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Impact of Geographical Indications on Consumers' Online Purchase of Fresh Agricultural Products

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Abstract. Based on 257 consumer survey data, a binary logistic regression model is built to empirically test the relationship between multi-dimensional geographical indication characteristics, consumer perceived value and online purchase intention for fresh agricultural products with geographical indications. The results show that quality is the key dimension in the evaluation of geographical indications. Meanwhile, the market recognition, popularity, reputation and cultural history of geographical indications can significantly stimulate consumers' online purchase intention, with the impacts of different dimensions varying. In addition, the popularity, reputation, product quality and cultural history of geographical indications can affect consumers' perceived value, thereby affecting their purchase intention.

Keywords: Geographical Indications; Fresh Agricultural Products; Online Purchase Intention; Perceived Value.

1. Introduction

According to the No. 1 document of the Ministry of Agriculture and Rural Affairs in 2023, "agricultural production and 'three certifications plus one registration' of agricultural products should be further promoted", "the scale of green, organic, geographical indication and famous high-quality new products should be expanded", "the protection of agricultural products with geographical indications should be implemented". Hence, agricultural products with geographical indications are key to stimulating rural revitalization, which is a driver that cannot be ignored to enhance the development of the regional industrial chain. Agricultural products with geographical indications are unique agricultural product signs indicating that agricultural products come from a specific region, and product quality and related characteristics are largely shaped by the local natural ecological environment and historical and human factors, which are named after the region. The rapid development of rural e-commerce has enlarged the market for agricultural products with geographical indications. In September 2022, the first *National Consumption Report of Agricultural Products with Geographical Indication* proposed that in the past five years, the consumption of agricultural products with geographical indication has increased by an average of 36% annually, which is 4 percent higher than the overall growth rate of agricultural products. Specifically, the consumption of local fresh agricultural products increased by an average of 41% annually, 7 percent higher than the overall growth rate of fresh agricultural products. Geographical indications can inspire consumers to associate products in terms of quality, economic support, culture and traditional crafts [1], providing consumers with positive effects [2]. Regional value will affect consumers' perception of agricultural products. While value acquisition is the ultimate goal of transaction behavior, perceived value is a vital factor to predicting and affecting consumer behavior [3]. When it comes to online shopping, some scholars mentioned that e-commerce companies need to combine the features of fresh agricultural products to enhance consumers' perceived value, thereby intensifying their intention to shop online [4]. In China, consumers' perceived value of agricultural products with special characteristics and geographical indications is mostly divided into functional value, emotional value

and social value, which significantly promotes consumers' purchase intention of certified agricultural products [5].

In addition to policy support, agricultural products with geographical indications can expand their market coverage by virtue of their inherent characteristics. Thus, it is particularly crucial to understand consumer needs and explore the relationship between geographical indications and consumers' intention to purchase online, so as to formulate brand-building strategies for government departments, support industries with rural characteristics and further provide solid theoretical guidance to boost rural revitalization.

Based on the existing literature, given the special nature of Chinese agricultural products with geographical indications and consumers' cognition, this paper builds multi-dimensional geographical indication characteristics theoretically. It not only investigates the characteristics of agricultural products with geographical indication and their origin, but discusses consumers' cognition and evaluation of geographical indications in the market. From the above two aspects of the intermediary role based on perceived value, the impact of geographical indications on consumers' online purchase intention of fresh agricultural products is explored. This study aims to help the government strengthen public awareness of geographical indications, further stimulate the potential of rural regional economic growth, and improve farmers' income and living standards.

2. Literature Review and Research Hypotheses

2.1. Features of Geographical Indication and Selection of Evaluation Dimension

Geographical indications are signs used for commodities with specific geographical sources. The most common situation is that geographical indications include the name of the commodity origin, such as "Yangshan juicy peach" and "Ding'ao red bayberry". The research on geographical indications of agricultural products in the existing literature mostly focuses on the protection of geographical indications [6], brand building [7], etc., while there is less research from the micro aspect such as the impact of consumers' purchase intention. At present, the research on the consumption of agricultural products with geographical indications only pays attention to whether geographical indications will affect consumers' intention to pay, etc., which has not been investigated in-depth from multiple dimensions such as geographical indication characteristics and consumer cognitive evaluation. Hence, it is a scientific issue that has not been systematically analyzed to divide geographical indications into multiple dimensions based on the existing literature, so as to clarify the impact of geographical indications on consumers' purchase intention.

The "three certificates plus one registration" of agricultural products (green, organic, qualified agricultural products with geographical indications) is a public brand featuring safety and high quality led by the Chinese government [8]. Geographical indications can be used as a signal of high-quality agricultural products. Li Yurui et al. mentioned natural geographical, historical and cultural factors when exploring the main reasons for the regional differentiation of agricultural products with geographical indications in China [9]. As agricultural products with regional characteristics, the distribution of agricultural products with geographical indications is inseparable from the natural geographical conditions. Consumers' geographical preference for the origin of agricultural products with geographical indications may affect their purchase intention. Agricultural products with geographical indications under the historical and cultural background are often more topical and influential, which stimulates more consumers' intention to buy. On the one hand, the geographical environment and humanistic history of the origin of agricultural products affect their quality and historical traceability. On the other hand, consumers' preferences and purchase behaviors also make a difference. In addition, according to the data from the field survey conducted by Zhan Huibin et al. to consumers of Huangshan tea, most consumers have never heard of geographical indications used in Huangshan tea. However, most consumers are willing to buy Huangshan tea with geographical indications and afford a certain premium after being provided the relevant information about the

geographical indications [10]. The public awareness of agricultural products with geographical indication still needs improvement, while it provides evidence support for the market recognition, popularity, reputation and other factors affecting consumers' awareness of agricultural products with geographical indication. Based on the data of the online purchase platform JD for tea, Jiang Yu et al. found that the positive premium of geographical indications depends on its popularity construction. Well-known geographical indications can bring significant positive premiums to products, while the case is the opposite for less-known geographical indications. It further verified the conjecture of this paper, proving that popularity and other factors are vital to affecting agricultural products with geographical indications on consumers' purchase intention.

2.2. Impact of Geographical Indications on Consumers' Perceived Value

Perceived value plays a crucial role in consumers' purchase of agricultural products with characteristics. Studies have confirmed the positive impact of origins on consumers' perceived value [11]. Based on the questionnaire survey data, Xu Yunfang et al. found that the origin of agricultural products has a positive impact on consumers' value perception and purchase intention. Besides, value perception is an intermediary between the origin and consumers' purchase intention [12]. In addition to the origin, scholars such as Zhu Zhanguo in recent years have proposed that the three dimensions including quality assurance, economic support, and cultural factors of geographical indications can significantly promote consumers' perceived value [13]. Geographical indications can bring quality assurance and cultural identity to consumers, and their historical and cultural experience can positively stimulate consumers' perceived value. Based on the previous research, this paper explores the impact of geographical indications on consumers' perceived value from the products with characteristics and geographical indication as well as consumer cognitive evaluation, putting forward the following hypotheses:

H1: Market recognition of geographical indications has a positive impact on consumers' perceived value.

H2: The popularity of geographical indications has a positive impact on consumers' perceived value.

H3: The reputation of geographical indications has a positive impact on consumers' perceived value.

H4: The geographical environment of the origin of agricultural products with geographical indications has a positive impact on consumers' perceived value.

H5: The humanistic history of the origin of agricultural products with geographical indications has a positive impact on consumers' perceived value.

H6: The quality of agricultural products with geographical indications has a positive impact on consumers' perceived value.

2.3. Impact of Consumers' Perceived Value on Purchase Intention

Perceived value is a subjective evaluation and preference orientation formed on the basis of evaluating the income and cost of products and services. Meanwhile, it is the core factor that determines customer satisfaction. Li Zongwei et al. believed that under the online shopping mode, customers' perceived value includes dimensions: product perceived value, service perceived value and social perceived value [14]. According to the research of Wang Gaoshan et al., the functional value of products can enhance consumer trust and improve consumers' purchase intention [15]. Yang Miao et al. proposed that the cost, social value and emotional value perceived by consumers can be initiated to enhance the intrinsic value of products, thereby enhancing consumers' purchase intention [16]. On this basis, this paper makes the following hypothesis:

H7: Consumers' perceived value has a positive impact on consumers' online purchase intention.

3. Research Design and Conceptual Methods

3.1. Variable Definition and Measurement

The questionnaire design is divided into two parts: (1) the basic information of the respondents, including gender, age, education, monthly family income, whether they have purchase experience, etc.; (2) measurement and determination of research variables such as geographical indication characteristics, consumers' perceived value, and purchase intention. As for the selection of the above key variables, this paper refers to the maturity scales of relevant research at home and abroad. The 5-point Likert scale is used to measure items of geographical indication characteristics and consumers' perceived value, with the specific content shown in Table 1. Consumers' purchase intention is a binary variable. If consumers are willing to buy fresh agricultural products with geographical indications, the variable is assigned 1, otherwise it is 0.

Table 1. Selection of Key Variables

Variables		Survey Item
		Whether the Production and Sales Process Information is Transparent
	Market Recognition	Is it Safe and Reliable?
		Price Rationality
		Brand Popularity
	Popularity	Popularity of Production Origin
		Frequency of Media Reports and Advertising
		Whether the Brand Image Meets Expectations
Features of Geographical Indications	Reputation	Word-of-mouth Evaluation
		Service Quality
		Climatic Conditions
	Geographical Environment of Origin	Soil Quality
		Market Demand and Scale
		Historic Longevity
	Humanistic History of Origin	Cultural Heritage
		Humanistic Characteristics of Origin
		Health Value
	Quality	Quality Certification
		Production Process
	Functional Value	Acceptable Value Corresponding to the Price
Perceived Value	Emotional Value	Enjoyment of the Purchase Process
	Social Value	Others' Recognition

3.2. Data Collection and Basic Statistics

The survey data of this study are derived from the survey questionnaires distributed through on-site and online collection from January to February 2023. The online survey was mainly conducted through WeChat, QQ, Questionnaire Star and other platforms, distributing a total of 223 questionnaires and obtaining 206 valid questionnaires. The offline survey was carried out in Shaoxing, with Keqiao District and Yuecheng District selected as sample areas. A total of 87 questionnaires were randomly distributed in large supermarkets, shopping malls, towns, streets, and schools in each

sample area, obtaining 51 valid questionnaires. To sum up, a total of 310 questionnaires were distributed in this survey. After excluding incomplete and unqualified questionnaires, 257 valid questionnaires were issued and the effective rate was 82.90%, with details seen in Table 2.

Table 2. Descriptive Statistics

Demographic Variables	Classification	Number of Persons	Percentage (%)
Gender	Male	102	39.7
	Female	155	60.31
Age	Under 18	31	12.1
	18-30 Years Old	97	37.7
	30-40 Years Old	100	38.9
	Above 40	29	11.3
Education	Primary and Below	36	14.0
	Junior High School	76	29.6
	High School	95	37.0
	College and Above	50	19.5
Occupation	Current Students	22	8.6
	Government Personnel	16	6.2
	Enterprise Manager	17	6.6
	General Staff	31	12.1
	Professionals	15	5.8
	Ordinary Workers	22	8.6
	Commercial Service Workers	25	9.7
	Self-employed	22	8.6
	Freelancers	21	8.2
	Retired	20	7.8
	Unemployed	19	7.4
	Others	27	10.5
Monthly Income	Below 3000 yuan	30	11.7
	3000-5000 yuan	69	26.8
	5000-7000 yuan	66	25.7
	7000-9000 yuan	72	28.0
	More than 9000 yuan	20	7.8

4. Data Analysis and Results

4.1. Reliability and Validity Test

(1) Reliability Analysis

Reliability analysis refers to the reliability of the measured data reflecting the actual situation, that is, whether the collected data can accurately reflect the objective reality, authenticity and accuracy of the surveyed object, mainly including stability, equivalence and internal consistency. In this study, the commonly used Cronbach α coefficient is used to test the reliability. Cronbach α is between 0-1. The larger the value, the higher the reliability of the scale. Generally, the Cronbach α coefficient is

lower than 0.6, which indicates that the reliability is poor. If it is 0.6-0.8, it proves that the reliability is good. If it is more than 0.8, the reliability is very good. According to the reliability analysis in Table 3, the market recognition, popularity, reputation, geographical environment and humanistic history of geographical indications, the quality of agricultural products and the perceived value of consumers have good reliability.

Table 3. Reliability Test

Variable	Number of Topics	Value of α
Market Recognition	3	0.682
Visibility	3	0.514
Reputation	3	0.662
Geographical Environment	3	0.627
Humanistic History	3	0.830
Quality	3	0.788
Perceived Value	3	0.873

(2) Validity Analysis

The validity test is used to verify whether the survey data can reflect the true characteristics of the sample. Validity test mainly includes content validity and construct validity. As for content validity, the main variables and items selected in this paper are derived from mature literature at home and abroad, which ensures good content validity of the questionnaire. The construct validity will be verified by exploratory factor analysis. According to the results of the study, the KMO coefficient is 0.812, close to 1. Bartlett sphericity test results are also significant, indicating that the construct validity is good. It can be seen that the variables in this study have good validity, suitable for further analysis.

Table 4. Results of Exploratory Factor Analysis

KMO Sampling Suitability Quantity		0.812
Bartlett Sphericity Test	Approximate chi-square	2088.968
	Degree of Freedom	153
	Salience	0.000

4.2. Hypothesis Test

The path test results of the model in this paper are shown in Tables 5 and 6. First of all, for H1, the market recognition of geographical indications did not significantly affect consumers' perceived value. P=0.402 and H1 did not pass the hypothesis test. Secondly, for H2, the popularity of geographical indications can significantly promote consumers' perceived value (β=0.120, P=0.012), so H2 passed the test. For H3, the reputation of geographical indications can also significantly promote the perceived value (β=0.104, P=0.028), so H3 proved right. The geographical environment of the origin of agricultural products with geographical indication has no significant impact on consumers' perceived value, so H4 is not tenable. Besides, the humanistic history of the origin has a significant positive impact on consumers' perceived value (β=0.267, P<0.01), so H5 passed the test. In addition, the quality of agricultural products with geographical indication passed the hypothesis test, so H6 is true. For H7, the higher the consumers' perceived value, the stronger the consumers' purchase intention.

Table 5. Regression Results of Geographical Indication Characteristics and Perceived Value

	Unnormalized Coefficient		Normalization Coefficient			Collinearity Statistics	
Variable	B	Standard Error	Beta	t	Salience	Tolerance	VIF
Market Recognition	0.038	0.045	0.046	0.839	0.402	0.836	1.197
Popularity	0.120	0.048	0.139	2.522	0.012**	0.829	1.206
Reputation	0.104	0.047	0.119	2.213	0.028**	0.861	1.162
Geographical Environment	0.035	0.053	0.053	0.672	0.502	0.799	1.252
Humanistic History	0.267	0.049	0.306	5.480	<0.01***	0.805	1.242
Mass	0.224	0.048	0.267	4.694	<0.01***	0.773	1.294
Constant	0.796	0.220		3.624	<0.01***		

Table 6. Regression Results of Consumers' Perceived Value and Purchase Intention

Variable	B	Standard Error	Walder	Degree of Freedom	Salience	Exp (B)	95% Lower Limit	Upper Limit
Perceived Value	0.997	0.176	32.104	1	<0.01***	2.711	1.920	3.828
Constant	-3.297	0.595	30.681	1	<0.01	0.037		

Table 7. Regression Results Between Geographical Indication Characteristics and Online Purchase Intention

Variable	B	Standard Error	Walder	Degree of Freedom	Salience	Exp (B)	95% Lower Limit	Upper Limit
Market Recognition	0.768	0.200	14.699	1	<0.01***	2.155	1.455	3.191
Popularity	0.511	0.199	6.588	1	0.010***	1.666	1.128	2.460
Reputation	0.733	0.207	12.511	1	<0.01***	2.081	1.386	3.124
Geographical Environment	-0.028	0.196	0.020	1	0.887	0.973	0.662	1.429
Humanistic History	0.770	0.208	13.748	1	<0.01***	2.160	1.438	3.246
Mass	1.828	0.307	35.537	1	<0.01***	6.222	3.411	11.349
Constant	-12.575	1.527	67.857	1	<0.01	0.000		

In addition, this paper uses a binary logistic regression model to verify the impact of geographical indication characteristics and consumers' online purchase intention. According to Table 7, the market recognition of geographical indications has a significant positive impact on purchase intention (β=0.768, $p<0.01$); popularity has a significant positive impact on purchase intention (β=0.511,

p=0.010); reputation has a significant positive impact on purchase intention (β=0.733, p<0.01); geographical environment has no significant impact on purchase intention (p=0.887); human history has a significant positive impact on purchase intention (β=0.770, p<0.01); quality has a significant positive impact on purchase intention (β=1.828, p<0.01). Hence, the higher the market recognition, popularity, and reputation of geographical indications, the stronger the cultural and historical atmosphere of the origin, the better the quality of agricultural products, and the stronger the consumers' intention to purchase agricultural products with geographical indications.

4.3. Model Fitness Test

The overall validity of the model is analyzed as shown in Table 8. The original hypothesis is that whether the independent variable is put in or not has no effect on the quality of the model. *p* value here is less than 0.05, indicating that the original hypothesis is rejected. In other words, when building this model, the independent variables put in are valid, and the model construction this time is meaningful.

Table 8. Omnibus Test for Model Coefficients

	Chi-square	Degree of Freedom	Salience
Step	182.289	6	<0.01
Block	182.289	6	<0.01
Model	182.289	6	<0.01

Then the model fitness is tested as shown in Table 9. P value greater than 0.05 indicates that the information in the current data has been fully extracted with high model fitness.

Table 9. Hosmer-Lemeshaw Test

Chi-square	Degree of Freedom	Salience
10.352	8	0.241

5. Conclusion and Policy Suggestions

Based on 257 consumer survey data, this paper empirically tests the role played by the characteristics and perceived value of multi-dimensional geographical indications in the process of consumers shopping for fresh agricultural products with geographical indications online. The conclusions are as follows. First, the market recognition, popularity, reputation, cultural history of origin and product quality of geographical indications can positively affect consumers' intention to purchase fresh agricultural products online. Secondly, the popularity, reputation, cultural history and quality of geographical indications can positively affect consumers' perceived value. Thirdly, there is utility transmission among the characteristics of geographical indications, consumers' perceived value and their purchase intention. In other words, when consumers purchase agricultural products with geographical indications, they can obtain value from attributes such as product quality, nutritional content, cost performance, shopping experience, and association of the status of consuming agricultural products with geographical indications.

According to the conclusions, to help the enterprises of fresh agricultural products with geographical indications better develop the market, this paper puts forward the following suggestions:

1. The enterprises should strengthen their regional brand stories of agricultural products with geographical indications. First of all, it is necessary to dig deep into the history, tradition and culture of the region to find representative and attractive story elements. For example, the unique planting techniques or traditional production techniques of the region can be tapped, combined with the lifestyles and customs of the local people, so as to show the deep origin of agricultural products and

regional culture. Secondly, when telling brand stories, we need to pay attention to authenticity and emotional expression. Through real storylines and vivid language, consumers can have emotional resonance and identity, thereby deepening their impression and trust in the brand. When spreading a brand story, a variety of communication channels can be used, such as the brand's official website, social media platforms, and offline activities. At the same time, conduct direct interaction and feedback with consumers to understand their needs, so as to continuously optimize and update the brand story, keeping it novel and attractive.

2. The government should increase the promotion and publicity of agricultural products with geographical indications. A special promotion and publicity agency or department can be established to coordinate and organize related work. These institutions can work with local agricultural departments, agribusinesses and professional groups to develop extension plans and strategies. In addition, the government can use various media platforms, including television, radio, the Internet and social media, to implement advertising and reporting activities to introduce the characteristics, advantages and quality assurance of agricultural products with geographical indication to the public. Meanwhile, the government can organize exhibitions and tasting activities of agricultural products with geographical indication. Experts, scholars and consumers can be invited to participate and enhance public awareness and trust in agricultural products with geographical indications.

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