0.0000101
Dependent person			0.3111158***	0.1333247
Age			−0.0130683	0.0119837
Education			0.0895826***	0.0349582
Family size			−0.1778778*	0.1004582
Food safety awareness			0.1419491***	0.0548891
Environmental awareness			0.099766*	0.0545043
Constant	4.128266***	0.5504975	1.429028	1.10584
Log-likelihood	−252.6491		−221.88134	
LR	67.24		128.77	
Prob > χ^2	0		0	
Pseudo R^2	0.1174		0.2249	
% of prediction correct	65.38%		75.3%	
Mean WTP (95% CI)	*81,010* (76,690–85,450)		*81,880* (77,380–86,320)	
n	413		413	

Note(s): ***, **, * indicate statistical significance at the 0.01 level; 0.05 and 0.1 respectively
95 per cent CI: 95 per cent confidence interval estimated using Krinsky and Robb (1986) method
Source(s): Analysis from survey data of 413 respondents

The test statistic of the index LR = 61.54 was much larger than the critical value of the chi-square distribution of 26.124 at the 0.001 significance level over 8 degrees of freedom. In addition, Model 2 had better predictability than Model 1. The results showed that Model 2 had an improved fit and superior results when compared to Model 1.

The coefficients of the variables of income, dependents, education level, food safety and environmental awareness have a positive sign, showing that these variables have a positive impact on WTP. Conversely, a negative sign of the coefficient of price variation and family size means that higher prices and larger family sizes will reduce consumers' WTP for organic oranges.

The results also showed the mean WTP of consumers for 1 kg of organic oranges is 82,000 VND. Thus, the WTP of households in urban areas in the Mekong Delta is relatively high (about 140% higher than the price of common oranges at 30,000 VND/kg).

4.2 Estimation results from CE

Table 6 presents the descriptive statistics of consumer choices in the CE model. The index Swait-Louvière LR test results in Table 7 show that the MXL model with interactive variables has improved fit and superior results when compared to the basic MXL model (Hensher *et al.*, 2005).

Table 8 show that the coefficients of the organic content, eco-label, organic certification label, traceability label and quality grade have positive signs, indicating that these attributes will increase consumer utility. Conversely, a negative coefficient of the price variable means that the higher the price increases, the more useful the consumer will be when buying, or the consumer tends to avoid consumption. In addition, the negative coefficient of the origin variable showed that Mekong Delta consumers tend to prefer oranges imported from abroad; specifically, in this study, oranges originating from Australia or the US increased their WTP.

The MXL model with interaction variables showed that, except for the coefficient of the interaction variable between ASC and the respondent's age, which is not statistically significant, the coefficient of ASC and the coefficients of the remaining interaction variables in the model are all meaningful. The coefficients of the interactive variables with ASC had

Choice	Frequency	Ratio (%)
Organic orange A	654	39.6
Organic orange B	448	27.1
Regular orange	550	33.3
Tổng	*1,652*	*100*

Source(s): Analysis from survey data of 413 respondents

Table 6. Descriptive statistics of consumer choices in CE

No.	Item	Model 1. MXL	Model 2. MXL with interactions
1	Log-likelihood	−1441.8489	−1431.0771
2	LR	305.99	318.20
3	Prob > χ^2	0	0
4	AIC	2911.698	2900.154
5	BIC	3002.812	3023.809
8	LR test model 1 and 2		21.54***
09	*n*	4,955	4,955

Source(s): Analysis from survey data of 413 respondents

Table 7. Swait Louviere LR test

No.	Variable	MXL Coefficient	MXL Standard error	MXL with interactions Coefficient	MXL with interactions Standard error
	Mean				
1	Country of origin	−1.001***	0.130	−1.012***	0.129
2	Quality grade	0.222**	0.096	0.232**	0.095
3	Organic certification label	1.381***	0.138	1.355***	0.137
4	Traceability label	1.034***	0.124	1.021***	0.124
5	Eco-label	0.702***	0.127	0.731***	0.125
6	Organic content	0.014***	0.005	0.013***	0.005
7	Price	−0.046***	0.004	−0.046***	0.004
8	ASC	0.725*	0.412	4.012***	1.136
9	ASC*Income			1.34e−05**	6.6e−06
10	ASC*Education			0.096***	0.037
11	ASC*Age			0.003	0.014
12	ASC*Food safety awareness			0.121**	0.059
13	ASC*Environmental awareness			0.123**	0.061
	SD				
1	Country of origin	−0.013	0.193	−0.050	0.198
2	Quality grade	0.715***	0.158	0.657***	0.175
3	Organic certification label	−0.654**	0.304	0.617*	0.330
4	Traceability label	0.752***	0.265	0.820***	0.330
5	Eco-label	−0.397*	0.309	0.055	0.297
6	Organic content	−0.025***	0.002	0.027***	0.002

Note(s): ***, **, * indicate statistical significance at 0.01, 0.05, and 0.1, respectively. The sign of the estimated standard deviation (SD) is irrelevant, thus interpreting it as positive
Source(s): Analysis from survey data of 413 respondents

Table 8.
Results of CE

positive values, showing that consumers with higher income, education level, and awareness of food safety and environmental issues had a higher probability of willingness to pay.

The study considered the magnitude of the coefficient of standard deviation (SD) compared to the coefficient of mean. The results showed that, when choosing organic oranges, about 63.7% of consumers preferred grade 1 oranges (better quality, more eye-catching appearance, more delicious), 98.6% of consumers preferred organic oranges with certified organic labels, more than 89.4% of consumers preferred oranges labeled with traceability, and about 68.5% of consumers preferred organic content in organic farming as high as possible.

The study determined a specific price for each attribute expressed at the marginal WTP of consumers when buying organic oranges in the presence of the above attributes. From there, the importance and influence of each attribute were determined. Consumers' willingness to pay for each attribute is shown in Table 9 and illustrated willingness to pay an

Unit: 1,000 VND No.	Attributes	WTP
1	Country of origin	*−22.056* (−27.282–−16.829)
2	Quality grade	*5.025* (0.808–9.242)
3	Organic certification label	*29.957* (23.663–36.250)
4	Traceability label	*22.123* (16.270–27.976)
5	Eco-label	*15.835* (10.896–20.774)
6	Organic content	*0.285* (0.076–0.494)

Note(s): 1 USD = 25405.00 VND
Source(s): Analysis from survey data of 413 respondents

Table 9.
Marginal WTP for organic orange attributes

average of 30,000 VND/kg more for oranges labeled with USDA organic certification (the highest WTP compared to other labels in the CE model). For traceability labeling to help consumers better understand product supply chain information, they were willing to pay an average of about 22,000 VND/kg more. Meanwhile, they were only willing to pay about 16,000 VND/kg more for oranges with eco-labeling. Consumers were willing to pay an average of 290 VND/kg more to increase 1% of organic content or input materials that meet organic standards in farming. After analyzing the origin attribute, results showed WTP had a negative sign, meaning that if the organic oranges were imported from Australia or the US, consumers were willing to pay a higher price than the average domestic orange, about 22,000 VND/kg. Consumers were willing to pay an average of about 5,000 VND/kg more for oranges of grade 1 quality.

5. Discussion, implication and conclusion

5.1 Discussion

In practical terms, the results reaffirmed the impact of health risk perception, environmental awareness and consumer characteristics on organic food consumption behavior, specifically through WTP. The coefficient of the income variable had a positive sign, meaning that the higher the consumer's income, the greater the likelihood of WTP for organic oranges, similar to studies by Jin *et al.* (2017), Skreli *et al.* (2017), and Wang *et al.* (2019). Income was a factor that strongly influenced demand for goods, and a consumer's shopping behavior was also strongly influenced by their economic situation (Kotler *et al.*, 2020) as a higher income brought higher spending power. When a consumer had a high disposable income, they had more opportunities to spend on premium products. In addition, results also showed that the higher the consumer's education level, the more likely they are to accept paying for organic food (Wahida *et al.*, 2013; Bhattarai, 2019). Education level profoundly influenced interest, assessment of goods value and preferences, and higher levels of education created a more advanced and modern consumer trend, with more choices and paying more attention to aesthetics, quality, branding, packaging, safety and health. Similar to Owusu and Anifori (2013) and Wahida *et al.*'s (2013) findings, which showed that the more elderly and children present in a household, the greater the concern with health and food safety issues, and the more positive the effect on WTP. However, the negative parameter estimated on the family size variable showed that the larger the number of family members, the lower the likelihood of WTP (Nandi *et al.*, 2017; Bhattarai, 2019) because families with many members have to spend more on food and, due to the higher price of organic food, spending on it was significantly reduced. Consumers with good knowledge about consumption health risks and awareness of current food safety and hygiene issues were likely to be willing to pay more for organic products (Adams *et al.*, 2018; Bhattarai, 2019; Wang *et al.*, 2019; Kokthi *et al.*, 2021). When looking for organic products, in addition to their usefulness, consumers were also interested in other social values. Supporting the research results of Nandi *et al.* (2017) and Kvakkestad *et al.* (2018), we found that consumers who were more aware of environmental risks in the agricultural production process had a higher WTP for organic oranges.

The better the orange quality, the more positively it affected consumer preference. Recent studies, which show that factors like product deliciousness (Kokthi *et al.*, 2021; Smith *et al.*, 2021), high nutritional value (Wang *et al.*, 2019; Kokthi *et al.*, 2021) and appearance (Gerini *et al.*, 2016; Wang *et al.*, 2019) all influenced consumer preferences as well as WTP.

The results showed consumers are interested in traceability labels when consuming organic oranges, similar to previous studies that stated labeling the origin of organic products was meaningful (Loureiro and Umberger, 2007; Hussein and Fraser, 2018; Cai *et al.*, 2019). Consumers were willing to pay more for products with traceability labels which were also extremely important for production and business activities, especially with agricultural

products, because counterfeit products, goods of unclear origin and poor quality are increasingly appearing on the market. However, our results showed a difference when analyzing consumer preferences for products originating locally or from other regions. Most previous studies showed consumers have a preference and high WTP for products of local or domestic origin over products of other regions or imports (Palma *et al.*, 2016; Cai *et al.*, 2019; Denver *et al.*, 2019; Smith *et al.*, 2021), however, Mekong Delta consumers preferred and were willing to pay more for organic oranges originating from countries with advanced agriculture. An undeniable characteristic of the Vietnamese consumption style is the preference for foreign products, perhaps because they believed that foreign fruits were more reliable in terms of food safety, had more stable quality, or that consumers did not really trust domestic agricultural producers.

Previous studies examined the role of food item organic certifications in different markets (Meas *et al.*, 2015; Jin *et al.*, 2017; Mazzocchi *et al.*, 2019; Wang *et al.*, 2019) and showed the presence of certifications created additional food safety trust that positively affected WTP for organic food. The results showed that consumers look to organic products because of their greater health and safety value compared to conventional products, and can be considered an indispensable core attribute of organic productsand why consumers are willing to pay the highest price. In addition, similar to recent studies, awareness of the use of pesticides and chemicals to ensure organic production standards and knowledge of pesticide and chemical residues in the product also positively affect WTP (Gerini *et al.*, 2016; Hempel and Hamm, 2016; Palma *et al.*, 2016; Adams *et al.*, 2018; Kvakkestad *et al.*, 2018; Bhattarai, 2019; Cai *et al.*, 2019; Denver *et al.*, 2019). In addition, the analysis results showed the positive role of eco-labeling in influencing the WTP of organic products, similar to previous studies (Jin *et al.*, 2017).

The negative and significant parameter estimate on price variable indicated that, as expected, respondents were less likely to purchase organic oranges when the price of oranges increased, all else being equal. Recent studies showed that high prices are the main barrier, making organic products less attractive to consumers (Cai *et al.*, 2019; Denver *et al.*, 2019; Mazzocchi *et al.*, 2019; Wang *et al.*, 2019; Curtis *et al.*, 2020). It can be inferred that the low purchasing rate of organic products among Mekong Delta consumers may be greatly affected by price.

From an academic perspective, we found that both CVM and CE can estimate the WTP for organic produce and, although CVM is more commonly used, (Hanley *et al.*, 1998), CE seemed more suitable for measuring the marginal value of different scenarios.

CVM is a well-established pricing technique in which respondents were asked their maximum WTP, assuming increased product quality, but CVM has been criticized for partial bias (Kahneman and Knetsch, 1992). For example, in this case, respondents bid on a broad category of organic orange product goodness rather than the individual attributes that made up each organic orange product. Carson and Mitchell (1995) argued this problem should be controlled by adequately informing respondents about alternatives and providing reminders of what was being highly evaluated.

In CE, respondents were asked to choose between different consumption packages described in terms of their attributes and the extent of the attribute, one used to estimate WTP being price. The CE method was closely related to association analysis (conjoint), a long-established technique in marketing that estimated "partial value" for different product attributes (Green and Srinivasan, 1990) and characteristics of each CE attribute allowed consumers to choose between different consumption options. By iterating such choices and varying the attribute levels, the researcher could infer four types of information: (1) which attribute significantly influenced the choice; (2) the rating implied the degree of influence of these attributes; (3) marginal WTP increased or decreased any significant attribute; and (4) WTP is implied for a scenario where multiple properties are changed simultaneously (Hanley

et al., 1998). Research also showed the CE method had promising advantages over CVM, the principle being its ability to provide an opportunity to elicit a deeper understanding of different product attributes that helped achieve effective production and business scenarios. However, the fundamental problems of using CE were that the experimental or statistical design was complex as was the attribute selection and relevance.

These choice attributes were not necessary in CVM, which may imply that if the main objective of the analysis was to estimate the overall WTP for organic oranges, then CVM was better than CE to evaluate individual business scenario characteristics. If researchers made progress accurately synthesizing attributes that form the appropriate sets and levels of features, other advantages of CE (such as related producer-to-consumer benefits) could lead to it becoming a priority in overall pricing. Based on consumers' expected benefits, we proposed potential scenarios for manufacturers businesses. Table 10 shows consumers' willingness to pay for organic orange scenarios.

Both CVM and CE methods were based on the concepts of stated preference and random utility theory (Hanemann, 1984), and individuals were encouraged to disclose true preferences through behavior in hypothetical markets. According to Jin *et al.* (2006), it was necessary to combine both CVM and CE methods to compare results and have a more solid basis before giving management implications. Therefore, we believed it was possible to combine both CVM and CE methods to price a product because the advantages of each method complemented the other, and thereby created an optimal business scenario for manufacturers.

5.2 Implications

From the results, we propose management implications to help components in the fruit supply chain develop the domestic organic fruit market.

First, according to Kotler *et al.* (2020), the formation of social class depended not only on income but also on education level, ability, occupation, status, place of residence, value orientation and relationships with other members of society. Different social classes have

Unit: 1,000 VND/kg

	Attributes					
Scenarios	Country of origin	Quality grade	Traceability label	Certification label	Organic content (%)	WTP
1	Vietnam	1	–	Eco	95	49.500
2	Australia/US	Other	–	Eco	70	59.000
3	Australia/US	Other	Yes	Eco	70	81.000
4	Vietnam	Other	Yes	Eco	70	59.000
5	Australia/US	Other	–	Organic	95	80.500
6	Australia/US	Other	Yes	Organic	95	102.500
7	Vietnam	1	–	Organic	70	56.000
8	Australia/US	1	–	Eco	100	73.000
9	Vietnam	Other	Yes	Organic	100	82.000
10	Australia/US	1	Yes	Organic	70	100.000
11	Vietnam	Other	–	Eco	70	37.000
12	Australia/US	1	–	Organic	70	78.000
13	Vietnam	Other	–	Organic	100	60.000
14	Vietnam	1	Yes	Organic	70%	78.000
15	Australia/US	1	Yes	Eco	100	68.000
16	Vietnam	1	Yes	Eco	95%	71.500

Source(s): 16 scenarios were created from orthogonal design by SPSS 20 software

Table 10. Estimating WTP levels for organic orange scenarios

different criteria for evaluating and choosing products and results showed that organic products are suitable for middle and upper classes, so market segmentation and product positioning in accordance with the target market played an important role.

Second, an organic fruit characteristic was that the products are often not attractive or uniformly sized. Thereby, organic agricultural producers should research, select and adjust plant varieties, organic farming methods and techniques to suit natural conditions of each ecological region. Measures to manage the harvesting, preservation and processing of organic products also needed to be considered by all components in the supply chain. In addition, we recommended that organic agricultural producers take advantage of changes in marketing trends to limit the risk of losses due to product quality deterioration by providing additional new channels (such as processing businesses, homestays, resorts, restaurants and fast-food chains).

Third, components in the supply chain developing the domestic organic fruit market needed to enhance the value of domestic agricultural products. Several countries around the world, such as France, Korea, Japan and Thailand, have used rural agricultural tourism to add value to products (Kien *et al.*, 2022). In addition, according to the Prime Minister's direction, rural agricultural tourism was a priority for the Vietnamese government from 2021 to 2025, and orientation to 2030, so businesses need to take advantage of this and develop effective local tourism marketing as a geographical indication of product quality. In addition, selecting members to participate in the organic fruit supply chain also played an extremely important role in the success or failure of building a perfect traceability system.

Fourth, for fruits in Vietnam, priority should be given to organic certification labels. However, achieving organic certification takes a lot of time, money and very complicated procedures, especially the process of maintaining certification and, for that reason, the target supply market must be identified. Vietnamese organic standards are enough for consumers who only care about the domestic market but, to expand the export market or the higher-end segment, attention must be paid to more advanced certifications.

Finally, the components of the domestic fruit supply chain must consider the domestic market and domestic resources as strengths for maintaining competitive prices. Organic fruit supply chains needed to segment the market to accurately identify target customers and design appropriate potential prices. The pricing method based on buyer perception seemed to be suitable for organic products.

5.3 Conclusion

The research results were similar to previous studies, namely empirical evidence that reaffirmed the impact of consumers' demographic characteristics, health awareness and environmental awareness on their willingness to pay for organic products. As expected, attributes such as country of origin, product quality, traceability label, organic certification label, eco-label, organic content in the production process and price all affected the WTP of consumers. An interesting finding was that most consumers in the Mekong Delta seemed to prefer fruits imported from countries with advanced agriculture which was different from previous empirical studies in other markets. Finally, price was a major barrier to organic fruit consumption in all customer segments.

This research framework focused only on organic product attributes and consumer characteristics. Future studies would need to focus on the value of other factors regarded as having a significant influence on organic consumption behavior, such as farm size, distance from production to consumption, purchasing frequency, product availability and trust in retailers.

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