

Article

# Self-interest or ethic: Consumer segmentation for purchasing agricultural products online based on attitude in China

**Fan Fan**

Faculty of Collaborative Regional Innovation, Ehime University, Ehime 790-0826, Japan; fan.fan.dx@ehime-u.ac.jp

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**Abstract:** This paper aims to segment online consumers based on their attitude toward self-interest and ethical attitudes and explore the impact of these attitudes on the purchasing behavior of agricultural products online in China. The study was conducted using 633 online survey responses from consumers who have purchased agricultural products online in China. First, to validate the relationship between attitude and behavior by structural equation modeling. Next, the number of segments was determined using K-means. Finally, Pearson Chi-square difference tests were performed to analyze demographic and behavioral variables and identify each segment's characteristics. The results of this study provide a segmentation analysis of the online market for agricultural products in China. The four segments identified are pure ethical consumers, information communicators, brand-quality pursuers, and well-heeled shoppers. Additionally, this study reveals the characteristics of each segment based on demographic and behavioral variables. This study provides a novel approach to segmenting Chinese consumers who purchase agricultural products online based on their attitudes toward self-interest and ethical attitudes, aiming to understand the impact of these attitudes on their purchasing behavior. Moreover, from an ethical consumerism perspective, it explores the effect of ethical information on purchasing agricultural products online, highlighting its significant implications for online marketing strategies.

**Keywords:** consumer segmentation; agricultural products online; self-interest attitude; ethical attitude

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## 1. Introduction

When making an online purchase of agricultural products, what are the primary factors influencing the preferences and choices of these online consumer segments? Consumers of different profiles consider specific key factors during their decision-making process. Hence, marketing segmentation, the first marketing step, is gaining importance. This approach aims to enhance the efficiency of addressing the unique requirements of each subgroup, and the potential benefits to be gained far outweigh the resource implications (Marshall and Johnston, 2019; Quinn, 2009).

In recent years, the rapid development of e-commerce has made it increasingly popular for consumers to purchase agricultural products online. This is because e-commerce allows for direct sales of agricultural products to consumers, reducing the intermediaries in the supply chain and shortening the distance between the farm and the table. This also breaks the geographical barriers of traditional brick-and-mortar markets, helping to address the imbalance between agricultural production and market demand (Han and Jing, 2018). Hence, agricultural-related market segmentation is the strategic process of categorizing the overall market into distinct segments composed of consumers with similar needs and desires (Kühl et al., 2017). However, most research today focuses on consumer commodities such as clothing, books, digital

products, and so on, with agricultural products receiving less attention (Zhao et al., 2017).

In contemporary literature, the examination of consumer behavior in online agricultural product purchases reveals a predominant focus on two discernible dimensions: self-interest attitude and ethical attitude (Gunia et al., 2012; Gino et al., 2011; Lu and Sinha, 2019). More specifically, the self-interest attitude encompasses factors related to brand-quality and online communication. In contrast, an ethical attitude comprises considerations such as environmental consciousness, animal welfare, and social contributions. Adopting a reductionist perspective by solely considering one of these attitudes during consumer purchase decision-making is deemed insufficient. The question of which of these two attitudes holds greater significance is a subject of controversy (Lu and Sinha, 2019). Hence, the study would be more persuasive by segmenting the consumers and comparing these two attitudes.

This study conducts attitude-based segmentation of online consumers, shedding light on the variables of self-interest attitude and ethical attitude, elucidating their impact on consumer purchasing behavior. It reveals that consumers, when procuring agricultural products online, not only prioritize fundamental attributes such as freshness and price but also demonstrate concern for brand-quality, online communication, and social issues. By segmenting consumers based on their attitude disparities and profiling these segments, corporations can discern and characterize these consumer segments, subsequently formulating tailored marketing strategies.

The data was collected in China, employing an online questionnaire survey in collaboration with a professional research company. The selection of Chinese data was motivated by the remarkable growth of e-commerce in the agricultural sector within China. According to statistics from the Chinese Electronic Commerce Research Center and the Ministry of Commerce, online sales of agricultural products surged from 158.90 billion yuan (approximately \$22.46 billion) in 2016 to surpass 587.03 billion yuan (approximately \$81.57 billion) by 2023 (Chinese Electronic Commerce Research Center, 2016-2023). This substantial growth can be attributed to the emergence of innovative online marketing models pioneered by major platforms such as Alibaba, JD.com, Buy Together, Dmall, Missfresh, and Freshhema. Consequently, scholarly interest in the marketing of agricultural products online has been steadily increasing (Han and Jing, 2018; Jin et al., 2020; Li, 2020; Zhao et al., 2017). Consumers exhibit a multifaceted focus beyond a basic self-interest attitude in the context of online agricultural product purchases in China. They also demonstrate a keen interest in ethical considerations. By discerning and profiling the differences in consumer attitudes and segmenting them accordingly, corporations can effectively delineate and describe these consumer segments, thereby facilitating the development of tailored marketing strategies.

This study is structured into three distinct sections. The first section comprehensively reviews the existing literature about online consumer segmentation for purchasing agricultural products. Then, for elucidating the theoretical foundations, and formulating hypotheses, the connection between self-interest attitudes and ethical attitude and online consumer behavior has been discussed. The second section provides a detailed exposition of the methodology employed for data collection and analysis, outlining the procedures and techniques utilized in the research process.

Finally, the third section deliberates upon the findings derived from the study, contextualizing them within the broader scope of the research objectives, while also acknowledging any inherent limitations encountered during the investigation.

## **2. Literature review and hypotheses development**

### **2.1. Online consumer segmentation for purchasing agricultural products**

Several crucial consumer characteristics were examined in a recent comprehensive literature review focusing on online consumer segmentation. Notably, factors such as age and education levels emerged as pivotal influencers shaping online consumers' awareness of network security, proficiency in computer operations, and preferences for information channels related to agricultural products (Huang et al., 2015; Han and Jing, 2018; Nie and Zepeda, 2011). However, recognizing the inadequacy of socio-demographic variables alone in effectively segmenting online consumers, scholars emphasized the imperative inclusion of additional dimensions in future studies. For instance, food-related lifestyle, the manifestation of social conscience in behavior, and underlying attitudes should all be considered critical variables for a more comprehensive segmentation framework (Verain et al., 2012). Consequently, to augment the breadth of segmentation approaches, empirical studies have undertaken analyses based on perceptual factors (Al-Debei et al., 2015), internet use patterns (Aljukhadar and Senecal, 2011), food-related lifestyle (Huang et al., 2015; Nie and Zepeda, 2011), consumption patterns (Kühl et al., 2017), and brand loyalty patterns (Liu et al., 2014). Beyond these empirical considerations, there is a notable dearth of research in segmentation comparing self-interest attitudes and ethical attitudes. As aforementioned, distinct characteristics characterize each segmentation group of online consumers. Corporations are required to delineate and analyze attitude variations within these segments, identifying the primary influencing factor. Subsequently, corporations should differentiate and articulate these consumer segments, formulating tailored marketing strategies accordingly.

### **2.2. Theoretical framework**

According to the value-attitude-behavior theoretical framework, it offers a nuanced lens for market segmentation grounded in consumer values. Exploring the values guiding online agricultural product purchases and their subsequent impact on consumption behaviors, this approach delves into how variations in values can manifest in diverse attitudinal and behavioral outcomes (Jerry et al., 1999). Within this theoretical framework, the multifaceted concept of consumer value, defined as an “interactive, relativistic preference experience,” has been dissected into economic value (quality, excellence), social value, and ethical value. Recognizing these dimensions as strategic imperatives, corporations are urged to provide enhanced value to consumers, thereby fostering competitiveness within the market (Marbach et al., 2019).

Comparatively, attitude-based segmentation assumes a more direct linkage to online marketing response and brand purchase behavior, with attitude emerging as a preeminent determinant of the intention to purchase agricultural products online

(Scheuffelen et al., 2019). Empirical evidence underscores a positive and statistically significant relationship between attitude and intention to purchase (Rana and Paul, 2017). However, in contrast to the vast number of consumer studies regarding the impact of consumer attitude on online purchasing intention, far less research has been conducted on consumer attitude-based segmentation.

Regarding the formation of consumer attitudes toward agricultural products, there are mainly two streams, which are self-interest attitude and ethical attitude. The self-interest attitude toward agricultural food encompasses price, product safety, quality expectations, freshness, brand, and origin (Bhakar et al., 2013; Liu et al., 2018; Zhao et al., 2017). Especially for online consumers, prioritizing product quality and certification in the design of informative web pages is crucial (Kühl et al., 2017). Moreover, within the context of social media marketing endeavors, elements such as interaction, trendiness, word of mouth, customization, and entertainment have the potential to amplify the impact on purchase decisions, as they influence perceptions of self-interest attitudes, subsequently influencing consumer choices (Wang et al., 2019).

### **2.2.1. Self-interest attitudes**

Self-interest attitudes encompass aspects such as freedom of action, self-reliance, sufficiency, and the ability to choose one's goals (Yamoah et al., 2016). When consumers are purchasing agricultural food, sometimes they focus on self-interest attitude. Especially, when ethical conduct imposes personal costs, individuals tend to opt for self-interested behaviors (Batson and Thompson, 2001). Self-interest attitudes encompass a wide range of factors, making it difficult to measure with just one or two dimensions. Therefore, in this study, self-interest attitudes were assessed through brand-quality and online communication. These two dimensions not only reflect one aspect of self-interest attitude but also align with the characteristics of the current online environment.

Brand-quality warrants attention, as psychological mechanisms impel consumers to allocate more resources toward a preferred brand that mirrors their actual or ideal self-concept (Tan et al., 2019), thereby influencing consumers' online purchasing decisions (Liu et al., 2018). Notably, signaling theory, widely explored across various domains, provides a framework for understanding how two parties (buyer and seller) exchange information before purchase, and how consumers evaluate product quality. According to this theory, online consumers can infer product quality from website quality, thus positively impacting their online purchasing decisions (Wells et al., 2011). Drawing on prior research, brand image and perceived product quality are intertwined and constitute pivotal dimensions for online consumers.

Online communication emerges as a key factor shaping purchasing motivations (Granzin and Painter, 2001). Through online communication, it is possible to obtain information related to the origin of agricultural products. Increasingly, consumers aspire to bolster local communities and support local businesses through the purchase of regional agricultural products (Seyfang, 2006). Therefore, products' origin information, as a significant factor, demands consideration. Notably, the interplay between product and origin information is noteworthy, where attitudes towards the origin's image influence perceptions and preferences for products (van Ittersum et al.,

2003). Moreover, online communication has been demonstrated to positively influence consumers' purchase intentions (Bhakar et al., 2013). In the context of China, online communication exerts a positive influence on consumers' attitudes, directly impacting online agricultural product purchasing behavior (Li, 2020). Consumers actively seek online communication to engage with other buyers or consumers with purchasing experiences. Particularly in pre-purchase information gathering, interactions with other consumers who can share product information and experiences online are pivotal (Adjei et al., 2010). Such communication serves multiple purposes, including information dissemination, community building, and corporate advocacy. Moreover, communication tends to be socially oriented, fostering the establishment of social relationships and the creation of networks (Wu et al., 2019). Therefore, this study emphasizes the importance of positive online communication with consumers/buyers.

### **2.2.2 Ethical attitude**

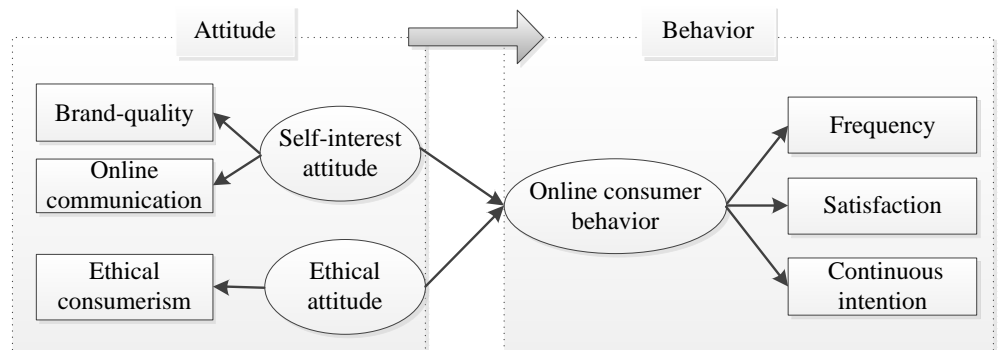
Another key component is ethical attitude, as it is believed that people regulate their conduct out of concern for the environment, animal welfare, and social contribution (Iglesias et al., 2019; Pandey et al., 2019; Rana and Paul, 2017). So far, the factors of ethical consumerism mentioned usually include environmental consciousness, ethical concerns, animal welfare, status symbols, and social consciousness (Rana and Paul, 2020). To remain competitive in an era of ethical consumerism, corporate brands are facing ever-increasing pressure to integrate ethical values into their identities and to demonstrate their ethical commitment at a corporate level (Iglesias et al., 2019). Meanwhile, customers' perceived ethicality has a positive and indirect impact on brand equity (Markovic et al., 2018). In addition, consumers' ethicality for agricultural products includes diverse components that can be influenced by several contextual factors, such as helping other individuals. These factors can be simultaneously involved as important predictors of behavioral intentions (Guido et al., 2010). For concerns about society and the environment, consumers would like to support solving these problems by purchasing more. Therefore, corporations are seeking to remain competitive and survive in the market. They have begun to incorporate these newly emerging concerns into their management and marketing decision-making (Finisterra do Paço et al., 2009). Especially in China, market segmentation has been performed from the aspect of environmental consciousness, and consumers would like to support green energy by purchasing products from corporations that use green energy (Luo et al., 2017). However, social consciousness has been less researched because it is usually related to specific social problems in one country. Therefore, in this study, the specific content of social consciousness needs to be clarified. Combining it with the strategy of rural vitalization in China, we take "increasing farmers' income" as one specific description of ethical consumerism. If consumers are aware that purchasing agricultural products simultaneously increases farmers' income, or if they know the product is from a corporation that has increased farmers' income, then buying agricultural products is no longer considered a self-interest attitude but rather an ethical attitude.

### **2.2.3. Online consumer behavior**

Online consumer behavior is central to the study and encompasses aspects such

as the frequency of purchasing agricultural products online, levels of satisfaction, and intentions for continued engagement in online purchasing. By the decisional balance scales by frequency, satisfaction, and continuous intention stages, the last behavior for consumers is not just “concerned and taken major action” (Freestone and McGoldrick, 2008), but also would like to continue purchasing in the future. Primarily, the consumer’s disposition toward agricultural products, encompassing self-interest and ethical considerations, correlates positively with their intention to purchase online (Brand et al., 2020; Gassler et al., 2023; O’Neill et al., 2023; Tariq et al., 2019). However, in this study, further validation is required in advance.

Building upon the theoretical framework and empirical research reviewed earlier, the ensuing step involves formulating the research conceptual model (shown in **Figure 1**) and proposing hypotheses.



**Figure 1.** Research conceptual model.

Following the attitude-behavior theoretical framework, it is posited that attitudes, encompassing self-interest and ethical dimensions, exert a positive influence on behavior. Specifically, self-interest attitude comprises two components: attitude prioritizing brand-quality and attitude prioritizing online communication. Ethical attitude is operationalized through ethical consumerism. Both forms of attitudes are hypothesized to exhibit positive correlations with online consumer behavior, as manifested in frequency, satisfaction, and continuous intention. The ensuing hypotheses are delineated as follows:

- Firstly, self-interest and ethical attitudes can independently exhibit positive associations with online consumer behavior, and online consumers can be segmented based on these two attitudes.
- Second, each segmentation group of online consumers has specific characteristics that can be explained by different demographic and behavioral patterns.

Consequently, the objective of this research is to segment online consumers according to their attitudes towards self-interest and ethical considerations, and to investigate the impact of these varying attitudes on their online purchasing behavior of agricultural products.

### 3. Methodology

#### 3.1. Description of data and measurement

The data collection was conducted in China from November 10th to December

15th in 2023, and collaborated with a professional online survey company (paid). The online questionnaire survey was designed in the following three parts:

The first part of the questionnaire explains the purpose of this survey. The first question is designed as “Do you have experience to purchase agricultural products online?” If the answer is yes, we admit it as a valid questionnaire. The survey received 789 responses, with 633 valid questionnaires. The sampling data are all from consumers who have experience in purchasing agricultural products online. Then, agricultural product purchasing behavioral variables were designed, including satisfaction, frequency, and continuous intention of purchasing agricultural products online.

The second part is the main part of data analysis in this study. It was meticulously designed, taking into consideration constructs that were measured using existing scale items in the literature as a reference (see **Table 1**).

**Table 1.** Constructs and items used in the survey.

Constructs	Items	Sources
Ethical attitude (ethical consumerism)	I am willing to buy agricultural products which increase farmers’ income.	modified from Adjei et al. (2010)
	I would like to know if the products from corporations increased farmers’ income or not.	
	I am willing to buy more because this product is from corporates which increases farmers’ income.	
	I will expect corporations that increase farmers’ income the more the better.	
Self-interest attitude (prioritizing brand-quality)	I will continue buying from corporates that increase farmers’ income.	modified from Hightower et al. (2002)
	I will give priority to buying products with high brand awareness.	
	I think brand agricultural products are better than ordinary agricultural products.	
	I am prior to buying products identified system of quality (such as ISO9000).	
Self-interest attitude (prioritizing online communication)	I’m prior to buying agricultural products with green or organic certification.	modified from Chu et al. (2005), Dagger et al. (2011)
	I’m interested in learning information about the place of origin for agricultural products.	
	I’m interested in learning information about activities and stories that happened in place-of-origin.	
	I usually talk with buyers about information on agricultural products or give some advice.	
Online consumer behavior	I usually talk with consumers who buy the same agricultural products.	modified from Freestone and McGoldrick (2008)
	Frequency: The frequency of purchasing agricultural products online	
	Satisfaction: I am currently very satisfied with the way of purchasing agricultural products online.	
	Continuous intention: I will continue to purchase agricultural products online in the future.	

Note: Kaiser–Meyer–Olkin = 0.76; 0.000 significance level for all three scales. Eigenvalues > 1; Total Variance = 50.1%

However, concepts of each dimension were scarcely utilized by consumers who purchased agricultural products online. The study encompasses several constructs relating to attitudes toward self-interest and ethics, particularly in the context of online consumer behavior regarding agricultural products. These dimensions include ethical attitudes, self-interest attitudes (prioritizing brand-quality), self-interest attitudes (prioritizing online communication), and online consumer behavior. Ethical attitudes are examined with a focus on purchasing agricultural products and supporting corporations that contribute to increasing farmers’ income as referenced in Adjei et al. (2010). Self-interest attitudes (prioritizing brand-quality) delve into factors such as brand awareness and perceptions of quality systems. Similarly, self-interest attitudes

(prioritizing online communication) explore individuals' interests in engaging with and acquiring information about the origin of products online. Brand-quality was adapted from Roscoe Hightower et al. (2002), while online communication was modified from Chu et al. (2005) and Dagger et al. (2011). Online consumer behavior was modified from Freestone and McGoldrick (2008).

Lastly, the study also collects demographic data, including information on gender, age, and household monthly income, to further contextualize the findings within different demographic groups. All variables were evaluated using the Likert scale: 1 represents completely disagree and 5 represents completely agree. SPSS 22 was used for statistical analysis.

### **3.2. Process**

The first step is to describe the sample characteristics, which is the basic step for consumer segmentation. The second step is to validate the relationship between attitude and behavior. We conducted structural equation modeling for 4 constructs, which are ethical attitudes, self-interest attitudes (prioritizing brand-quality), self-interest attitudes (prioritizing online communication), and online consumer behavior. Previous studies have demonstrated a positive correlation between attitudes and online behavior. Therefore, the purpose of validation in this study is to verify the collected data, ensuring its reliability and accuracy for subsequent analyses. The third step is the principal component analysis performed on the data, and the group membership was corrected by K-means. The mean values for the factors and items for each cluster were computed by an analysis of variance (ANOVA). The significance of the differences between the clusters was determined with *F*-ratio. The last step is Pearson Chi-square difference tests performed in demographic variables and behavioral variables, which can explain the characters of each cluster further.

## **4. Results**

### **4.1. Sample description**

A total of 633 valid questionnaires were collected. The characteristics analyzed include gender, age, household monthly income, frequency of online agricultural product purchases, satisfaction with online agricultural product purchases, and the intention to continue purchasing online.

**Table 2** presents the description of the samples. In this investigation, the number of female consumers was 398 (62.9%), and male was 235 (37.1%). The gender ratio was roughly 6:4. Women were likely to purchase agricultural products more frequently than men, which is consistent with the actual situation of Chinese households whose agricultural product buyers are mostly women (Han and Jing, 2018). The majority of respondents was 20–29(44.2%), followed by 30–39 (40.3%), a proportion of which is over 80%. Household monthly incomes were mainly between 5000–10,000 yuan (36.2%) and 10000–30,000 yuan (47.2%). The others were below 5000 yuan (9.8%), 30,000–5000 yuan (5.1%), and above 50,000 yuan (1.7%), which means that consumers who purchase agricultural products online were generally middle-class individuals. This range is similar to consumers who purchase organic



food online (Rong-Da Liang, 2014). Regarding the frequency of online purchases of agricultural products, the majority of consumers engage in such transactions between 1 to 3 times per month (50.7%), followed by those who purchase 1 to 3 times per week, constituting 26.9% of the sample. Notably, over 80% of consumers in this study make at least one online agricultural product purchase annually. In terms of satisfaction with online agricultural product purchases, responses span the spectrum from strongly disagree to strongly agree. Specifically, 0.5% strongly disagree, 2.6% disagree, 19.9% are neutral, 47.3% agree, and 29.7% strongly agree, showcasing varied levels of satisfaction among consumers. With regards to continuous intention for online purchases, a significant proportion of consumers express agreement (41.7%) or strong agreement (47.5%), indicating that over 89.2% of consumers exhibit a continuous intention to purchase agricultural products online.

**Table 2.** Description of the samples (n = 633).

Characteristic	Category	n (%)
Gender	Male	235 (37.1)
	Female	398 (62.9)
Age	Below 20	16 (2.5)
	20–29	280 (44.2)
	30–39	255 (40.3)
	40–49	62 (9.8)
	50–59	17 (2.7)
	Above 60	3 (5)
Income (Yuan)	Below 5000	62 (9.8)
	5000–10,000	229 (36.2)
	10,000–30,000	299 (47.2)
	30,000–50,000	32 (5.1)
	Above 50,000	11 (1.7)
Frequency	<3 (per year)	19 (2.9)
	4–6 (per year)	93 (14.7)
	1–3 (per month)	321 (50.7)
	1–3 (per week)	170 (26.9)
	>3 (per week)	30 (4.7)
Satisfaction	Strongly disagree	3 (0.5)
	Disagree	16 (2.6)
	Neutral	123 (19.9)
	Agree	292 (47.3)
	Strongly agree	183 (29.7)
Continuous Intention	Strongly disagree	0 (0.0)
	Disagree	15 (2.4)
	Neutral	52 (8.4)
	Agree	257 (41.7)
	Strongly agree	293 (47.5)

To investigate the statistical relationships among the sample characteristics, a correlation analysis was performed, as shown in **Table 3**. The findings reveal significant correlations at the 0.01 level among various dimensions of consumer behavior, including the frequency of online agricultural product purchases, satisfaction with these purchases, and the intention to continue purchasing online. Notably, gender and age do not demonstrate significant relationships with online consumer behavior in this study. This is a contentious issue, as some research indicates that males are more frequent internet shoppers and spend more on mobile shopping than females, and younger individuals make more online purchases than older individuals (Hou and Elliott, 2021). However, our sample did not reflect these trends.

**Table 3.** Correlations of the samples (n = 633).

Characteristic	1	2	3	4	5	6
1 Gender	1					
2 Age	-0.17**	1				
3 Income (Yuan)	-0.04	0.13**	1			
4 Frequency	0.03	-0.01	0.21**	1		
5 Satisfaction	0.07	0.08	0.15**	0.18**	1	
6 Continuous Intention	0.05	0.04	0.12**	0.11**	0.23**	1

\*\* Correlation is significant at the 0.01 level.

Conversely, household monthly income exhibits significant correlations with online consumer behavior. Specifically, higher household monthly income is significantly associated with a stronger propensity to purchase agricultural products online. These results imply that increased household income correlates with a greater inclination toward online purchases of agricultural products. Similarly, previous research has identified a relationship between income and online consumer behavior, underscoring the importance of segmenting consumer clusters based on this characteristic (Dhaoui et al., 2020; Nguyen et al., 2023). This observation highlights the necessity of considering income levels when analyzing and targeting consumer groups for online agricultural product purchases.

#### 4.2. Attitude and behavior

This study involved 4 constructs: ethical attitude (ethical consumerism), self-interest attitude (prioritizing brand quality), self-interest attitude (prioritizing online communication), and online consumer behavior. In the construct of online consumer behavior, the frequency of purchasing online, satisfaction, and continuous intention were observed.

To assess the validity of the relationship between attitude and behavior, a structural equation modeling analysis will be conducted. This analytical approach will enable the examination of the structural relationships between the variables of interest, providing a comprehensive assessment of the proposed theoretical model. Because in this study, exploratory factor analysis has been designed on each construct, to ensure that was applicable, Kaiser–Meyer–Olkin and Bartlett’s test of sphericity has been tested first. The result is 0.76 and 0.000 significance level for all three scales. Factors

with eigenvalues larger than 1 were extracted, which explained 50.1 percent of the total variance. Cronbach’s alpha was examined to assess the reliability values of the dimensions. It ranged between 0.47 and 0.75. Although some factors had values for Cronbach’s alpha below 0.6 (Hair, 1998), the study is still acceptable as reliable because of the low number of items in respective factors (as per the rationale of Nunnally, 1978). Nevertheless, the result indicated the following: the questions “I care about the method and environment of agricultural production”, “I am interested in knowing the cultural activities in place-of-origin” and “If it’s possible, I would like to travel to products’ place-of-origin” items, loadings of which did not reach 0.45, and were deleted.

Based on the above results, structural equation modeling has been conducted. Amos 24 was used to test the validity of the data, and the results of confirmatory factor analysis (CFA) showed that the model fit well. The statistics are chi-square ( $X^2$ ) = 325.70, degrees of freedom ( $df$ ) = 101. The correlation fit indices are  $X^2/df$  = 3.72, GFI = 0.93, CFI = 0.78, AGFI = 0.91, RMSEA = 0.07, although the values of relative fit indices CFI less than 0.9, and the value of RMSEA is greater than 0.05. The values of GFI and AGFI are greater than 0.9. The results of the composite fit indices show that the theoretical model constructed in this study is relatively reasonable and sufficient for path analysis.

From the results of the path analysis, it is evident that ethical attitude and self-interest attitude (prioritizing brand-quality) exhibit positive associations with online consumer behavior, with path coefficients of approximately 0.28 and 0.35, respectively. Significance testing indicates that the p-values for these paths are less than 0.05, thereby supporting their inclusion in the structural equation model. However, the path representing self-interest attitude (prioritizing online communication) does not achieve statistical significance, as the p-value exceeds 0.05, specifically reaching 0.06 (Table 4). Although not statistically significant, a p-value close to 0.05 (such as  $p = 0.06$ ) should still be considered as “evidence worth noting” rather than being completely disregarded (Benjamin et al., 2018). Particularly in practical applications, some studies suggest interpreting p-values in conjunction with effect size, study design, and exploratory factors (Amrhein et al., 2019). This approach allows for a more comprehensive understanding of the results and can provide valuable insights that might be overlooked if solely relying on the threshold of statistical significance. It is worth noting that the present study utilized exploratory factor analysis. It must be acknowledged that, in terms of factor loading and path analysis, the numerical outcomes were not entirely satisfactory. Therefore, based on the actual circumstances, this study further employed cluster analysis to conduct consumer segmentation, which serves as a validation of the preceding analytical steps.

**Table 4.** The relationship between attitude and behavior: structural equation modeling results.

Path relationships		Path coefficient	Standardize estimates	P	Results
Ethical attitude	→ Online consumer behavior	0.28	0.06	***	supported
Self-interest attitude (prioritizing brand-quality)	→ Online consumer behavior	0.35	0.08	***	supported
Self-interest attitude (prioritizing online communication)	→ Online consumer behavior	0.12	0.07	0.06	Not supported

### 4.3. Cluster analysis and Pearson Chi-square difference tests

Cluster analysis (Figure 2 and Table 5) and Pearson Chi-square difference tests (Table 6) were performed on demographic variables, such as gender, age, and household income per month, and behavioral variables such as satisfaction, frequency, and continuous intention, which were measured by a five-point Likert scale. Four clusters would be the best solution because all factors are suitable to separate between the clusters and describe them (Kühl et al., 2017). Importantly, four segments provide a parsimonious solution by showing indicative and significant means' differences in the segmentation variable. Except for gender, all factors show significant differences between clusters using ANOVA by *F*-ratio higher than one. Differences between the clusters are marked by superscripted letters which indicate the 0.05 level of significance. Drawing upon the findings presented in Figure 2, Table 5 and Table 6, the subsequent analysis aims to delineate the distinctive characteristics of each cluster.

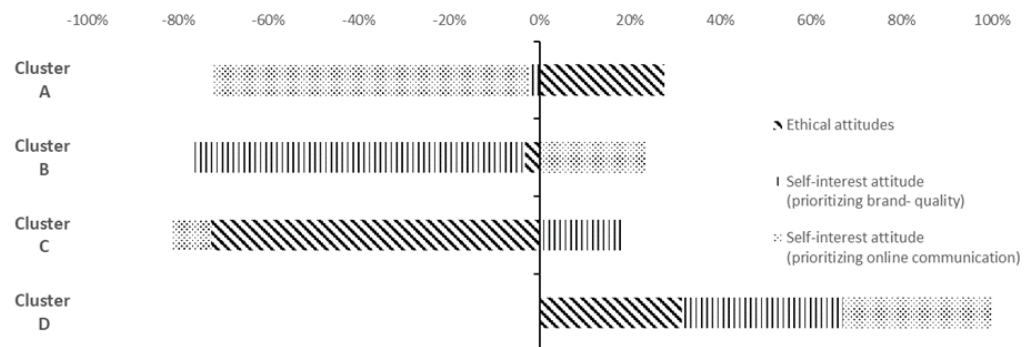


Figure 2. Cluster analysis results.

Table 5. Cluster analysis comparing results.

Attitudes	Cluster A	Cluster B	Cluster C	Cluster D	Comparing Result
Ethical attitudes	0.55	-0.05	-1.40	0.51	A > D > B > C
Self-interest attitude (prioritizing brand- quality)	-0.05	-1.28	0.36	0.58	D > C > A > B
Self-interest attitude (prioritizing online communication)	-1.39	0.41	-0.17	0.53	D > B > C > A

Notes: Cluster A = pure ethical consumers; Cluster B = information communicators; Cluster C = brand-quality pursuers; Cluster D = well-heeled shoppers; Satisfaction/Continuous Intention Scales are examined on a five-point Likert scale; \**p* ≤ 0.05; \*\*\**p* ≤ 0.001; only the factors which are significantly differ are shown.

Table 6. Further description of clusters.

Description	Cluster A	Cluster B	Cluster C	Cluster D	Sample
	n = 119 (18.8%)	n = 142 (22.4%)	n = 130 (20.5%)	n = 242 (38.2%)	n = 633 (100%)
Average age (years old) *	31.8	31.9	30.2	33.2	32.0
Household Income per month (10000 yen a month) (%) *	43.6	50.0	50.8	63.2	54.0
Satisfaction (≥ 4) (%) ***	73.9	66.9	72.3	85.1	76.3
Frequency (≥ 12 times a year) (%) ***	80.7	75.4	79.2	88.8	82.3
Continuous Intention (≥ 4) (%) ***	90.8	83.8	83.8	94.2	89.1

Cluster A, comprising 18.8 percent of the respondents is characterized as “pure

ethical consumers.” This segment of respondents demonstrates a strong commitment to ethical principles in their purchasing behavior, as evidenced by their high agreement with attitudes supportive of corporations that elevate farmers’ income through online agricultural product purchases. However, while they prioritize ethical considerations, this group exhibits relatively lower interest in online communication compared to other clusters. Despite having a lower household income per month compared to other clusters, satisfaction levels and continuous intention for online purchasing rank second highest among the four clusters.

Cluster B, representing 22.4 percent of the respondents, is labeled as “information communicators”. Members of this group prioritize online communication and information exchange, actively engaging with buyers and consumers in online forums. While less focused on specific agricultural product brands, this cluster shows a propensity for online engagement and collaboration. The average age of this cluster aligns closely with the overall sample’s average age of 32 years, indicating a relatively youthful demographic profile.

Cluster C, encompassing 20.5 percent of the respondents, is identified as “brand-quality pursuers.” This segment places a strong emphasis on product quality and brand recognition in their purchasing decisions, rather than solely adhering to ethical consumption principles. Despite exhibiting a higher household income per month compared to other clusters, respondents in this group are relatively younger, suggesting a preference for quality and brand-conscious consumption patterns from a younger demographic cohort.

Cluster D, constituting the largest group with 38.2 percent of the respondents, is denoted as “well-heeled shoppers.” Members of this cluster exhibit a multifaceted approach to online shopping, prioritizing both brand reputation and product quality while also expressing support for corporations that contribute to farmers’ income through online purchases. While their commitment to ethical consumption is slightly less pronounced than Cluster A, this group demonstrates the highest average age among the four clusters, indicating a mature demographic profile. Additionally, boasting the highest household income per month, this cluster showcases robust satisfaction levels, frequent purchasing behavior, and sustained intention for online transactions.

## **5. Discussion**

In this study, we validate the relationship between attitude and behavior by structural equation modeling. Then, four groups of online consumers can be segmented based on their different attitudes towards self-interest and ethics, which influence their purchasing behavior for agricultural products online as shown by the cluster analysis and the characteristics of each cluster have been described. To further highlight the research significance, it is necessary to delve into the obtained results of the study.

From the results of this study, Cluster A (pure ethical consumers) and Cluster D (well-heeled shoppers) both supported corporations that increase farmers’ income. They showed their attitude which was willing to purchase more agricultural products online. Meanwhile, based on behavioral variables, we can see that both of groups had

a high level of satisfaction, frequency for purchasing, and continuous intention, which was higher than the other two groups. This result is important and helpful for corporations to conduct marketing activities online because the goal of online marketing in e-commerce is to draw consumers eventually to the website to create sales (Dinner et al., 2013). In particular, ethical consumption has become an important issue as consumers have started to care about social problems. While there is no unified definition of the concept of ethical consumption (Jung et al., 2016), ethically motivated behavior is worth to be found. If consumers pay more attention to ethical information in corporations online, the possibility of purchasing intention will increase (Rana and Paul, 2017). Especially for organic food, perceiving information about ethical information positively leads to consumer purchase intentions (Pandey et al., 2019). Strategic insight for effectively communicating messages to ethical consumers and gaining a deeper understanding of their purchasing decisions is essential (Freestone and McGoldrick, 2008). Therefore, corporations could send ethical information to consumers online, such as increasing farmers' income, which also corresponds with the Chinese context.

Especially Cluster D should be paid more attention to, as an uninterested group is often identified within segmentation groups for ag-related marketing (Hemmerling et al., 2015). However, in contrast to previous findings, our study revealed that Cluster D (well-heeled shoppers) exhibited interest in all three types of attitudes and demonstrated the highest rates for both demographic and behavioral variables. Therefore, establishing relationships with well-heeled shoppers could prove advantageous for corporations. Furthermore, corporations can enhance their online advertising strategies by targeting specific attitudes through segmentation (Scheuffelen et al., 2019). Compared to previous research on online consumer segmentation (Aljukhadar and Senecal, 2011; Kühl et al., 2017; Nasir and Karakaya, 2014; Verain et al., 2012), this study focuses on different consumer attitudes towards purchasing agricultural products online, which carries significant implications for both corporations and academia. Thus, by seamlessly integrating socio-demographic factors, perceptual dimensions, and values, our study contributes to a more nuanced understanding of consumer behavior and preferences within the realm of online consumer segmentation.

In addition, in this study, online consumers could be segmented into four groups based on their different attitudes. Nevertheless, these three kinds of attitude are not independent respectively, but have connections deeply with each other actually. Through consumer-to-consumer communication online, arguments can be made regarding product quality, place-of-origin, and tie strength, which positively influence consumers' purchase decision-making (Zhu et al., 2016). Meanwhile, corporations cannot just build website quality to draw the attention of brand-quality pursuers, but they can also send signals through website information about product-related attributes, price, and ethical value to conduct e-commerce marketing (Wells et al., 2011). Besides, consumers' perception of a corporation's ethics in the services sector positively impacts brand equity, which may influence purchase decisions (He and Lai, 2014; Markovic et al., 2018). Therefore, when making marketing strategies, corporations need to consider all three attitudes together, rather than just focusing on one segmentation group.

## **6. Conclusions and Limitations**

This study provides a segmentation analysis of the online agricultural product market using a questionnaire survey in China. Results indicate that self-interest and ethical attitudes can each independently demonstrate positive associations with online consumer behavior. Consequently, online consumers can be effectively segmented based on these two distinct attitudes. Also, each segmentation group of online consumers has specific characteristics that can be explained by different demographic and behavioral patterns. According to consumers' attitudes towards self-interest and ethics, online consumers are comprised of four segments: pure ethical consumers (consumers who would like to support corporations that increase farmers' income by purchasing their agricultural products more via the Internet), information communicators (consumers who care about online communication when purchasing agricultural products and are willing to communicate with buyers and consumers), brand-quality pursuers (consumers who pursue product quality and are willing to purchase based on brand awareness), and well-heeled shoppers (consumers who support corporations that increase farmers' income by purchasing and are interested in online communication, and also value brand and quality). Besides, based on the demographic and behavioral variables, this study reveals the characteristics for each of these segments.

Among these segments, particular attention should be given to pure ethical consumers and well-heeled shoppers. Both groups exhibit highly ethical attitudes, which have a more positive influence on consumer behavior than self-interest attitudes. The concept of ethical branding and its connection to corporate reputation underscores the need for corporations to emphasize ethical behavior in their marketing strategies (Fan, 2005). Therefore, ethical attitudes should be further explored as a critical factor for market segmentation. This study shows that Chinese consumers' attitude toward purchasing agricultural products online is not just focusing on the basic attributes of products, such as freshness, and price. They are starting to pay attention to product quality, online communication, and caring about social problems. From this perspective, the outcomes of this study reveal the current insufficient aspects of consumers' awareness and cognition to a certain degree. Also, our results show that different attitudes can influence consumers' purchasing behavior online. It is a good implication for corporations to build a marketing strategy.

Marketing and advertising strategies can be developed according to the customers' online segment. Besides, online corporations can use demographic and experience profiles to predict their customers' segment (Aljukhadar and Senecal, 2011). Hence, corporations should think about their self-actualization beyond material objectives. Profit will result from consumers' appreciation of these corporations' contributions to human well-being (Kotler et al., 2010). Therefore, when a brand does a great job of satisfying customers and building trust, commitment develops, which increases the ethical burden on the brand. The very brand actions that develop commitment to high quality, good service, and caring about the customer, must actually increase in importance once strong customer relationships are built (Story and Hess, 2010).

Nevertheless, in this study, the sample population in China may be limited, and this can be addressed by using samples from other countries. This study is deliberately

based on Chinese consumers who have online shopping experience. Future studies could aim to explore more diverse website components (e.g., logistics, after-sales service, information security) by developing webpages to collect data through actual physical interactions. Additionally, the comments by other users of social commerce websites, classified as electronic word-of-mouth, could be studied.

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