INDIAN JOURNAL OF ECONOMICS AND DEVELOPMENT

RESEARCH ARTICLE

Determinants of Consumer's Willingness to Pay towards Organic Products: A Structural Equation Modelling Approach

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OPEN ACCESS

Received: 12.09.2021
Accepted: 02.11.2021
Published: 28.12.2021

Citation: Harishankar K, Ashok KR, Saravanakumar V, Shalander K, Duraisamy MR, Maragatham N (2021) Determinants of Consumer's Willingness to Pay towards Organic Products: A Structural Equation Modelling Approach. Indian Journal of Economics and Development, Vol. 9, Article ID: IJED-2021-126, Pages: 7. Doi: https://doi.org/10.17485/IJED/v9.2021.126

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Funding: None

Competing Interests: None

Published By Indian Society for Education and Environment (iSee)

ISSN
Print: 2320-9828
Electronic: 2320-9836

Abstract

Background: India's food industries are hotly debated as there are numerous scandals involved in tainted food products, which deliberately lowers the public's confidence. These incidents made the organic food market growth in developing countries, especially in India. **Objective:** This study examines the underlying factors that influence consumer's willingness to pay for organic products. **Methods:** Coimbatore district of Tamil Nadu in India was purposively selected for the study using a structural equation model (SEM) with 250 respondents. The study was conducted in twelve organic shops distributed across the district. The model is bifurcated into the willingness to pay construct and attitude construct, which helps understand the factors influencing the consumer's willingness to pay towards organic products. **Findings:** The results from the attribute construct showed that health concerns, environmental concerns and subjective norms were found to positively affect the consumer's attitude towards purchasing the organic product. In the case of willingness to pay construct, the factors like attitude, knowledge, awareness and income of the consumers positively influence willingness to pay towards the organic product. In contrast, the factor perceived expensiveness was contrary in nature. **Novelty:** This empirical study provides a good understanding of purchase intention towards organic products, which will aid the producers, middlemen, and stakeholders develop the product and expand the market.

Keywords: Willingness to Pay; Organic Products; Structural Equation Model; Tamil Nadu

1 Introduction

Pesticide usage has been widespread in the field of agricultural operations and it causes 30,00,000 poisoning cases and 2,20,000 deaths were reported across the globe annually, the majority were from developing countries [1]. The products overexposed to the pesticides might cause lip, stomach, skin and brain cancers, lymphoma, leukaemia and multiple myeloma [2]. In India, pesticides were used at an average rate of 0.6kg/ha to decrease pest incidence [3]. Moreover, high usage of pesticide deposits heavy metal residues of mercury, arsenic and lead in the open environment, which results in air pollution, soil degradation and groundwater contamination [1]. Rapid urbanisation in the past decades has led our population to follow a fast-food habitat, pushing them towards an unhealthy diet [4,5]. These real-world issues have created an awareness of organic food and its products to follow a healthy life. The International Federation of Organic Agricultural Movements (IFOAM) has established several guidelines for organic production and processing [6]. Participatory Guarantee System for India (PGS-India) is a low-cost alternative to third-party certification for small-scale organic farmers seeking domestic markets. In addition to a shared vision to govern production standards, it incorporates a participatory approach and collaborative responsibility. It has 562 Regional Councils that help farmers achieve organic food certification for domestic sale. The Jaivik Bharat logo was created in response to consumer complaints about fake organic items in the market and to build confidence among consumers. The logo was created in partnership with the Agricultural and Processed Food Products Export Development Authority (APEDA) and the PGS of the Ministry of Agriculture and Farmers Welfare. The National Program for Organic Production (NPOP) certifies farmers for exporting organic produce through 28 accredited certification bodies [7,8]. Tamil Nadu Organic Certification Department (TNOCD) was established in 2007 by the Tamil Nadu Government to conduct inspection and certification of organic production systems in compliance with NPOP (National Programme for Organic Production) and there are three number of Regional councils working for Tamil Nadu farmers at Ooty, Vellore and Thajavur. In 2018-19, 4768 farmers in Tamil Nadu were certified with 31687 acres of land as organic [9,10]. India ranks eighth position in land under organic production with an area of 1.78 million hectares and has the largest organic producers (0.83 million) across the globe. In organic production, India has produced around 1.7 MT of organic produces in 2017-18 [11]. Several studies have investigated the willingness to pay (WTP) towards organic products and argued that factors like attitude, knowledge and awareness were higher in developing countries which influences the WTP [12]. In developing countries like India, due to increasing awareness of health concerns and environmental and food safeties, the demand for organic products has increased over the years [13]. This paper is mainly oriented on the demand side of the market, i.e., consumer's WTP towards organic products to estimate statistical inter-relationships between the factors influencing WTP using structural equation modelling (SEM).

2 Methodological Framework

The primary data was collected in Coimbatore city in Tamil Nadu through a non-probability purposive sampling method with 250 respondents surveyed in twelve retailer shops to fulfil the objective by a well-structured questionnaire. Out of the total samples, 244 were utterly filled and considered for the estimation of WTP.

Model Specification

The model has a theoretical framework that believes that WTP is greatly influenced by the factors like knowledge, health concerns, attitude, subjective norms, culture, environmental concerns, perceived expensiveness and certification and labelling[14]. The model was illustrated in Figure 1. It was used to assort the statistical methods that allow quantifying the relationship between a group of discrete or continuous variables. They were measured through SEM and it is a combination of factor analysis and regression that directly links path diagram, equations, and fit statistics[15]. SEM describes the statistical relationship between endogenous and exogenous latent variables. The equation of the structural equation model was given as:

$$\theta = \beta\theta + \alpha\xi + \zeta$$

where θ is the endogenous latent variable; β is the coefficient of endogenous latent variable; ξ is the exogenous variable; α is the coefficient exogenous variable and ζ is the random error. The relationship between the endogenous or exogenous variable and its observed variable was given by the measurement model below:

$$A = \Lambda a\xi + \delta$$

$$B = \Lambda b\eta + \varepsilon$$

Where, A is the observation index of ξ; B is the observation index of η; δ is the measurement error of A and ε is the measurement error of B. Λa and Λb are the factor load matrices which are used to measure the relationship between measurement variables and latent variables. The empirical equation for the estimation of the willingness to pay is given as :

$$ATT = \beta_0 + \beta_1 HC + \beta_2 EC + \beta_3 CUL + \beta_4 SN + \delta$$

$$WTP = \alpha_0 + \alpha_1 ATT + \alpha_2 OPK + \alpha_3 PEX + \alpha_4 LAC + \alpha_5 EDN + \alpha_6 AGE + \alpha_7 INC + \alpha_8 FS + \varepsilon$$

Where, the abbreviations in the above equations are denoted as attitude (ATT), health concerns (HC), environmental concerns (EC), culture (CUL), subjective norms (SN), willingness to pay (WTP), knowledge about organic products (OPK), perceived expensiveness (PEX), labelling and certification (LAC), education (EDN), age (AGE), monthly income (INC) and family size (FS) of the respondents.

The endogenous and exogenous latent variables and their description were given in Table 1. Nine latent variables were included in the model such as health concerns, subjective norms, knowledge about the organic products, culture, environmental concerns, perceived expensiveness, attitude, labelling and certification and willingness to pay. WTP was considered as the endogenous variable and other latent variables were taken as exogenous latent variables. Measurement variables were the tools that measure the latent variables with a series of questions with varied Likert values. Only attitude, labelling and certificate and WTP have four measurement variables and others had three measurement variables. The measurement variables of each latent variable were coded separately for avoiding confusion. Each measurement variable was assessed through a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Cronbach alpha, composite reliability and average variance extracted (AVE) were used to check the reliability and validity of the model[16,17]. The hypothesis was put forward to determine the factors affecting consumer's WTP towards organic products shows that all the factors positively influence the WTP except perceived expensiveness. The structural equation modelling was performed through computer-aided software ADANCO.

3 Results and discussion

The descriptive statistics show that the females were commonly involved in purchasing the household groceries and they contributed about 62 percent of the respondents. The majority of the respondents (37 percent) were 41-50 years of age as middle-aged people aware of health consciousness. The past studies revealed that middle-aged people were more conscious about organic food as they were subjected to more diseases[18]. Meanwhile, 40 per cent of the respondents were graduates and 52 per cent of them were found to have an income higher than Rs. 50,000. Structural Equation Modelling which is similar to simultaneous equation modelling was employed to assess the factors influencing the WTP. To examine the internal consistency of the model, Cronbach alpha (CA) and composite reliability (CR) were used and in case of convergent validity check, average

Table 1. Description of the latent variables included in SEM

Latent variables	Measurement variables	Measurement variable code
Health Concerns	I do not eat foods with additives and preservatives.	HC1
	While purchasing I regularly read ingredient labels	HC2
	Harmful chemicals in food items worry me	HC3
Subjective Norms	I choose organic products by looking at others	SN1
	I choose organic products due to pressure given by the society	SN2
	Most people who are important to me would like me to choose organic food.	SN3
Knowledge	I have sufficient knowledge about organic products	OPK1
	I have knowledge about organic food is based on previous experience	OPK2
	I know the process of organic production.	OPK3
Culture	I follow a healthy habitat or lifestyle	CUL1
	Environmental values concern me	CUL2
	I choose organic food because rich people use it.	CUL3
Environmental Concerns	I choose organic products due to climate change	EC1
	I carry my bag to avoid plastic pollution	EC2
	Organic products are produced from sustainable resources without any pollution	EC3
Perceived Expensiveness	Organic products are high priced.	PEX1
	Only rich people can afford organic products.	PEX2
	Organic products are not in my budget.	PEX3
Attitude	Organic product contains more natural ingredients than conventional products.	ATT1
	I am willing to pay higher prices for high-quality organic products.	ATT2
	I have a good impression of organic products.	ATT3
	Buying an organic product is a wise choice.	ATT4
Labelling and Certification	I will only prefer the organic products with labelling and certification given by the authority.	LAC1
	Some organic products are difficult to find as they are without any certified logo.	LAC2
	My willingness to pay is based on the organic label.	LAC3
	I trust in the standards behind the certification	LAC4
Willingness to Pay	I am a regular buyer of organic products irrespective of variations in prices.	WPT1
	I buy organic products even at peak prices.	WPT2
	I always buy organic products, although they are in a distant market	WPT3
	I would still buy organic products even if an alternative comes to the market.	WPT4

Table 2. Reliability and validity analysis for the structural equation model

Latent Variable	Cronbach Alpha (CA)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Knowledge	0.760	0.690	0.660
Health concerns	0.851	0.810	0.770
Subjective norms	0.719	0.850	0.501
Environmental concerns	0.802	0.890	0.519
Culture	0.571	0.501	0.418
Attitude	0.732	0.874	0.777
Perceived expensiveness	0.830	0.914	0.792
Labelling and certification	0.772	0.897	0.701
Willingness to pay	0.868	0.899	0.791

variance extracted (AVE) was used in this model. The threshold values for CA, CR and AVE were reported as 0.7, 0.8 and 0.5 respectively [17,19,20]. Considering the above facts, the results from Table 2 revealed that all the latent variables except culture were internally consistent and valid for estimation.

SEM has been used by many researchers and policymakers to estimate the interrelationship among the factors or latent variables [21]. Model fit represents how the data reflects the underlying theory. In this context, Goodness of fit index (GFI) and standardised root mean residual (SRMR) should be greater than 0.90 and less than 0.08 respectively for a good model [22]. To avoid complications, our model is split into two constructs viz., sub-model (attitude construct) and primary model (WTP construct) as shown in Figure 1. In the sub-model, the attitude was treated as an endogenous (dependent) latent variable, while variables like health concerns, environmental concerns, subjective norms and culture were treated as an exogenous (independent) latent variable. In case of the primary model, WTP was treated as the endogenous variable. Other factors like attitude, perceived expensiveness, labelling and certification, age, monthly income, knowledge about organic products, educational status, and family size were treated as the latent variables. Table 3 represents the structural equation estimates for the attitude constructs. Results revealed that the model was well fit to the responses as the GFI (0.921) and SRMR (0.0672) were in the acceptable range. The R^2 for this sub-model was estimated as 0.312.

Table 3. Structural equation estimates for attitude construct

Dependent variable		Independent variable	Estimate	Standard estimate	Standard error	C.R
ATT	<—	Health Concerns	0.143	0.16***	0.017	4.442
ATT	<—	Environmental Concerns	0.208	0.217**	0.016	7.23
ATT	<—	Subjective Norms	0.123	0.117**	0.024	9.033
ATT	<—	Culture	0.277	0.289 ^{NS}	0.209	2.009

Source: Primary data; ** Significant at 5 per cent level; ***Significant at 1 per cent level, NS- Non-significance.

The estimates from Table 3 show that variables like health concerns, environmental concerns, and subjective norms were significant and positively influenced the consumer's attitude. This gives a strong support that the health concerns, environmental concerns and subjective norms changes the attitude of the respondents to purchase the organic products for their wellbeing. The primary model includes the sub-model to estimate the direct and indirect effect of the independent variables on WTP. In case of the WTP construct, the model has a good fit as GFI (0.932) and SRMR (0.055) exceeded the threshold level and were in the acceptable range. The results from Table 3 revealed that the factors like knowledge, attitude, age and income were found to be positively influencing the consumer's WTP. Meanwhile, the perceived expensiveness negatively impacted the consumer's WTP indicating that whenever the price of the organic produce being higher or expensive, the consumers were less likely to purchase the organic products. The results provide a shred of evidence that the WTP towards organic products dramatically depends on the socio-demographic pattern of the respondents. Several studies emphasised the attitude and knowledge were the root cause factors that control the purchase intention of the consumer [23]. The findings from this paper were on the demand-side oriented and would help each actor (producer, middleman and retailer) in the marketing channel to understand the purchase intention of the consumers. Further, it will give additional information to the young researchers and policy makers about the price discovery in the arena of the organic world.

Table 4. Structural equation estimates for willingness to pay construct

Dependent variable		Independent variable	Estimate	Standard estimate	Standard error	C.R
WTP	<—	Knowledge	0.099	0.101***	0.008	15.458
WTP	<—	Perceived Expensiveness	-0.189	-0.267**	0.011	-13.215
WTP	<—	Labelling and Certificate	0.332	0.341^{NS}	0.214	1.752
WTP	<—	Attitude	0.289	0.302***	0.017	4.422
WTP	<—	Age	0.74	0.085**	0.051	10.146
WTP	<—	Education	-0.800	-0.088 ^{NS}	0.113	-2.487
WTP	<—	Income	0.138	0.151***	0.11	11.254
WTP	<—	Family size	-0.025	-0.027 ^{NS}	0.177	-3.365

Source: Primary data; ** Significant at 5 per cent level; ***Significant at 1 per cent level,
NS- Non-significance

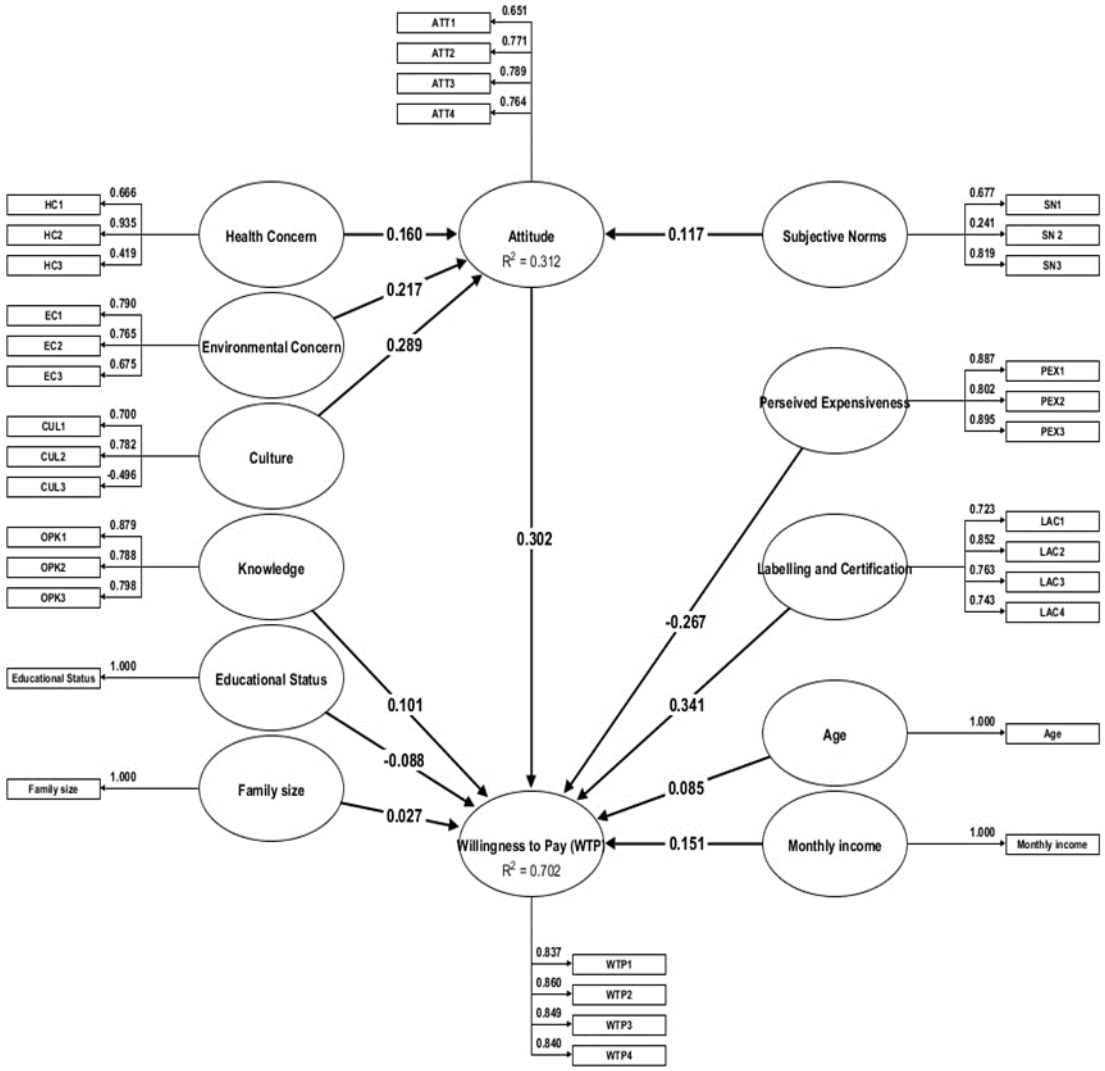

Fig 1. Structural Equation Model for the WTP construct

4 Conclusion

Trends in the growth of organic products showed that the consumers were seeking alternative food products that were environmentally sustainable without any harmful synthetics. Few respondents in the study area believed that some organic products were illicit as they contain chemical compounds. In order to attract more consumers, proper guidelines under the production system, labelling and certification should be followed. Henceforth, the trust in the organic products would be maintained among the consumers. Education and awareness of the consumers greatly influence purchase intention and the result of this study gives a clear view that knowledge, perceived expensiveness, attitude, age and income of the consumer plays a huge role in influencing willingness to pay. Appropriate strategies like creating awareness through education, campaigns and trustworthy advertisement will increase the confidence of the consumers. Future research should concentrate on other intrinsic and extrinsic factors which are related to consumer's willingness to pay.

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