

Research on the Willingness of Chinese Consumers to Pay a Premium for Sustainable and Green Certified Foods

Xiangyi Lai^{1*}, Qiurong Chen², Yihan Zeng³, Ruxue Yang⁴, Ye Xu⁵, Ruoyu Shao⁶

¹*Faculty of Business and Management, Beijing Normal University – Hong Kong Baptist University
United International College, Zhuhai, China*

²*Faculty of Straits College of Finance and Economics, Fujian Jiangxia University, Fuzhou, China*

³*International Business School, Xi'an Jiaotong-Liverpool University, Suzhou, China*

⁴*HNU-ASU Joint International Tourism College, Hainan University, Haikou, China*

⁵*Winchester School of Art, University of Southampton, Southampton, England*

⁶*Faculty of Arts and Social Science, The University of Sydney, Sydney, Australia*

**Corresponding Author. Email: xiangyilai@outlook.com*

Abstract. As environmental and food safety awareness rises, sustainable and green certified food has gained popularity globally and in China, yet a gap remains in understanding Chinese consumers' willingness to purchase. This study investigates 175 consumers' willingness to buy these products from demographic and psychological perspectives, including their readiness to pay a premium and preferred buying methods. Findings show most consumers are willing to accept a 15-25% premium, driven by product quality and health concerns, and prefer purchasing online and in supermarkets. This research enhances understanding of the Chinese market and promotes the sustainable and green food industry's development.

Keywords: sustainable and green certified foods, premium, Chinese customer, willingness to pay, purchasing behavior

1. Introduction

1.1. Background

With the global focus on sustainable development and health, the demand for green-certified food is rapidly expanding, and the organic food market is projected to grow at 12% annually, reaching \$272.18 billion by 2027 [1]. While China's organic food consumption is below the global average, increasing awareness of food safety and green initiatives are driving market growth [2]. Incidents like the "Sanlu Milk Scandal" have also further intensified consumers' desire for green-certified products [3].

1.2. Research purpose and significance

This study is to explore Chinese consumers' willingness to purchase green-certified food, their readiness to pay a premium, and preferred purchasing channels. Its significance lies in providing insights that enable businesses to adapt marketing strategies and assist policymakers in promoting sustainable consumption. To achieve this purpose, we raised three hypotheses.

H1: The main motivation for Chinese consumers to purchase sustainable and green certified food is to pursue higher levels of health.

H2: Compared with supermarkets, farmer's market is the most popular primary channel for Chinese consumers to buy sustainable and green certified food.

H3: Most Chinese consumers are willing to pay a premium for sustainable and green certified food.

2. Literature review

Extensive research has been conducted on the factors affecting foreign consumers' willingness to pay for organic products, particularly in North America and Europe. Gschwandtner studied the UK market, focusing on consumer behavior preferences and the impact of pricing policies on premium payments. The study revealed that both contingent valuation and hedonic pricing similarly influenced consumers' willingness to pay a premium [4]. In Canada, Hamzaoui-Essoussi and Zahaf, M. segmented consumers into three groups—true organic consumers, sporadic organic consumers, and inexperienced consumers—using a 5-point Likert scale, each displaying different levels of willingness to pay [5]. In the U.S., Britwum et al. investigated how the attributes of organic products, such as being free from synthetic pesticides and non-GMO, affected consumers' purchasing confidence [6].

Most of this research focuses on developed countries like ,North America and Europe, with a focus on consumer behavior preferences and psychological factors , but lack analysis of emerging markets like China. To fill this gap, this study explores how demographic factors influence Chinese consumers' willingness to pay for organic products.

Researchers have also extensively investigated the retail premiums for green products in the global market and predicted future trends. Carlson, A and Jaenicke, E. examined price trends from 2004 to 2010, noting a wide range of organic premiums for fresh produce, varying from 7% for non-organic vegetables to 60% for salad mixes [7]. Maguire et al. focused on baby food and found the premium to be generally 3-4 euros per ounce. In the U.S., consumers show a willingness to pay 31% to 41% more for fresh organic foods [8]. Watanabe et al. anticipate stable premiums in the future [9], while Dimitri, C and Oberholtzer, L suggest premiums will remain high [10].

Historical premiums and future trends of green products have been extensively studied abroad, yet similar studies are scarce within China. Our investigation aims to rectify this by determining the current premium Chinese consumers are willing to pay and their anticipated trends for the future

3. Hypotheses of the paper

3.1. Hypothesis one

H1: The main motivation for Chinese consumers to purchase sustainable and green certified food is to pursue higher levels of health.

Existing literature suggests that in developed countries such as North America and Europe, consumer health awareness is one of the main factors driving their purchase of organic products. Although these studies mainly focus on the European and American markets, in recent years, Chinese consumers have been increasingly concerned about food safety and healthy eating, which to some extent reflects their pursuit of higher levels of health. We can reasonably speculate that with the development of the Chinese economy and the improvement of people's living standards, Chinese consumers may also pay more attention to health, and view green certified food as a healthier choice due to its compliance with strict food safety standards and production processes, thus willing to pay higher prices for green certified food. This hypothesis aims to explore the key role of health factors in green certified food consumption decisions, which will help us gain a deeper understanding of Chinese consumers' purchasing motivations

3.2. Hypothesis two

H2: Compared with supermarkets, farmers' markets are the most popular channel for Chinese consumers to purchase sustainable and green certified food.

Some studies suggest that consumers tend to choose channels they are familiar with and trust when purchasing food. In China, based on the analysis of Chinese consumers' shopping habits and channel preferences, agricultural markets, as a traditional food sales channel, have a high degree of popularity among Chinese consumers, with a wide consumer base and profound cultural heritage. Despite the rapid rise of modern retail channels such as supermarkets and e-commerce platforms in recent years, agricultural markets still hold an important position in the minds of consumers. Therefore, considering the position of different sales channels in the sales of green certified food, we assume that agricultural markets have special appeal to Chinese consumers when purchasing green certified food. This assumption aims to evaluate Chinese consumers' preferences for sales channels when purchasing green certified food, and provide strong support for relevant enterprises to formulate effective market strategies.

3.3. Hypothesis three

H3: Most Chinese consumers are willing to pay a premium for sustainable and green certified food.

Based on the market phenomenon that green certified foods are usually priced higher than regular foods, and in-depth analysis of research in the international market, we conclude that consumers are usually willing to pay a premium for green or organic foods. These premiums often reflect consumers' recognition and emphasis on food quality, safety, and environmental sustainability. With the increasing attention of Chinese consumers to food safety and healthy eating, as well as the gradual acceptance of green consumption concepts, we assume that Chinese consumers are also willing to pay a certain premium for green certified food. However, the magnitude of the premium will be influenced by various factors, including consumers' income level, price sensitivity, and their awareness and trust in green certified food. This hypothesis aims to explore consumer purchasing behavior and price sensitivity, and quantify the acceptance level of Chinese consumers towards the premium of green certified food

4. Research methods

4.1. Determine research methods

Based on the background investigation and the three major hypotheses proposed, we hope to use a research method that can collect data widely, and the research method can be standardized and objective, avoiding the interference of subjective factors of investigators. At the same time, the research method also needs to meet the characteristics of easy quantitative analysis of data [11]. Therefore, we adopt the research method of survey questionnaire, which can cover a large number of survey subjects and collect rich data. The question design of simultaneous survey questionnaires is usually more consistent, which helps to reduce subjective interference and improve data accuracy. And the data collected from survey questionnaires is usually easy to quantify and analyze, which helps us to have a deeper understanding of the characteristics and needs of the survey subjects. Compared with other research methods, survey questionnaires usually have lower costs and higher benefits.

4.2. Design process

4.2.1. Clarify the purpose of the investigation

Before designing the survey questionnaire, we first clarified the purpose of the survey, which is to understand (specific objectives, test hypotheses, survey objectives, etc.) The purpose of this paper is to investigate and discuss the willingness of Chinese consumers to pay extra for sustainable green food. This step is the cornerstone of survey questionnaire design, which determines the content and structure of the questionnaire.

4.2.2. Determine the survey subjects

Based on the purpose of the survey, we need to determine which groups or organizations will be included in our survey sample. In this survey questionnaire, we have identified Chinese high net worth individuals and green conscious consumer groups as the survey subjects. This step helps us to design questionnaire questions more accurately to ensure their targeting and applicability.

4.2.3. Design questionnaire questions

[12] When designing questionnaire questions, we followed five principles of clarity: clear question expression to avoid ambiguity; Relevance: The question is closely related to the purpose of the investigation, and unrelated questions should be avoided; Objectivity: Try to use closed ended questions to reduce subjective interference; Simplicity: The problem is concise and clear, avoiding being lengthy and complex; Logic: Maintain logical coherence between problems, avoid jumping and repetition [13]. The questionnaire design of this paper is divided into three parts, through which the target consumers are comprehensively understood

The first part of the questionnaire is to record the basic demographic information of the respondents and determine the basic situation of the consumers, including age, gender, educational level, and social identify. The second part of the questionnaire aims to evaluate the respondents' understanding of sustainable green food and their awareness and attitude towards food safety. The final part of the questionnaire focused on respondents' real purchasing behavior and their willingness to pay extra for sustainable food.

To ensure the validity of the recovered content [14], the questionnaire used a Likert scale in which participants indicated their degree of agreement or disagreement with the question. The answer options range from "strongly disagree" to "strongly agree", which quantifies the attitudes and behaviors of the respondents, making it easier to understand and compare.

4.2.4. Distribute questionnaires

[15] According to the characteristics of the wide coverage of the respondents and the actual situation, we have selected different online platforms to issue a large number of questionnaires, such as WeChat, Xiaohongshu, Weibo, Tiktok and other social media. This step helps us collect more data from different regions and collect data more effectively.

4.2.5. Pre testing and revision

Before the formal implementation of the survey, we conducted a pre-test on the questionnaire to evaluate its effectiveness and reliability. Based on the results of the pre-test, we have made necessary revisions and improvements to the questionnaire.

4.3. Overall analysis

This questionnaire consists of 16 questions, including 9 multiple-choice questions, 5 fill in the blank questions, and 2 multiple-choice questions. The content covers basic information, consumer awareness of sustainable green food, willingness to pay, influencing factors, and market expectations. A total of 175 valid questionnaires were collected.

4.4. Significance of the questionnaire

Through 175 valid survey questionnaires, we have learned about the current situation of Chinese consumers and their demand for certified sustainable green food, providing a basis for business decision-making. At the same time, through data analysis of the survey questionnaire, we tested the three major hypotheses proposed, providing reference for future strategic planning of sustainable green food. Market planning has made significant contributions. This survey questionnaire also serves as a two-way communication tool, promoting communication and understanding between survey respondents and researchers, and helping to establish closer relationships.

5. Result and discussion

5.1. Descriptive analysis of sample characteristics

5.1.1. Sample age and gender

According to the survey data, 72.6% of the groups participating in the questionnaire are between the ages of 18 and 30, which is relatively young and has a certain amount of spending power. During this period, 66.29% of respondents were women.

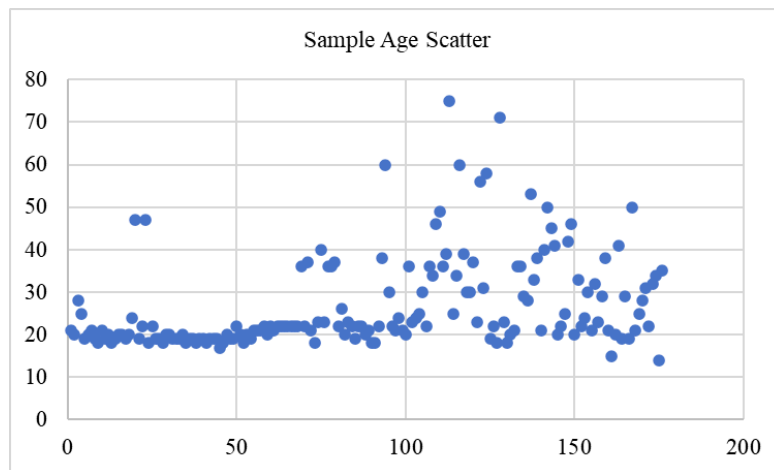


Figure 1. Sample age scatter

Table 1. Sample gender analysis results

Gender	Sample size (persons)	Proportion (%)
Male	56	32.00%
Female	116	66.29%
Other gender	3	1.71%
Total	175	100%

5.1.2. Sample educational level

According to the education level of the respondents, 9 (5.14%) had a high school degree or less, 12 (6.86%) had a college degree, 134 (76.57%) had a bachelor's degree, and 20 (11.43%) had a master's degree or above. The vast majority of respondents have a bachelor's degree or higher.

Table 2. Sample educational level analysis results

Educational Level	Sample size (persons)	Proportion (%)
High school degree and below	9	5.14%
Junior college degree	12	6.86%
Bachelor's degree	134	76.57%
Master's degree or above	20	11.43%
Total	175	100%

5.1.3. Sample social identity

In the survey sample, 104 (59.43%) were students, 57 (32.57%) were already working, 7 (4%) were freelancers, 5 (2.86%) were retirees, and 2 others (1.14%) were already working. Students and working people make up the highest percentage of the sample.

Table 3. Sample social identity analysis results

Social Identity	Sample size (persons)	Proportion (%)
Student	104	59.43%
Worker	57	32.57%
Freelance	7	4.00%
Retire	5	2.86%
Others	2	1.14%
Total	175	100%

5.2. Descriptive analysis of cognitive and attitudinal characteristics

5.2.1. Consumer perception of sustainable and green food concept

According to the survey, 71.43% of respondents believe that green and sustainable food is equivalent to organic food, and 70.29% associate it with pesticide-free products. In addition, 68% of the respondents recognized that green food needs to have a sustainable green food certification label, and 58.86% believed that non-polluted food is green food. This shows that respondents have a high awareness of sustainable food, especially since many people are aware of the importance of green food certification.

Table 4. Chinese consumer perception of sustainable and green food concept results

Perception	Sample size (persons)	Proportion (%)
Pesticide-free, fertilizer-free agricultural products	123	70.29%
Organic food	125	71.43%
Products with the Sustainable Green Food Label	119	68.00%
Contaminated-free food	103	58.86%
Others	8	4.57%
Total	175	100%

5.2.2. Factors influencing the purchase of sustainable and green food

69.14% of the respondents believed that product quality was the main factor influencing their purchase of green food, followed by health (68.57%) and brand trust (57.14%). Only 41.14% of the respondents chose environmental factors, indicating that personal health is more important than the environment for Chinese consumers. These results validate the paper's hypothesis one.

In addition, 47.43% of respondents said that price has a significant impact on their purchase decision, indicating that consumers are willing to pay a premium, but the price still needs to be reasonably acceptable.

Table 5. Factors influence Chinese consumers' purchasing behavior results

Factors	Sample size (persons)	Proportion (%)
Environmental crisis	72	41.14%
Health concerns	120	68.57%
Brand trust	100	57.14%
Product quality	121	69.14%
Price sensitivity	83	47.43%
Social impact	36	20.57%
Others	6	3.43%

5.3. Willingness to pay and purchasing behavior

5.3.1. Primary channel for purchasing sustainable and green certified food

There are many ways for Chinese consumers to access sustainable and green certified food, including not only traditional store channels, but also online platforms. Supermarkets are clearly the most popular purchase channel, chosen by 51.43% of respondents, followed by online malls (26.86%). Hypothesis two is not valid. Specialty stores and farmers' markets accounted for only 3.41% and 15.34%. Therefore, supermarkets and online malls are the most common places to buy sustainable and green certified food. Businesses should focus on these channels to expand their product offerings and may place a secondary focus on farmers markets to reach a niche but loyal consumer base.

Table 6. Chinese consumer primary purchasing channel results

Purchase channel	Sample size (persons)	Proportion (%)
Supermarket	90	51.43%
Online Mall	47	26.86%
Specialty Store	6	3.43%
Farmer's Market	27	15.43%
Others	5	2.86%
Total	175	100%

5.3.2. The frequency of sustainable and green purchases

While only a small percentage of consumers buy sustainable and green certified food every week, more than 50% sometimes do. This shows that Chinese consumers still have a certain demand and interest in sustainable and green certified food. Therefore, there is an opportunity to convert most of these casual buyers into more frequent customers through targeted promotions, discounts and increased product availability in common shopping channels such as supermarkets.

Table 7. Chinese consumers purchases frequency results

Purchase frequency	Sample size (persons)	Proportion (%)
Weekly	42	24.00%
Monthly	29	6.57%
Occasionally	98	56.00%
Never	6	3.43%
Total	175	100%

5.3.3. Price sensitivity of Chinese consumers to sustainable and green certified food

(a) The average price of regular milk was set at 20RMB, and when respondents were asked how much they were willing to pay for sustainable and green certified milk, according to this pareto, the largest majority of people were willing to pay a price of 23RMB-25RMB, which is a premium of more than 15% to 25%. Then some people are only willing to accept a premium of 15% or less. This suggests that most respondents are willing to pay a small premium for sustainability and green, but price sensitivity suggests that the premium should remain modest. Hypothesis three is valid.

In addition, a small number of people are willing to pay more than a 25% premium. There are a few people who are willing to pay less than 20RMB for regular milk, and they may feel that sustainable and green certified foods have the potential for economies of scale and should have a lower cost.

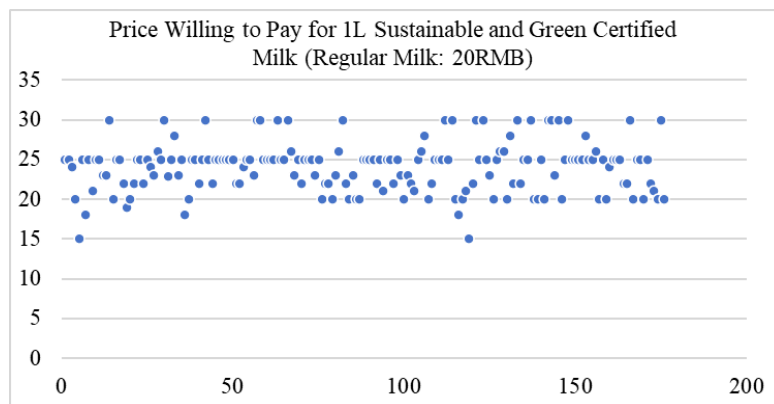


Figure 2. Scatter diagram of willing price

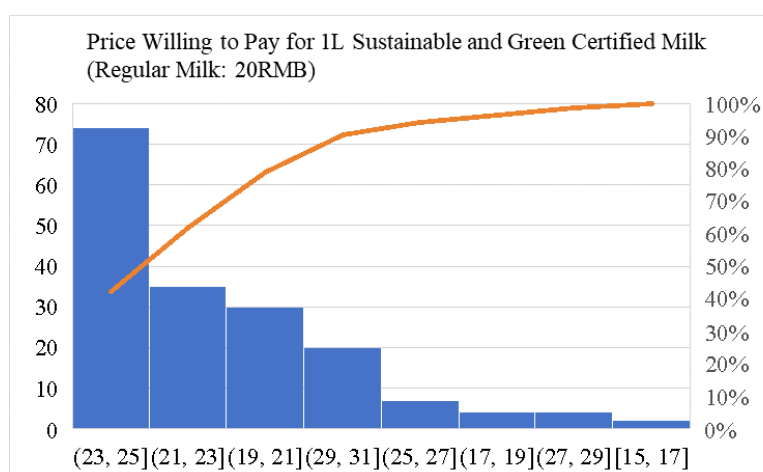


Figure 3. Pareto diagram of willing price

(b) When it comes to the purchase of the same product, only 15.43% of consumers buy 1L ordinary pure milk worth 20 yuan, while 29.14% of consumers are willing to buy organic pure milk worth 21 yuan with the same capacity. When organic pure milk with the same capacity but holding sustainable and green certification appears, more than half of consumers are willing to buy it (55.43%), even if its price is 10% higher than that of regular pure milk. This shows that consumers are prepared to pay a premium for green sustainable food and that the market is inclusive.

Table 8. Chinese consumers' preference for pure milk results

Preference	Sample size (persons)	Proportion (%)
1L regular pure milk at 20RMB	27	15.43%
1L organic pure milk at 21RMB	51	29.14%
1L pure milk with S&G Certif. at 22RMB	97	55.43%
Total	175	100%

5.3.4. Expectation for the development of the sustainable and green food market

More than half of the respondents (52%) see the sustainable and green food market as "Good Expectations" and 23.43% as "Very good expectations". This optimistic outlook suggests that the demand for sustainable and green food is likely to grow, but companies must consider price-sensitive consumers, who are a large portion of the population.

Table 9. Expectation for the markert development results

Expectation	Sample size (persons)	Proportion (%)
Very good expectations	41	23.43%
Good Expectations	91	52.00%
Uncertain	37	21.14%
Bad expectations	5	2.86%
Very bad expectations	1	0.57%
Total	175	100%

6. Recommendation

From the previous analysis, there are three proposals to enhance Chinese consumers' willingness to pay a premium for sustainable and green certified food:

(a) Enhance consumers' health awareness:

Based on research findings that health is the primary driver for Chinese consumers to purchase green food, companies should enhance consumers' health awareness by publicizing the health benefits of green food. They can deepen consumers' association between green food and health by conducting health lectures, publishing health-related research reports, and cooperating with medical or nutritional experts. Meanwhile, publicity campaigns on healthy eating and green food are conducted through social media and short video platforms, such as WeChat, Weibo and Xiaohongshu. Enhance consumer awareness of the health value of green food, so that health becomes the main motivation for buying green food.

(b) Reduce price sensitivity and introduce acceptable premium strategies:

The survey shows that consumers are very sensitive to price, and although there is a certain willingness to pay a premium, the premium needs to be moderate. To cope with this situation, enterprises can adjust production and supply chain management to minimize production costs, thereby controlling the selling price under the premise of maintaining product quality. On the one hand, enterprises can seek to optimize the production process to improve the production efficiency of green food and reduce supply chain costs; on the other hand, they can cooperate with the government and make use of policies such as tax breaks and subsidies to reduce the cost pressure on green food. At the same time, promotional activities such as limited-time discounts and coupon distribution can be carried out to increase consumers' motivation to buy. Through reasonable pricing strategies, more price-sensitive consumers can be attracted, and the market penetration rate of green food can be increased.

(c) Expand green food purchase channels and optimize consumer experience:

According to the survey, supermarkets and e-commerce platforms are the main channels for consumers to buy green food, so enterprises should focus on the layout of these platforms, while improving the consumer's buying experience. Enterprises can cooperate with large supermarkets and e-commerce platforms to increase the product lines of green food and provide more detailed information about the products, user reviews and recommendations on these platforms. Meanwhile, subscription services for green food or green food package delivery can be developed so that consumers can access fresh green products on a regular basis. On online platforms, novel approaches such as live banding and interactive advertising can be used to increase user engagement and trust. Improving the availability of green food optimizes the consumer shopping experience and increases purchase frequency.

7. Conclusion

The analysis reveals several key findings. Consumers demonstrate a sophisticated understanding of sustainable and green-certified food, distinguishing it from regular food, particularly through the certification label's sustainability cues. While expressing a willingness to pay a premium, consumers are highly price-sensitive, with most accepting only a 15-25% increase. Supermarkets are the primary purchase channel, followed by online malls. Health and product quality are the primary purchase drivers, with environmental concerns having a weaker impact. Despite price sensitivity constraints, the Chinese market for sustainable foods shows promising growth potential. Companies

that offer competitive pricing and emphasize health benefits can capture a larger market share and foster the green food industry's sustainable growth in China.

8. Limitations and suggestions for future research

Firstly, the study's sample presents a diversity issue, with the majority of participants being young adults aged 18-30 and predominantly female, and the sample is geographically limited to a few provinces and regions. To enhance the study's applicability, future research should diversify the sample to include a broader age range, including middle-aged and older adults, and achieve a more equitable gender balance. Additionally, while the study examined consumer attitudes towards green food, it did not account for discrepancies between stated attitudes and actual purchasing behavior, which can be influenced by practical considerations like price and convenience. Future studies should employ mixed methods, integrating self-reported attitudes with actual shopping data or behavioral experiments to track decision-making processes, bridging the gap between attitudes and behaviors. Lastly, the current study's questionnaire design features a limited range of green food categories, potentially overlooking variations in consumer perceptions of value, health benefits, and sustainability across different food types. Future research should expand the variety of food categories to provide a more nuanced understanding of consumer purchasing behaviors and price sensitivities across different food segments.

Acknowledgements

Acknowledgments are extended to Professor Matthew Grimes for his invaluable guidance and insights, to Assistant Hayton for his dedicated support and constructive feedback, and to the Chinese consumers who participated in the survey, whose contributions were instrumental to the completion of this research. Xiangyi Lai, Qiurong Chen, Yihan Zeng, Ruxue Yang, Ye Xu, Ruoyu Shao contributed equally to this work and should be considered co-first authors.

References

- [1] Hu, T., Al Mamun, A., Reza, M.N.H. (2024). Examining consumers' willingness to pay premium price for organic food. *Humanit Soc Sci Commun* 11, 1249.
- [2] Suo, L., & Huang, Y. (2023). Willingness to Pay Premium for Green Agricultural Products. *Rajabhat Chiang Mai Research Journal*.
- [3] Yin, S., Wu, L., Du, L., & Chen, M. (2010). Consumers' purchase intention of organic food in China. *Journal of the Science of Food and Agriculture*, 90(8), 1361-1367.
- [4] Gschwandtner, A. (2018). The organic food premium: a local assessment in the UK. *International Journal of the Economics of Business*, 25(2), 313-338.
- [5] Hamzaoui-Essoussi, L., & Zahaf, M. (2012). Canadian organic food consumers' profile and their willingness to pay premium prices. *Journal of international food & agribusiness marketing*, 24(1), 1-21.
- [6] Britwum, K., Bernard, J. C., & Albrecht, S. E. (2021). Does importance influence confidence in organic food attributes? *Food Quality and Preference*, 87, 104056.
- [7] Carlson, A., & Jaenicke, E. (2016). Changes in retail organic price premiums from 2004 to 2010. *Changes in retail organic price premiums from 2004 to 2010*
- [8] Jaenicke, E. C., & Carlson, A. C. (2015). Estimating and investigating organic premiums for retail-level food products. *Agribusiness*, 31(4), 453-471.
- [9] Maguire, K. B., Owens, N., & Simon, N. B. (2004). The price premium for organic babyfood: a hedonic analysis. *Journal of Agricultural and Resource Economics*, 132-149.
- [10] Dimitri, C., & Oberholtzer, L. (2005). Organic price premiums remain high. *Amber Waves: The Economics of Food, Farming, Natural Resources, and Rural America*, 2-3.

- [11] Zheng Jingjing. Review of Research on Questionnaire Survey Method [J]. Theoretical Observation, 2014, (10): 102-103
- [12] Zhang Ying, Ni Zongzan, Wang Guoqing, et al. Discussion on Quality Control of Questionnaire Surveys in Social Survey Research [J]. Modern Preventive Medicine, 1992, (02): 85-88+127
- [13] Wang Xiao, Wang Xiaoning, Liu Yunqiang. Application and Research of Questionnaire Segmentation Technology in Market Research [J]. Statistical Theory and Practice, 2020, (02): 17-25
- [14] Zhao Qian, Zhao Dongfang, Li Bingjie, et al. Analysis of the Option Order Effect and Its Influencing Factors of the Likert Scale in the Education Field [J]. Chinese Examinations, 2020, (04): 22-27. DOI: 10.19360/j.cnki. 11-3303/g4.2020.04.005
- [15] Julili. How to Design a Scientific and Reasonable Survey Questionnaire - Taking "Survey Questionnaire on Fragmented Time Management of College Students" as an Example [J]. Applied Writing, 2016, (07): 32-35