

Factors Affecting Customers' Organic Vegetable Buying Intentions: A Case Study in the Northern Provinces of Vietnam

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ABSTRACT

Vietnam had the world's 92nd highest cancer rate out of 185 countries and territories in 2020. There are many causes, of which polluted environment and unsafe food are the two primary causes. The large amounts of pesticides in vegetables that are toxic to humans are also harmful to the environment. Therefore, the demand for safe vegetables is increasing while the current supply is not enough, difficult to find and trace the product origin. This study analyzes the demand for organic vegetables in the northern midland and mountainous regions of Vietnam. The research shows that only 77% out of 128 surveyed consumers are knowledgeable about organic vegetables. Among which, 84% knowing about organic vegetables spend 40% of their income on healthy and organic food. After using the SEM model to analyze the influencing factors, it shows that consumers' confidence, understanding and income have positive relations with the intention of buying organic vegetables. Family size is another determinant of organic vegetable buying behaviour. Families with vegetarians or Asian preferences tend to use vegetables more often. Moreover, the study shows that the organic vegetable market in the northern mountainous region of Vietnam is not fully developed; the range of organic agricultural products needs to be expanded, in addition, continuous supply, better marketing, better educating and providing information for customers are necessary to increase the supply as well as the production of organic vegetables in this region.

JEL Classifications: Q11, Q13, Q50, M3, I12

Keywords: organic vegetable, buying intentions, Vietnam, SEM model, mountainous area

I. INTRODUCTION

Being known as a famous agricultural country, Vietnamese products have been presented in many countries and trusted by numerous consumers. Although vegetables and fruits are essential daily items, more than 90 million Vietnamese are struggling to find safe products for each family meal, especially in the current agricultural market. According to statistics in 2018, more than 2,000 people suffered from food poisoning across the country (Ha et al., 2019). Moreover, using unsafe vegetables will be very dangerous for children, women with pregnancy, lactating women, people who have just recovered from illness or chronic diseases, etc. The recent statistics show the alarm about the current situation of unsafe vegetables on the market. Unhealthy food is one of the main causes of cancer in Vietnam, with 35% of cases. According to data from the Ministry of Health, Vietnam is one of the countries with the highest cancer rates in the world. Each year, the number of food poisoning is from 250 to 500; 7000 to 10000 people are hospitalized causing 100-200 deaths. In addition, Vietnam spends 0.22% of the annual GDP on 6 cancers caused mainly by unsafe food (Vietnam Ministry of Health, 2012).

Organic agricultural products are considered with relatively higher nutritional value since they are produced more naturally, without using pesticides, fertilizers or harmful chemicals, instead of applying microbial fertilizers which do not harm human health. In addition, clean water is used in both caring and irrigation processes, therefore, organic products contain more antioxidants, nutrients, vitamins and minerals, which contributes to creating a healthier immune system than other common vegetables helping to reduce the risk of cardiovascular diseases, cancer, and high blood pressure. Using organic vegetables is not only good for human health but also contributes to improving the living habitat by saying no to chemicals that are harmful to the environment (Govindasamy et al., 2020). As a result, farming land for organic vegetables becomes more fertile, better land reclamation, and reduces the problems of soil fallowing and organic erosion. Therefore, organic food contributes to protecting people's health, the environment and animal welfare. Those who are conscious and concerned about environmental issues are defined as green consumers (Azam and Shaheen, 2019).

The organic vegetable demand is increasing in the world, because of its dual benefits for both people's health and the environment. The largest organic product consumption market is the US (over 45%), followed by Germany and France. The demand for organic food is increasing because many consumers are concerned about conventional production (Khai, 2017; Kini et al., 2020). Customer's receiving a lot of information about risks from pesticides, fungicides and herbicides used in food production is one of the main reasons for this. Since health safety is important, consumers gradually switch to organic products. In recent years, the increasing distribution of organic products in the provinces and cities of Vietnam indicates that Vietnamese consumers are increasingly interested in protecting their health by using organic foods. However, according to the research, Vietnam provides its market with less than 1% of the total daily consumption of organic vegetables (Ha et al., 2019; Khai, 2017). Many causes are leading to the limited buying of organic vegetable products on the Vietnamese market, including some of the main reasons below:

- Consumers have not yet differentiated between organic, safe and other vegetables.

- High price compared to customers' income
- Products have not really reached the right market where consumers have demand.
- Products with little advertising, poor supply chain.

To understand the factors promoting organic vegetable consumption, many scholars and businesses have studied the consumers' buying intention or their demand for organic vegetables since the 2010s. This is a form of organic vegetable market research for the development and business strategies (Bhattarai, 2019; Govidasamy et al., 2020; Marda et al., 2021). Most studies indicate that beliefs, qualifications and attitudes are among important factors determining the intention to buy organic vegetables, while income is decisive on the buying behaviour. The hypothesis of the living area is also considered when the buyers' demand is not equal among the regions (Ha et al., 2019).

In this study, the authors surveyed consumers to determine the factors affecting the demand for organic vegetable products in the northern midland and mountainous provinces. This is an area approved by the Government to promote organic vegetables for people's health, improving the living environment, and sustainable economic development in the region. The survey was conducted in two parts. Part 1 includes demographic information to classify subjects inherited from previous studies such as age, gender, education level, marital status, living area with 02 additional factors including eating habits and family size. In Vietnam, extended families may stay together with up to 10 members, so the cost of using organic food becomes higher than families with smaller size. Similarly, the families' habits of using vegetarian food frequently also influence their increase of organic vegetable consumption to ensure adequate nutrition. Part 2 of the survey includes variables about intentions, perceived about the origin of the product, convenience perception, price perception, environmental perception, and subjective standards. The PLS-SEM model is used to evaluate the factors affecting the intention to use organic products of customers in the northern midland and mountainous areas of Vietnam.

The rest of the paper is structured as follows: Section 2 includes studies related to the demand for organic vegetables. Section 3 presents the conceptual model. The research methodology of this paper will be presented in section 4. The results will be presented in section 5, followed by the discussion and conclusion in section 6.

II. LITERATURE REVIEW

Consumers in the world are increasingly conscious of healthy food for the health of themselves and their families. There are also many other reasons for consumers' intention to choose organic products instead of ordinary ones. However, recent studies have also shown that there are many different factors influencing purchasing decisions, including environmental issues, health concerns, trust in food origin, convenience, subjective standards and price.

Trust is a decisive consideration when purchasing and consuming foods. Food certification is an aspect of food labelling used by policymakers and marketers to increase consumers' trust in food. Equally important, consumers' confidence in the food system and actors in its supply chain influences their overall perceptions of food safety and which foods they choose and consume (Truong et al., 2021). However, there are still many

consumers are bewildered by the widespread organic labeling and lack of government quality control barriers, leading them to pay large sums for food of uncertain origin. Numerous studies state that consumer's trust affects their organic product buying behaviour, moreover, the factors that directly affect the intention and behaviour to consume organic products confirmed in many studies are trust and consumption values (Ladwein and Sánchez Romero, 2021; Ngo et al., 2020; Tandon et al., 2020; Truong et al., 2021; Vega-Zamora et al., 2019). Organic food is a commodity that requires a high degree of confidence because consumers cannot verify its quality even after purchase and consumption. They rarely feel the difference between conventional and organic food. Consumers are incredulous that there may be fraud in crop control, certification and selling, etc. Indeed, organic food is a prime example of commodity credit; in other words, the consumer cannot verify whether the product is manufactured to the promised characteristics. Lack of trust is arguably one of the most important barriers toward organic food sustainable consumption.

Environmental protection and animal welfare are the factors that green consumers want to aim. They want a healthy environment by learning about products that protect the environment, which is also the fundamental reason why green consumers use organic products. Many studies have shown that their consumption behaviour is for environmental protection reasons (Srinieang and Thapa, 2018; Atalay et al., 2019). A part of the research believes that environmental health is closely related to human health because the environment ensures human survival, breathing air, clean water, and safe food. Many families start using organic vegetables when their health decreases; or someone in the family is sick. Some studies in families with vegetarians also found that they are more conscious of consuming safe vegetable products (Rahman, 2021; Tandon et al., 2020; Vega-Zamora et al., 2019).

Organic products on the market are 30% more expensive than non-organic products, so most low-income consumers cannot afford them, especially in big cities. While people in suburban or rural areas can cultivate vegetables for their families easily, low-income citizens in big cities have to take higher risks buying unsafe products for cheaper prices. They have no intention to choose organic vegetables, even many of them have no concept of organic products. Recent psychological studies indicated that the discrepancy between intention and behaviour to purchase organic food resulting from several deterrent factors such as high price (Tran et al., 2019; Kini et al., 2020).

Due to various reasons, organic vegetables are not advertised and supplied insufficiently. Therefore, many consumers do not understand the concept of organic vegetables and do not know where and how to buy them (Truong et al., 2021). Several studies have proven that convenience is one of the factors that improve the consumption of organic vegetables. The convenience of buying the products in the organic vegetable supply chain, including convenience store chains, supermarkets and other services to supply vegetables to consumers (Ha et al., 2019; Tandon et al., 2020).

Some studies have mentioned that the reason for using organic vegetables is introduced by friends, through propaganda or sick family members to make consumers see that access to organic vegetables is necessary. Therefore, policies and advertising communication are decisive to change the habit of consuming organic vegetables (Tran et al. 2019; Bhattarai, 2019).

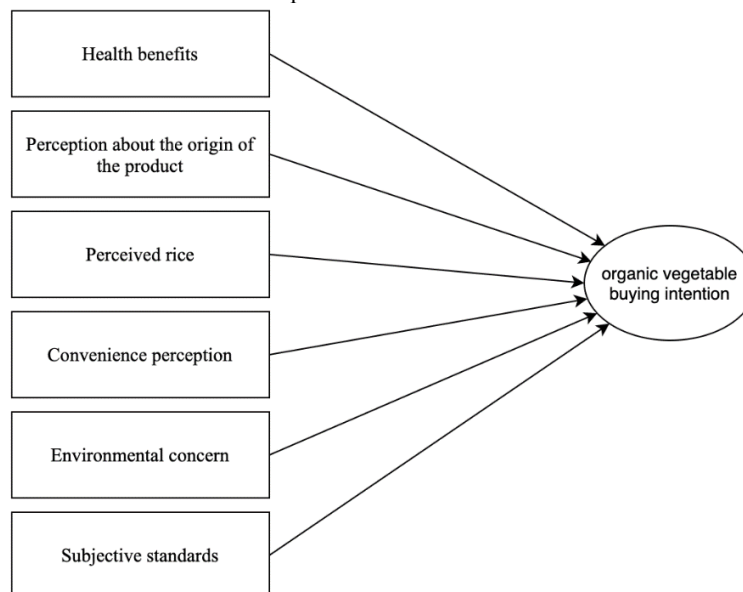
In short, from the overview to the details, most studies analyze a set of factors including health, environment, prices and consumer's income to determine the demand

for organic products. This study presents further investigations on aspects such as eating habits, family size and their influences on the demand for organic vegetable products in the midland and mountainous areas of northern Vietnam.

III. CONCEPTUAL MODEL

The online survey on Brazilian consumers about the consumption of organic vegetable products (Dorce et al., 2021) indicates that the variables used to measure include behaviour, intention, attitude, subjective norms, perceived behavioural control, perceived price, perceived health benefits along perceived sustainability. Tran et al. (2019) studied the factors affecting the intention to consume organic food in Vietnam. Their proposed hypotheses, including health benefits, environmental perception, price and convenience, are opposite factors with intention and behaviour. The study of Tandon et al. (2020) mentioned seven factors affecting buying behaviour of organic products: Attitude, Intrinsic motivation, Extrinsic motivation, Integrated regulation Integrated, Introjected regulation Introjected, External regulation External, Moderating role: environmental concerns and trust. Many other studies highlighted health, environmental, price, trust, social perceived and other factors (Atalay et al., 2019; Vega-Zamora et al., 2019; Rattanasuteerakul and Thapa, 2012; Slamet et al., 2016). Therefore, this study presents hypotheses about the factors affecting the demand for organic vegetables in the northern midland and mountainous areas of Vietnam after studying previous works. Although Vietnamese consumers become familiar with the concept of safe vegetables and wish to use them in their family's daily meals, other factors are also affecting their buying behaviour, of which health concern is the most important factor when unhealthy food is rampant in the market (Khai, 2017).

Figure 1
Proposed Research Model



- H1: Health concerns have a positive effect on the organic vegetable buying intention.*
- H2: Perception about the origin of the product has a positive effect on the organic vegetable buying intention.*
- H3: The perceived price has a negative effect on the organic vegetable buying intention.*
- H4: Convenience perception has a positive effect on the organic vegetable buying intention.*
- H5: Environmental concern has a positive effect on the organic vegetable buying intention.*
- H6: Social influence has a positive effect on the organic vegetable buying intention.*

A. Health Concerns

Several studies have stated that consumers' concerns about unsafe food in the market affect their intention to buy organic food (Srinieang and Thapa, 2018). This is one of the most fundamental factors since many northern midland and mountainous provinces in Vietnam such as Thai Nguyen and Bac Giang are currently among the cities with heavy industry development causing air and environmental pollution.

B. Perception about the Origin of the Product

Market surveys show that consumer's trust is an obstacle for brands and products. In the current market, products with illegitimate origin labelled as organic are rampant, resulting in scepticism about whether the product is truly organic. Therefore, the benefits and relevant information about organic food products need to be available for sound decisions based on their budget and/or preferences. Studies have shown that providing adequate information on the products is important to increase the demand for organic food because it increases consumer confidence and positive attitudes towards organic products.

C. The Perceived Price Has a Negative Effect on the Organic Vegetable Buying Intention

The price of organic vegetable products on the Vietnamese market is 3 to 4 times higher than that of conventional vegetables. Therefore, it is difficult for people with low-income to access this product. Price and spending influence the decision to choose organic products. Middle and high-income consumers who are willing to pay a high price for organic foods mentioned that the high price causes them to reduce their consumption of the products. The family size also affects the need to reduce household expenses.

D. Convenience Perception Has a Positive Effect on the Organic Vegetable Buying Intention

The organic supply chain seems to be available only in supermarkets or chain stores selling organic products in big cities. Local markets or small shops often do not offer organic products. Therefore, consumers have little access to organic products in small cities or rural areas.

E. Environmental Concern Has a Positive Effect on the Organic Vegetable Buying Intention

Consumers with environmental and social well-being perception are motivated to find, innovate alternative ways, and take the right actions to protect the environment. So they participate in an environmental strategy by using green environmental and biodegradable products, consuming organic food, etc. Customers involved in environmental protection activities tend to accept and consume organic food products. Being produced under natural farming processes without using chemical pesticides and fertilizers, organic food is considered as an environmental strategy to reduce pollution. This encourages green consumers to buy organic food products since they want to protect the environment.

F. Subjective Standards Have a Positive Effect on the Organic Vegetable Buying Intention

Subjective standards are positive social factors including the media, referrals from friends, acquaintances, or family members who work in this field. In addition, families with children or sick people, and those who are sensitive to chemicals are more likely to consume organic vegetable products. Families with vegetarian habits and daily use of vegetables in family meals spend up to 40% of monthly expenses on the products.

IV. RESEARCH DESIGN

A. Data Collection

Authors designed a questionnaire and created survey form by Google. Google form is a convenient and popular tool to survey in Vietnam since most Vietnamese people use google email (reach over 90%). So that, we've used it for collecting data from consumers. The survey was conducted from April to June 2020 on the intention to consume organic vegetable products in cities and rural areas in the Northern Midlands and Mountains region of Vietnam with 287 samples. After filtering the incorrect or incomplete questionnaires, 182 complete samples are selected for the study.

B. Statistical Analyses

Demographic information, which has a significant impact on the intention and demand to consume organic vegetables, was collected during the sampling process, including information on name, marital status, age, gender, education, job position, monthly income, family size, type of food used and the area of residence. Table 1 below presents the basic demographic profile of the samples.

V. RESEARCH RESULTS

In this study, the authors used the SEM model to test the hypothesis. SmartPLS is a tool to implement the SEM model. SmartPLS is one of the featured software applications for Partial Least Squares Structural Equation Modeling (PLS-SEM) and the leading software in applying the PLS approach in SEM model estimation (PLS-SEM). The effective

application of the PLS-SEM method in the research project thanks to its intuitiveness and ease of use.

Table 1
Demographic Characteristics of The Sample

	Category	Number	%	Variable	Category	Number	%	
Marital status	Married	162	89%	Gender	Female	39	21%	
	Single	20	11%		Male	143	79%	
	Total	182	100%		Total	182	100%	
Age	< 20	8	4%	Education	High school	0	0%	
	20-29	36	20%		Bachelor	174	96%	
	30-39	57	31%		Master	7	4%	
	40-50	54	30%		Doctoral	1	1%	
	> 50	27	15%		Total	182	100%	
	Total	182	100%					
Professional	Officer	148	81%	Income monthly	< 8 mil	57	31%	
	Retired	7	4%		8 mil – 15 mil	79	43%	
	Housewife	23	13%		15 mil – 30 mil	30	16%	
	Student	4	2%		> 30 mil	16	9%	
	Total	182	100%		Total	182	100%	
Number of family members	1	8	4%	Commonly used foods	Western food	37	20%	
	2	19	10%		Vietnamese food	124	68%	
	3	96	53%		Vegetarian food	21	12%	
	4	45	25%		Total	182	100%	
	> 4	14	8%					
	Total	182	100%					
Living are	Urban	103	43					
	Countryside	79	57					
	Total	182	100%					

The study encoded the variables in questions after collecting, cleaning the data and removing empty fields. Next, the study encodes survey questions into variables to measure, grouped with 07 scales, in which there are 06 scales as factors and 01 as the influence results. Table 2 below describes the scale and the variables coded from the survey question.

The reliability of the scale is assessed by the internal consistency method through Cronbach's Alpha coefficient. Commonly, the scale is selected when Cronbach's Alpha reliability is greater than 0,6, but in some cases, can select when Cronbach's Alpha is greater than 0.5.

Because the Cronbach's Alpha coefficient of these variables SK, MT, CM, GC, NT, TL are all greater than 0.6, indicating that these three variables are all significant for the hypothetical model. Composite Reliability (CR) ≥ 0.7 is calculated for each unidirectional factor, in this model, CR > 0.7 , showing that the model has high reliability. The average variance extracted (AVE), used to measure the convergence between a set of items representing a hidden concept, is the average percentage of the explained change (variance extracted) between the items of a given concept. The AVE of the model is all greater than 0.6, which shows the fit of the variables in the model. R square = 0.578 and Chi-square = 510,920, acceptable model.

Table 2
Coding of Question Variables

Variable	Scale
	Health Concern (HC)
HC1	I use organic vegetables because it's good for my family's health
HC2	I use organic vegetables because of the diet
HC3	Organic vegetables are healthy
HC4	It is important to eat healthily
	Price perception (PP)
PP1	The price is higher than usual
PP2	The current price is appropriate
PP3	My income is enough to buy organic vegetables
PP4	The price is high but I still buy
	Perception about the origin of the product (TP)
TP1	I believe in supermarkets and stores that sell
TP2	I just bought it through an acquaintance
TP3	I buy online or through a referral
	Convenience Perception (CP)
CP1	I easily buy at the supermarket
CP2	I have a regular supply
CP3	It's hard for me to buy because it's too far and inconvenient
	Environmental perception (EP)
EP1	Using organic vegetables is protecting the environment
EP2	I use organic vegetables because of the environment
EP3	I recommend my relatives to use organic vegetables for the environment
	Subjective standards (SS)
SS1	I reach out through social media to promote organic vegetables
SS2	I always find good sources of organic food for my family
SS3	I know it through a friend's recommendation
SS4	I have acquaintances who produce and recommend
	Buying intention of organic products (BI)

Table 3
Reliability and Validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
BI	0.736	0.692	0.705	0.727
HC	0.741	0.727	0.843	0.852
PP	0.816	0.729	0.861	0.752
TP	0.719	0.793	0.745	0.638
CP	0.882	0.862	0.826	0.680
EP	0.693	0.761	0.905	0.824
SS	0.623	0.674	0.521	0.680

This study used the outer loading value of the variables to calculate the loading to see whether it fits the model. When evaluating the outer loadings measurement, the model is acceptable if it is between 0.5 and 0.7. Table 4 shows the outer value of this model.

The variance inflation factor (VIF) is used for diagnosing collinearity and multicollinearity. The evaluation of multicollinearity between variables includes evaluation with hidden variables and indicators in table 5 below.

Table 4
Analysis of Independent Variables

	HC	PP	TP	CP	EP	SS	BI
HC1	0.762						
HC2	0.871						
HC3	0.624						
HC4	0.553						
PP1		0.912					
PP2		0.908					
PP3		0.868					
PP4		0.842					
TP1			0.741				
TP2			0.723				
TP3			0.746				
CP1				0.547			
CP2				0.623			
CP3				0.758			
EP1					0.857		
EP2					0.738		
EP3					0.862		
SS1						0.718	
SS2						0.614	
SS3						0.612	
SS4						0.603	
BI							0.861

Table 5
Outer Variance Inflation Factor of Indicators

	VIF
HC1	1.239
HC2	1.462
HC3	1.934
HC4	1.345
PP1	2.134
PP2	1.425
PP3	2.066
PP4	1.536
TP1	1.946
TP2	4.516
TP3	2.191
CP1	3.525
CP2	1.442
CP3	1.883
EP1	2.424
EP2	1.987
EP3	2.836
SS1	1.823
SS2	3.524
SS3	2.524
SS4	1.342
BI	2.014

The study evaluates if the model fits the hypothesis t-value and p-value, used to measure and assess the proposed hypotheses. The values of t-value > 1 and p-value < 0.05 are both acceptable. The results are in table 6 below.

Table 6
Measurement of T-value and P-value

Hypothesis		Standard Deviation (STDEV)	t-Statistics (O/STDEV)	p- values
<i>H1: Health concerns have a positive effect on the organic vegetable buying intention.</i>	Health Concerns -> Intention	0.024	13.242	0
<i>H2: Perception about the origin of the product has a positive effect on the organic vegetable buying intention.</i>	Trust -> Intention	0.072	4.241	0.028
<i>H3: The perceived price has a negative effect on the organic vegetable buying intention.</i>	Price -> Intention	0.038	3.241	0.082
<i>H4: Convenience perception has a positive effect on the organic vegetable buying intention.</i>	Convenience -> Intention	0.062	6.013	0
<i>H5: environmental concern has a positive effect on the organic vegetable buying intention.</i>	Environment Concerns-> Intention	0.047	3.635	0
<i>H6: Social influence has a positive effect on the organic vegetable buying intention.</i>	Subjective Standards -> Intention	0.083	5.731	0.058

The model estimation results show that the hypothesis is appropriate. Summarize the hypothesis and test results in Table 7 below.

Table 7
Hypothesis Test Results

Hypothesis	Accept/reject
<i>H1: Health concerns have a positive effect on intention to buy organic vegetables</i>	Accept
<i>H2: Perception about the origin of the product has a positive effect on intention to buy organic vegetables</i>	Accept
<i>H3: Price has a negative effect on intention to buy organic vegetables</i>	Accept
<i>H4: Convenience perception has a positive effect on intention to buy organic vegetables</i>	Accept
<i>H5: environmental perception has a positive effect on the intention to buy organic vegetables</i>	Accept
<i>H6: Social influence has a positive effect on intention to buy organic vegetables</i>	Accept

The above results show that the model is consistent with the hypothesis. Thus, the proposed hypotheses are reasonable in determining the factors affecting to buy intention organic vegetables of consumers in northern Vietnam.

VI. CONCLUSION

Research into organic food purchase intention is an important issue to stimulate production growth and economic development in this area. Developing organic food not only brings health benefits to people but also ensures economic development for farmers. Research into organic food purchase intention plays an important role in stimulating production and economic development in this area. Promoting organic food not only brings health benefits but also ensures economic development for people. For Vietnam, organic agriculture development is of great macro importance to solve environmental and

social problems and exporting organic agriculture to the international market.

According to the Project on organic agriculture development approved by the Vietnamese government from 2020 to 2030, planning organic farming land effectively and increasing the area for organic production are necessary. The Northern midland and mountainous region is the key area to develop organic vegetable production. It is also a watershed of many rivers, so the development of organic vegetables helps to balance the ecology, protect water sources and solve employment problems and ensure social security for the region.

The percentage of people with high demand for organic vegetables related to their health concern is high, reaching nearly 97% of the surveyors intending to use organic vegetables in the future. However, many people said that they have a habit of using products with illegitimate origin provided by acquaintances, so their confidence in the labels of organic vegetable products is low. This is easily proven because most local people have a habit of self-cultivation as they believe in their own safe products. On the other hand, some people argue that the inconvenience of the supply chain has made it difficult to find daily organic vegetable supplies since most of them are transferred to major cities. The study shows that the supply chain of organic vegetables in the northern midland and mountainous areas of Vietnam has an important influence on the buying behaviour of organic vegetables in this region. Because according to the survey, despite having buying intention, it is difficult for consumers to find trusted suppliers for the products. In addition, the purchase of organic vegetable products by local farmers also contributes to expanding the supply chain to the current organic vegetable market.

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