

Determinant Attributes of Customer Satisfaction on Organic Rice in Thailand: A Comparison of Methods

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Received: May 19, 2021; Revised: June 14, 2021; Accepted June 21, 2021

ABSTRACT

This study aimed to 1) determine determinant attributes affecting customer satisfaction of new generation Thai customers with organic rice, 2) compare two widely used methods, OLS and logistic regression, and 3) provide suggestions for marketing implementation for local organic rice entrepreneurs. The authors applied OLS and logistic regression as methods to identify significant determinants of customer satisfaction. Overall, there are four determinant factors, product quality, brand image, customer service, and social responsibility, influencing customer satisfaction with organic rice. In this study, there was no difference in both significance and prioritizing of determinant attributes affecting customer satisfaction between both methods. Corresponding with previous research findings, product quality that consists of taste, texture, nutrition, smell/aroma, and type of rice are significant and have the highest impact on customer satisfaction with organic rice. Both male and female customers focus on product quality. The only male focuses on social responsibility, whereas the only female focuses on brand image and customer service. An organic rice entrepreneur should focus on four determinant factors that are product quality/attributes, brand image with packaging, customer service/backyard system, and social responsibility.

KEYWORDS: Satisfaction, Method Comparison, OLS, Logistic Regression, Organic Rice

Introduction

Agriculture is an important sector in Thailand, which contributes for 8.64% of the total GDP (Office of Agricultural Economics, 2021a). There are around 8 million households who are agricultures and around half of them grow rice (Office of Agricultural Economics, 2021b). Therefore, rice is an important product.

Organic rice is obtained from organic production based on an agricultural management system that supports ecosystems and biodiversity and emphasizes on the use of natural materials without synthetic raw materials or plants, animals, and microorganisms derived from genetic modification or genetic engineering process (Rice Department,

2018). Agriculturers can create more value by charging a premium price for organic rice products. Consumers are willing to pay a premium price because customers are more concerned about their health and environment (Vapa-Tankosić, Ignjatijevic, Kranjac, Lekić, & Prodanović, 2018; Vietoris et al., 2016).

Purposes

This study generally aimed to study the determinant attributes affecting customer satisfaction with organic rice on new generation customers in Thailand. However, there are various methods widely employed to identify the determinants. This study, therefore, also makes an attempt to compare two conventional methods of identifying determinant attributes that are ordinary least square (OLS) regression and logistic regression. This should yield us more alternatives to select the best-fitted model to explain and reflect the real market situation.

Customer satisfaction as the dependent variable in this study is measured by Likert's scale ranges from 1 to 5. Then, all related determinant factors are examined whether there is any relationship between those factors and the level of customer satisfaction. Under OLS regression, customer satisfaction is treated as a numerical variable, while it is treated as a categorical variable under logistic regression. To ensure the robustness of the result, the level of satisfaction is grouped into high satisfaction and low satisfaction. All related determinant factors are examined whether they can lead to high satisfaction.

Specifically, the objectives of this study are to (1) identify the determinant attributes of customer satisfaction on organic rice for Thai new generation

customers, (2) compare two conventionally employed methods of identifying these attributes, (3) suggest marketing implementations for local organic rice entrepreneurs, and (4) test gender as a moderator to come up with possible marketing implementations separately for both male and female customers.

Benefit of Research

1. For academics, this study demonstrates how determinant attributes of customer satisfaction can be identified for organic rice by employed two commonly used methods, are OLS and logistic regression. The study not only compares the two methods of identifying these attributes but also compares the values of the methods of identification, along with relevant marketing implications for organic rice.

2. For practitioners, this study provides two alternative models to derive determinant attributes of customer satisfaction for new generation Thai customers. Basically, practitioners can select a better set of attributes in terms of practical interpretation and marketing implementations. Moreover, this study also test moderator effect; therefore, might come up with different set of marketing implementations for male and female customers.

Literature Review

There are many studies to determine the factor affecting the level of customer satisfaction. Van Andersen and Hyldig (2015) employed the qualitative approach in determining customer satisfaction with food. They found that the determinants of food satisfaction are different depending on each participant. However, the sensory experience such as taste, color, texture, etc. is mentioned by all participants. Other factors such as

satiety, health, and expectations were also commonly considered with the sensory experience. Zhong and Mood (2020) showed that food quality including smell, taste, freshness, and looking was an important factor leading to customer satisfaction and loyalty.

Kusno, Liandy, Mukti, and Sadeli (2021) studied factors affecting the purchase decision and satisfaction of organic rice in Indonesia. They found that most of the important factors were related to sensory experiences like stickiness, sweet taste, aroma, and white color. The packaging was moderately important because consumers paid attention to the packaging that was easy to store.

Convenience can be an important factor affecting a consumer's purchase decision. Duarte, Silva, and Ferreira (2018) showed that the customer's purchase decision depended on convenience like the speed and ease to contact the retail outlet and this can be enhanced by locating the outlet in the convenient location for customers or moving to online shopping.

The order and payment system were also important for customer satisfaction. Pham and Ahammad (2017) studied and showed that various factors including production information, ease of use, customization, ease of check out, security assurance, order fulfillment, responsiveness of customer service, and ease of return would affect the level of customer satisfaction and customer loyalty like repurchase intention and word of mouth.

Maesano, Di Vita, Chinnici, Pappalardo, and D'Amico (2020) studied consumer selection of sustainable fish focusing on the relationship between sustainable fish labels and willingness to pay. They found that the source of fish or

the country of origin was the most important factor in consumer selection.

Liang, Yang, Chen, and Chung (2017) studied the effect of different types of sale promotions on organic food. They divided sale promotions into 4 categories, which were discount, free gift, membership, and limited time offer. They found that consumers of organic food preferred discounts and free gifts rather than limited time offers and membership.

Vapa-Tankosić, Ignjatijevic, Kranjac, Lekić, and Prodanović (2018) showed people were more willing to pay for organic products and people with higher levels of income and education were more willing to pay for organic products. Moreover, Vietoris et al. (2016) studied consumer preference on the purchase of organic foods and found that consumers were able to pay 5-10% additionally for organic food compared to conventional food.

Based on the literature review above, we come up with initial sets of determinant attributes that are used to develop guideline questions for our qualitative research study to further identify a final set of determinants on customers to purchase organic rice.

Research Process

This study aims to eventually identify the determinant factors affecting new generation customers' satisfaction with organic rice in Thailand. To fulfill the purpose of the study, firstly we conduct exploratory research with secondary data analysis and qualitative research. The qualitative research study was conducted by 3 focus group interviews (24 participants altogether) and 25 in-depth interviews during December 2020. Each focus group lasted approximately 2 hours, while around 1 hour for in-depth

interviews. As results of the exploratory research, there are 16 factors of possible attributes affecting customer satisfaction, which are sale location, growth location, environmental friendliness, taste, nutrition, texture, type of organic rice, smell, promotion, payment system, ordering system, convenience to buy, seller's manner, popularity, packaging, and brand image.

Then, a quantitative research study measures these 16 determinant attributes on the person-administered questionnaire survey which collected from 328 new generation Thai customers, who have regular experience in purchasing and eating organic rice, in Bangkok, Thailand. Respondents rated the performance of their favorite organic rice on these 16 determinant attributes on a five-point Likert scale labeled by 1= “strongly disagree” and 5= “strongly agree”. Table 1 illustrates descriptive statistics of these 16 determinant attributes. Then, under quantitative research study, exploratory factor analysis (EFA) applying principal

component analysis with orthogonal rotation method is applied to group these 16 attributes into a specific number of components. Thereafter, those components are used as independent variables in OLS and logistic regression. OLS regression applies the level of satisfaction as the dependent variable.

To ensure the robustness of the result, the original levels of satisfaction are categorized into two satisfaction groups, which are ‘satisfaction’ and ‘not satisfaction’. According to the top-two box model (Farris, Bendle, Pfeifer, and Reibstein, 2016), if the level of satisfaction is in the top-two boxes (score 4, or 5), they are classified as ‘satisfaction’. If not (score 1, 2, or 3), they will be classified as ‘not satisfaction’. Then, the logistic regression is used to determine whether the six determinant factors can lead to ‘satisfaction’. Finally, the significant determinant factors of the two methods are compared in both business interpretations and marketing implementations.

Table 1 Descriptive Statistics of 16 Determinant Attributes

Attribute	Mean	Std. Dev.
Nutrition	4.62	0.662
Taste	4.44	0.776
Texture	4.34	0.809
Convenience	4.29	0.773
Type of Rice	4.27	0.808
Smell/Aroma	4.11	0.911
Promotion	4.10	0.956
Sale Location	4.09	0.847
Popularity	4.00	0.914
Packaging	3.99	0.915
Environmental	3.95	0.947

Seller's Manner	3.90	0.991
Brand Image	3.87	0.880
Ordering System	3.81	0.974
Growth Location	3.79	0.954
Payment System	3.65	1.062

Population and Sample

The population in this study are new generation Thai people who are experienced in purchasing and consuming organic rice regularly. The sample is purposively collected from new generation Thai consumers in the Bangkok metropolitan area during January and February 2021. The sample consists of 328 respondents with a range between 17 and 25 years of age. A sample size of 328 should be large enough to run quantitative data analysis based on Yamane (1973)'s

formula for a large population size with a marginal error of 6% at least and confidence level at 95%. Table 2 illustrates the basic demographic characteristics and general behavior toward organic rice of the sample. The sample was all Thais with the majority were female (59%), predominantly were university students (78.4%), had monthly income/allowance less than 30,000 baht (94%), ate organic rice at least once a week (93.3%), and made purchases of organic rice at least once a month (72%).

Table 2 Sample Profiles

Profile	#	%
Gender		
male	134	40.8%
female	194	59.2%
Occupation		
university student	257	78.4%
first jobber	71	21.6%
Monthly income/allowance		
less than 12,000	51	15.5%
12,000-15,000	131	39.9%
15,001-20,000	88	26.8%
more than 20,000	58	17.7%
Residence		

inner BKK	177	54%
outer BKK	63	19.2%
outskirt	88	26.8%
Number of family members		
alone	56	17.1%
2 persons	59	18%
3 persons	63	19.2%
more than 3 persons	150	45.7%
Frequency of eating organic rice		
less than once a week	22	6.7%
once a week	83	25.3%
2-3 times a week	101	30.8%
every day	122	37.2%
Frequency of purchasing		
every week	42	12.8%
every month	194	59.1%
every two months	71	21.6%
> two months	21	6.4%

Instruments

The data is collected using a person-administered questionnaire survey with voice recordings of the interviews to ensure the validity of the data. The final 16 determinant attributes derived from the results of the qualitative research pre-conducted are used to measure their effects on customer satisfaction. There are 3 question items to measure the level of customer satisfaction on organic rice. All

question items are measured by a five-point Likert scale.

The questionnaire is organized into 3 parts that are demographic profiles, general behavior, and the customer journey (in which the determinant attributes and customer satisfaction are measured). The final version of the questionnaire was inspected by qualified experts in the organic rice industry.

Data Analysis

The questionnaire survey involved 328 respondents. The exploratory factor analysis output is reported in Table 3. The EFA includes the final 16 determinant items as inputs. As the results, all 16 question items of determinant attributes remained, and can be grouped into 6 determinant factors (for combining of 67.44% of cumulative % of variance) that are product quality, customer

service, brand image, social responsibility, promotion, and sale location, with the factor loadings ranging from 0.529 to 0.838, which are above 0.5 suggested by Hair, Black, Babin, and Anderson (2010). This study assesses the consistency of the entire scale with Cronbach's alpha of 0.837, which exceeds the value of 0.7 suggested by Hair et al. (2010).

Table 3 Exploratory Factor Analysis of 16 Determinant Attributes

Attribute	Factor Loading
Product Quality	
Taste	0.795
Texture	0.764
Nutrition	0.646
Smell/Aroma	0.645
Type of Rice	0.606
Customer Service	
Payment System	0.838
Ordering System	0.799
Convenience to Buy	0.643
Seller's Manner	0.530
Brand Image	
Brand Image	0.764
Packaging	0.677
Popularity	0.568
Social Responsibility	
Growth Location	0.838
Environmental	0.529
Sale Location	0.731

Promotion	0.753
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These 6 determinant factors are employed as the independent variables in both OLS and logistic regression for further analysis to identify the significant determinant factors influencing customer satisfaction with organic rice. These determinant factors from EFA with the orthogonal rotation method would avoid multicollinearity problems for both methods.

Table 4 Overall OLS Regression

Factor	beta	p-value
Product Quality	0.310	<0.001**
Brand Image	0.163	0.002**
Customer Service	0.157	0.002**
Social Responsibility	0.102	0.047*
Sale Location	0.075	0.141
Promotion	0.052	0.306

Note: **-be significant at 1% level, *-be significant at 5% level

Table 4 illustrates overall OLS regression results. Overall, there are four significant determinant factors influencing customer satisfaction with organic rice at 95% confidence level from OLS regression as the consequence of coefficient beta: (1) product quality (0.310), (2) Brand Image (0.163), (3) customer service (0.157), and (4) social responsibility (0.102). Also

noted that the model has quite a low R-square with the value of 0.166, however, ANOVA is strongly significant at 99% confidence with an F-statistic of 10.631 and there is no sign of multicollinearity with VIF of 1.0 and condition index of 1.0 (much less than the cut point of 10 and 30 respectively for VIF and condition index suggested by Hair et al. (2010).

Table 5 Overall Logistic Regression

Factor	Wald	p-value
Product Quality	29.063	<0.001**
Brand Image	8.146	0.004**
Customer Service	6.589	0.010**
Social Responsibility	3.641	0.046*
Sale Location	1.292	0.256
Promotion	0.779	0.378

Note: **-be significant at 1% level, *-be significant at 5% level

Table 5 illustrates overall logistic regression results. Similar to OLS regression results, Overall, there are four significant determinant factors affecting customer satisfaction with organic rice at 95% confidence level from logistic regression as the consequence of Wald chi-

square statistic: (1) product quality (29.063), (2) Brand Image (8.146), (3) customer service (6.589), and (4) social responsibility (3.641). Also noted that the overall percent correction of classification is 68.3 percent. For the satisfaction group, the percent correction is 69.3 percent.

Table 6 OLS Regression for Male

Factor	beta	p-value
Product Quality	0.361	<0.001**
Social Responsibility	0.217	0.011**
Promotion	0.095	0.257
Brand Image	0.074	0.368
Sale Location	0.069	0.405
Customer Service	0.054	0.513

Note: **-be significant at 1% level

Table 7 Logistic Regression for Male

Factor	Wald	p-value
Product Quality	13.571	<0.001**
Social Responsibility	6.966	0.008**
Promotion	0.049	0.824
Brand Image	1.090	0.297
Sale Location	2.736	0.098
Customer Service	0.505	0.477

Note: **-be significant at 1% level

Further analysis is conducted with gender as a moderator. From Table 6 and 7, the results of OLS and logistic regression are also the same for male customers. For male customers, we found

only two significant factors at a 95% confidence level from both OLS and logistic regression as the consequence of significance: (1) product quality and (2) social responsibility.

Table 8 OLS Regression for Female

Factor	beta	p-value
Product Quality	0.283	<0.001**
Customer Service	0.211	0.002**
Brand Image	0.189	0.006**
Social Responsibility	0.070	0.309
Sale Location	0.055	0.425
Promotion	0.007	0915

Note: **-be significant at 1% level

Table 9 Logistic Regression for Female

Factor	Wald	p-value
Product Quality	16.734	<0.001**
Customer Service	6.599	0.01**
Brand Image	4.249	0.039*
Social Responsibility	0.762	0.383
Promotion	0.153	0.695
Sale Location	0.076	0.782

Note: **-be significant at 1% level, *-be significant at 5% level

From Table 8 and 9, the results of OLS and logistic regression are also similar for female customers. For female customers, we found three significant factors at a 95% confidence level from both OLS and logistic regression as the consequence of significance: (1) product quality, (2) customer service, and (3) brand image.

customer satisfaction. Since the two methods yield the same results, we should have strong confidence in interpreting and implementing them.

Corresponding with previous research findings, product quality that

Discussion and Conclusion

In summary, in this study, the results of OLS and logistic regression are the same not only in identifying the significant determinant factors but also in prioritizing the factors influencing

consists of taste, texture, nutrition, smell/aroma, and type of rice are significant and have the highest impact on customer satisfaction with organic rice. This is true for both male and female customers. However, male customers pay

attention not only to product quality but also to social responsibility consisting of growth location and environmental friendliness. On the other hand, female customers do not care about social responsibility, but rather about brand image, and customer service, consisting of the payment system, ordering system, convenience to buy, and seller's manner, about which male customers do not care. Therefore, female customers seem to be pickier than male customers.

Sale location and promotion are not significant in all models. Nowadays, customers can purchase organic rice from various channels, both online and offline stores. According to the sample, for offline stores, the respondents buy organic rice from supermarkets (88.2%), shopping malls (36.5%), convenience stores (29.7%), and local markets (23.2%). 21.7% of them buy organic rice via online channels. 61.6% of them buy organic rice from multiple channels. Therefore, this would support why sale location does not significantly affect customer satisfaction. Promotion might not significantly affect since organic rice does not compete by promotion. Customers normally have a higher willingness to pay for organic rice and normal products as discussed in the previous section.

Recommendation

To fulfill the objectives of this study, we propose some marketing

implementations according to the research findings discussed above. Overall, an organic rice entrepreneur should focus on four determinant factors that are product quality/attributes, brand image with packaging, customer service/backyard system, and social responsibility. The first priority, of course, must be product attributes including taste, texture, nutrition, aroma, and type of rice. Customers should be informed and educated about these product attributes. For example, storytelling techniques might be used to inform about the type of rice. How-to approaches, such as how-to-cook, and how-to-eat might be used to promote taste, texture, aroma, and maybe also nutrition. For example, what kind of food is better to eat with organic brown rice.

Packaging should be improved to support an overall image of organic rice, especially designed to attract female customers. The brand presentation overall needs to support an image of an organic product. Customer service/ backyard system needs to be taken care of, especially for female customers. Customer service should support the ordering process, and payment, make them easy and convenient. Social responsibility should also be promoted in terms of supporting environmental concerns and the local community, especially to male customers.

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