

계획행동이론을 적용한 COVID-19 전후 중국 소비자의 유기농 농산물 구매의향에 영향을 미치는 요인에 관한 실증분석

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An empirical analysis of the factors influencing Chinese consumers' willingness to purchase organic agricultural products before and after the COVID-19 epidemic through the application of planned behavior

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Abstract

This paper takes the factors influencing consumers' purchase of organic agricultural products before and after the COVID-19 epidemic as the starting point, decomposes Chinese consumers' purchase behavior of organic agricultural products into questionnaire surveys before and after the COVID-19 epidemic with the help of the theory of planned behavior, and builds structural equation regression models to compare and analyze them respectively. The study investigates whether this change has any impact on consumers' purchasing behavior of organic agricultural products, and proposes rationalized countermeasures from different perspectives based on the results of the study. To this end, this study collected 219 valid questionnaires by combing through domestic and international literature and referring to scholars' mature scales for measurement. The results showed that consumers' attitudes, subjective norms and perceptual behavioral control of organic agricultural products before and after the COVID-19 epidemic had a significant positive effect on consumers' willingness to purchase; however, it can be seen that the intervention of the COVID-19 epidemic event has significantly improved consumers' attitudes, subjective norms and perceptual behavioral control of organic agricultural products.

Keywords: Organic agricultural products; COVID-19 epidemic; Willingness to purchases; Attitudes; Subjective norms; Perceptual behavioral control, Chinese consumer

JEL Classifications: D11, D12, F23

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I. Introduction

The world is currently facing multiple challenges such as Climate Change, Species Extinction, and Resource Scarcity. This is due to excessive emissions caused by overproduction and consumption of goods and services, and more and more consumers are buying green and organic products (Cao et al., 2020). According to research, in recent years, China's rapid economic growth, growing national power, and excellent improvement in people's living standards have led to a shift in the consumption of agricultural products from the pursuit of "enough to eat" to the pursuit of "good to eat" (Liu, Li, and Yang, 2018). As a result, the consumption structure of agricultural products in China is changing, the problem of surplus of general agricultural products is becoming more and more prominent, and functional and special agricultural products are developing rapidly. And organic agricultural products have a huge consumption potential in the market, and more and more people will be satisfied with the function of agricultural products as food, and pursue higher safety, green and health attributes (Daniel et al., 2021). In fact, the global landscape has changed dramatically with the impact of the COVID-19 epidemic, which has also caused a certain impact on the consumer economy. In the field of organic produce consumption, on the one hand, the COVID-19 epidemic has to some extent driven Chinese consumers to pursue safe and healthy green foods, resulting in a gradual increase in demand for organic produce (Zhang et al., 2022). At the beginning of the COVID-19 epidemic, Chinese traditional medicine made a certain contribution, somehow making people aware of the importance of a healthy diet for disease prevention and maintenance, and

arousing the public's pursuit of green, healthy, and safe food (Zhang et al., 2020). Galanakis et al., (2021) suggest that with the rapid development of China's economy, the market demand for organic agricultural products will continue to expand in the next few years with the backdrop of the new crown COVID-19 epidemic, and consumer behavior toward organic agricultural products will also change. In the study of efficient purchasing methods for organic products, Roh et al. (2022) analyzed how consumption value and rationalized action affect consumers' organic food consumption choices, based on the role of increasing green perceived value and perceived knowledge. By analyzing trust and perceived knowledge in addition to subjective norms, attitudes, and behavioral intentions, the authors argued that consumer attitudes and subjective norms have a significantly positive effect on purchase intention. Unlike Roh et al. (2022), the current study investigates how consumer attitudes, subjective norms, and perceptual behavior control the organic agricultural products of Chinese consumers and affect their purchasing during the outbreak of COVID-19.

In such a context, analyzing how to improve consumers' willingness to consume organic agricultural products under the influence of the COVID-19 epidemic background and further studying how the subjective consumption willingness is transformed into objective purchasing behavior has become a development trend, which has certain research significance for promoting China's economic development, implementing the rural revitalization strategy, promoting the upgrading of primary industries with the green strategy, and promoting the construction of agricultural modernization. Ultimately, this paper

combines the expansion of existing research, with the help of the theory of planned behavior, to perfect the study of the behavioral path mechanisms affecting Chinese consumers' purchase of organic agricultural products in the context of the COVID-19 epidemic, with the intention of providing advice and suggestions for the realization of high-quality sustainable development of green consumption in China.

II. Literature Review

1. Planned Behavior

The theory of planned behavior, first proposed by Ajzen (1991), aims to explain complex human behavior and relates attitudes, subjective norms, perceptual behavioral control, behavioral intentions, and actual behavior in a fixed causal order. Usually we choose the theory of planned behavior to study consumer behavior, specifically that consumer behavior is influenced by a combination of consumer attitudes, subjective norms, and perceptual behavioral control. When consumers' attitudes are more positive, subjective norms are more ethical, and perceptual behavioral control is stronger, the willingness to behave is stronger (Do et al., 2020). The theory of planned behavior assumes that human behavior is the result of deliberate planning and is a correlation between three variables: consumer attitude, willingness, and actual behavior. The model involves individual behavioral attitudes, i.e., the attitude formed by the subject in response to a behavior; subjective norms, i.e., the degree to which a behavior chosen by the subject is influenced from others, society, and the

environment; perceptual behavioral control, i.e., the degree to which the act is adopted; behavioral intentions, i.e., the ease or difficulty of adopting a behavior and the benefits, costs, and risks associated with the behavior; and behavioral intentions, i.e., the subject's willingness to take a certain action (Kumar, 2021). Planned behavior is also used to predict and evaluate eco-friendly behaviors (Choi and Johnson, 2019). Several studies have found that subjective norms and attitudes play a very important role in consumers' participation in environmentally friendly behavior (Wu and Chen, 2014; Maichum et al., 2016). Some studies have argued that the partial application of high perceived procurement prices by lower operational costs negatively affects planned behavior (Skippon & Garwood, 2011; Graham-Rowe et al., 2012). Behavioral willingness is reflected in this paper as the consumer's willingness to purchase, and the willingness to purchase then triggers the actual behavior, i.e., the behavior that the individual ultimately realizes, as reflected in the consumer's purchase behavior for organic agricultural products.

2. Organic agricultural products

Organic agricultural products are safe, high-quality, and nutritious agricultural products that follow the principles of sustainable development, are produced according to specific production methods, are certified by specialized agencies, are licensed to use the green food mark, and are pollution-free. In other words, organic agricultural products are produced in accordance with organic agricultural standards, and through the decomposition of organic matter, agricultural production and

ecological environment form a virtuous cycle, thus reducing pollution and achieving ecological balance (Timpanaro et al., 2021). It is an agricultural product produced by the use of modern technology, with the goal of promoting the unity of safety and economic benefits of agricultural products, and promoting the sustainable development of human society and economy in a comprehensive and coordinated manner.

3. Willingness to purchase of organic agricultural products

Matute et al. (2021) proposed that behavioral intention is an individual's subjective evaluation of the possibility of doing a certain behavior or accomplishing a certain intention. Chang et al. (2018) found that the outcome of a behavior affects an individual's inclination to perform a particular behavior, i.e., behavioral intention is an individual's subjective evaluation of a particular behavior, indicating the degree to which he or she is willing to perform the behavior, and when the individual is Vahdat et al. (2021) found that willingness to purchase is expressed by individuals through the purchase and consumption of various products or services, and that willingness to purchase can be used to predict the behavioral actions exhibited by consumers in terms of whether or not they will purchase a product. Nie et al. (2021) found that perceived utility was the most important factor influencing consumers' willingness to consume organic agricultural products, in which environment, subjective standards and position elevated consumers' willingness to consume green, in addition to the acceptable price level of organic agricultural products, logo was an important factor influencing

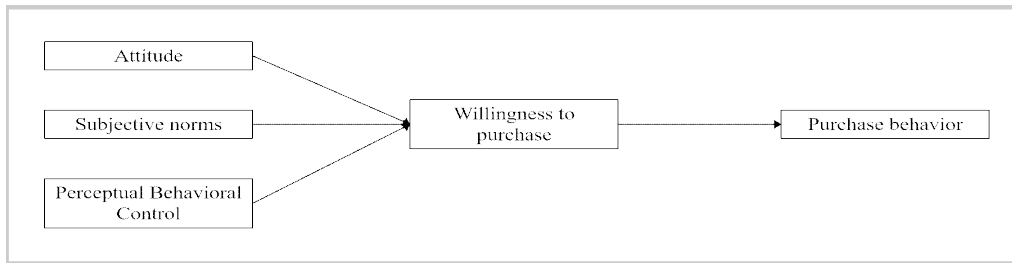
consumers' willingness to consume organic agricultural products, and consumers tended to choose safe and green labeled agricultural products, meaning that the stricter the range of food safety that consumers can accept, the higher the consumer's willingness to purchase. In this study, willingness to buy refers to consumers' willingness to consume organic agricultural products.

4. Factors affecting consumers' willingness to buy organic agricultural products

4.1 Attitude

Attitude is the subjective evaluation of the individual who acts, expressed as the degree of individual's preference for feedback on the outcome of a behavior, and it is the main influencing factor of willingness to act in the theory of planned behavior (Taufique and Vaithianathan, 2018). According to Wang and Tsai (2022), it is concluded that the generation of behavior is determined by the individual's attitude towards the behavior prior to the behavior. Zhao et al. (2019a) posited that attitudes are a powerful factor influencing the intention to purchase energy-saving applications when considering haze pollution rather than subjective norm and perceived behavioral control. As explained in cognitive-behavioral science, cognition is influenced by the consequences of behavior, and so are behavioral attitudes. That is, attitudes are appropriate responses that draw on feedback from past behaviors, and when behaviors are favorable, the more explicit the individual's attitudes are thus better translated into behavioral impetus. This is reflected in this study in the attitudes of consumers toward organic produce.

Fig. 1. Research model



4.2 Subjective norms

Subjective norms refer to the influence of individuals in responding to a behavior from the side of their close friends, family, and community members, and are one of the main influences on willingness to act in the theory of planned behavior (Du and Pan, 2021). Bae and Chang (2021) argue that subjective norms are not expressed in terms of the willingness of others, but rather through individuals' own perceived social pressure and Marmaya et al., (2019) argue that the most important factor that constrains the influence of subjective norms on individuals' willingness to behave is that the measurement of subjective norms does not accurately represent the role of society and the surrounding important groups on individual behavior. According to Nie et al. (2019), subjective norms act as powerful indicators of car use and energy-saving behaviors in residential buildings. In addition, Nayum et al. (2016) suggested that subjective norms operating with the expectations of others related to selecting/purchasing fuel-efficient and environmentally friendly vehicles cannot be discriminated against. Therefore, it is expected that subjective norms will positively affect willingness to purchase and ultimately affect consumers' purchasing attitudes. In this

study, this is reflected in the subjective norms of consumers toward organic produce.

4.3 Perceptual Behavioral Control

While perceptual behavioral control relies heavily on the theoretical underpinnings of rational behavior, increasing perceptual behavioral control is intended to articulate complete control over involuntary behavior. That is, perceptual behavioral control refers to the difficulties one has to experience in order to take a certain action, expressed as an individual's personal perception of the factors involved in achieving a behavior or stopping a behavior (Değirmenci et al., 2021). Hagger et al., (2022) found that perceptual behavioral control was associated with confidence in behavioral competence and the achievement of behavioral control. The first of these factors primarily reflects internal control beliefs, while the second reflects external control beliefs. In other words, individuals are aware of their strengths, resources, and current opportunities to see if they can take such actions. This also indicates whether their own characteristics help or hinder the implementation of external conditions. For external factors, if they are easier to use, the individual's perceived own resources will be more adequate and the execution of the

Table 1. Influencing factors measurement scale

Names of variables	Questions for measuring variables	Source
Attitude	I like to buy organic produce	Choi and Johnson (2019)
	I think it's a wise decision to buy organic produce	
	I feel that buying organic produce will contribute to the environment, which makes me feel satisfied and happy	
	I think buying organic produce is a good move for everyone	
Subjective norms	I think buying organic produce is more in line with my ethics	La and Ajzen (2020)
	People who are important to me (such as my family and friends) feel I should buy organic produce	
	People who influence my behavior (such as my leaders and colleagues) feel I should buy organic produce	
	I think buying organic produce is in line with the trend of social development	
Perceptual Behavioral Control	It's easy for me to buy organic produce	Tommase tti et al. (2018)
	For me, the time spent buying organic produce has not increased significantly	
	For me, the cost of buying organic produce has not increased significantly	
	Organic produce is easier to handle and preserve	
Willingness to purchase	I will actively focus on buying organic produce when I consume	Haustein and Jensen (2018)
	I would like to collect and learn more about organic produce	
	I would like to recommend my friends and relatives to buy organic produce	
	I am willing to spend a little more time and money to choose to buy organic produce	
	I will choose to buy organic produce in the future	

behavior will be weaker, but its purpose will be strengthened. This is reflected in this study in the perceptual behavioral control of consumers of organic produce. This paper focuses on how Chinese consumers' perceptions and values of organic agricultural products have changed after the COVID-19 epidemic and determines whether this change has positively facilitated or negatively inhibited the transformation of consumption intentions into purchase behavior. The research model is shown in Figure 1.

III. Research Design

1. Questionnaire design and data collection

This paper designs the questionnaire according to the theoretical model and related literature. The questionnaire consists of two parts, the first part is about the basic information of consumers, including the gender, age, education, occupation, city or region of the sample and monthly income. The second part strictly follows the theory of

Table 2. Descriptive statistical analysis of the survey respondents

Items	Categories	Number of samples	Percentage(%)
Gender	Male	102	46.58
	Female	117	53.42
Age	20–29 years old	30	13.7
	30–39 years old	64	29.22
	40–49 years old	68	31.05
	50–59 years old	49	22.37
	Over 60 years old	8	3.65
	Education background	Below specialist qualification	15
Specialist qualification		25	11.42
Bachelor degree		77	35.16
Master degree		93	42.47
Doctor degree		9	4.11
Occupation		Student	17
	Public servant	42	19.18
	Employee in enterprise	49	22.37
	Employee in public institution	81	36.99
Monthly income	non-working people and others	30	13.7
	Less than 3000 Yuan	27	12.33
	3000–5000 Yuan	47	21.46
	5000–8000 Yuan	66	30.14
	8000–10000 Yuan	66	30.14
	More than 10000 Yuan	13	5.94

planned behavior, and measures four variables: attitude, subjective norms, perceptual behavioral control, and willingness to purchase, and the measurement dimensions are all adopted from established scales of domestic and foreign scholars, and then adapted to the topic of this research paper. The attitudes were selected from Choi and Johnson's (2019) study with a total of 5 questions, the subjective norms were selected from La and Ajzen's (2020) study with a total of 6 questions, the perceptual behavioral control was selected from Tommasetti et al., (2018) study with a total of 5 questions, and the willingness to purchase was selected from Haustein and Jensen's (2018) study, with a total of 3 questions. As shown in Table 1. In addition to this, the measurement items were divided into two parts,

pre-COVID-19 epidemic and post-COVID-19 epidemic, with a total of 34 questions, all of which were measured using a 5-point scale, with options ranging from 1 to 5 indicating strongly disagree, disagree, middle ground, agree, and strongly agree, respectively. A total of 230 questionnaires were distributed between January and February 2022 by forwarding the link to WeChat, QQ and Weibo through the questionnaire star website, of which 219 were valid.

2. Descriptive statistical analysis

In order to have a clearer understanding of the structural characteristics of the study population, we conducted statistical analysis on the gender, age, education, occupation, and monthly income of the sample, as shown

Table 3. Reliability test results of the questionnaire

Variables	Cronbach's Alpha	Number of items
Overall	0.947	17
Willingness to purchase	0.849	5
Attitude	0.809	4
Subjective norms	0.875	4
Perceptual Behavioral Control	0.830	4

in Table 2. It can be seen that there are 102 males, accounting for 46.58%, 117 females, accounting for 53.42%; 30 people aged 20-29, accounting for 13.7%, 64 people aged 30-39, accounting for 29.22%, 68 people aged 40-49, accounting for 31.05%, 49 people aged 50-59, accounting for 22.37%, and 60 and There are 8 people aged 60 and above, accounting for 3.65%. There are 15 people with education level below college, accounting for 6.85%; 25 people with college degree, accounting for 11.42%; 77 people with college degree, accounting for 35.16%; 93 people with master's degree, accounting for 42.47%; 9 people with doctoral degree, accounting for 4.11%. The occupation of students was 17, accounting for 7.76%, civil servants were 42, accounting for 19.18%, corporate employees were 49, accounting for 22.37%, institutional employees accounted for the most, with 81, accounting for 36.99%, and non-working and others were 30, accounting for 13.7%. The monthly income of individuals was below 3,000 Yuan with 27 people or 12.33%, 3,000-5,000 Yuan with 47 people or 21.46%, 5,000-8,000 Yuan with 66 people or 30.14%, 8,000-10,000 Yuan with 66 people or 30.14%, and over 10,000 Yuan with 13 people or 5.94%. The analysis of the above data shows that the basic information of the survey respondents in this paper is basically in line with the current reality of consumers, so the data collected in this research is representative, true and reliable.

3. Reliability analysis

The consistency of the results of each question of the scale and its questionnaire in measuring the same concept was analyzed by the internal reliability analysis method. SPSS26.0 software was used to test the Cronbach's Alpha coefficients of each variable, including attitudes toward buying organic agricultural products, subjective norms, perceptual behavior control, and willingness to purchase scales, to analyze whether their reliability met the requirements. Judgment was made based on the magnitude of Cronbach's Alpha coefficient, with 0.6 or above being acceptable, 0.7-0.8 being in an ideal state, and 0.8 or above indicating a high degree of feasibility. The specific analysis is shown in Table 3. From the analysis of the table results, it is concluded that the factors with Cronbach's Alpha coefficient over 0.8 include willingness to purchase, behavioral attitude, subjective norm and perceptual behavioral control, indicating that the reliability of these four elements is acceptable and the reliability of the whole questionnaire is high, which lays a theoretical foundation for the subsequent analysis. We found that Cronbach's alpha was statistically significant because most of them were 0.8 or higher. These result values can also be confirmed in the study of Hair et al. (2009).

Table 4. Validity of willingness to purchase KMO and Bartlett

Scale	KMO and Bartlett's validity test	Results
Willingness to purchase	KMO	.821
	Approximate chi-square	440.983
	Degree of freedom	10
	Significance	.000
Attitude	KMO	.790
	Approximate chi-square	275.044
	Degree of freedom	6
	Significance	.000
Subjective norms	KMO	.820
	Approximate chi-square	435.746
	Degree of freedom	6
Perceptual B	Significance	.000
	KMO	.800
	Approximate chi-square	316.074
Behavioral Control	Degree of freedom	6
	Significance	.000

Table 5. Factor loadings

	Factor1	Factor2	Factor3	Factor4
A2	.733	.327	.200	.345
A3	.712	.318	.187	.408
A4	.501	.343	.347	.396
B3	.205	.707	.386	.308
B2	.288	.702	.245	.430
B1	.505	.589	.338	.253
B4	.298	.539	.342	.479
C3	.360	.412	.667	.214
C1	.455	.271	.571	.327
C2	.524	.288	.570	.221
D5	.272	.347	.144	.791
D2	.253	.338	.505	.589
D3	.477	.239	.332	.533

4. Validity analysis

In the structural validity analysis, this study used factor analysis for testing. Factor analysis is barely possible if the KMO value is greater than 0.5, and suitable for factor analysis if the KMO value is greater than 0.7. Based on this, this study analyzed the sample validity by using KMO values and Bartlett's

test. The specific analysis is shown in Table 4. The results in Table 4 show that the KMO values of willingness to purchase, behavioral attitude, subjective norm, and perceptual behavior control of organic agricultural products are all greater than 0.7, and the significance is less than 0.01, indicating that the structural validity of the scales of willingness to purchase, behavioral attitude,

subjective norm, and perceptual behavior control is good and suitable for relevant research. We performed the centering of variables after CFA as Mean-centering. All indicators of variables grouped into four to a statistically significant level. We can see that all of the scales in this paper can explain the factor variables as Table 5.

6. Common method bias test

Data were collected via a questionnaire, and the homogeneity of this data collection method is likely to cause common method bias. Therefore, procedural control was used to reduce its impact, and statistical control to test for the presence of such bias in the measurement. In terms of procedural control, anonymous surveys were used in the questionnaire design to disrupt the order of questions and reduce respondents' guesswork regarding the purpose of the measurement. However, procedural control is likely to not completely eliminate common method bias; therefore, we used statistical control methods to test for such bias. The first was to test for homophily bias using the Harman single factor test. The results revealed that there were four factors with unrotated principal component factor analysis eigenroots greater than one, and the total variance explained by the first factor was 34.159%, which was less than the critical criterion of 40%. This indicates that there is no problem of homoscedasticity bias explained by a single factor. Second, we used the method of adding a non-measurable method factor, that is, the common method factor was added to the structural model as a latent variable, and compared the change in model fit after adding this latent variable. The results indicated that $CMIN/DF=2.457$,

$IFI=0.957$, $TLI=0.943$, $CFI=0.957$, and $RMSEA=0.028$; according to the goodness-of-fit criteria, $CMIN/DF$ should be less than 5, IFI , TLI , and CFI should be greater than 0.9, and $RMSEA$ should be less than 0.08. Thus, to some extent, it also proves that there is no significant common method bias in this study.

IV. Empirical analysis

1. Correlation between consumers' attitudes, subjective norms, perceptual behavioral control and willingness to purchase of organic agricultural products before the COVID-19 epidemic

According to the theory of planned behavior, consumers' willingness to purchase organic agricultural products is influenced by the interaction of three factors: attitude, subjective norm and perceptual behavior control. Based on this, this study analyzes whether there is a correlation among the variables of consumers' attitudes, subjective norms, perceptual behavioral control and willingness to purchase of organic agricultural products, and conducts a correlation test, as shown in Table 6. The results of Table 9 show that the Pearson coefficients of attitude, subjective norm, perceptual behavior control and willingness to purchase are all positive and the significance (two-sided) is less than 0.01. This indicates that there is a significant positive correlation between consumers' attitude, subjective norm, perceptual behavior control and willingness to purchase of organic agricultural products before the

Table 6. Correlation analysis between consumers' attitudes, subjective norms, perceptual behavioral control and willingness to purchase of organic agricultural products before the COVID-19 epidemic

Pearson Correlation		Attitude	Subjective norms	Perceptual Behavioral Control	Willingness to purchase
Attitude	Pearson Correlation	1			
	Significance (two-tailed)				
Subjective norms	Pearson Correlation	.788**	1		
	Significance (two-tailed)	.000			
Perceptual Behavioral Control	Pearson Correlation	.734**	.769**	1	
	Significance (two-tailed)	.000	.000		
Willingness to purchase	Pearson Correlation	.754**	.755**	.751**	1
	Significance (two-tailed)	.000	.000	.000	

** . At the 0.01 level (two-tailed), the correlation is significant.

COVID-19 epidemic at the 0.01 level. Firstly, attitudes are expressed in terms of individuals' behaviors such as inclination, avoidance, preference, acceptance or resistance to purchase organic agricultural products, but attitudes are not fully equivalent to actual outcomes. As shown in Table 9, there is a significant relationship between consumers' attitudes toward organic agricultural products and willingness to purchase before the COVID-19 epidemic (significance is 0.000, less than 0.01), and the pearson coefficient is 0.754, so there is a significant positive relationship between consumers' attitudes toward organic agricultural products and willingness to purchase at the 0.01 level. Secondly, subjective norms are expressed in the fact

that social relationships around consumers such as friends, classmates and family members show support for consumers' purchase behavior or these important people themselves are choosing to buy organic agricultural products, which on one side will increase the possibility of consumers to make purchases of organic agricultural products and on the other side will also make the objective obstacles encountered by consumers in purchasing organic agricultural products smaller and even try to overcome the obstacles to choose to buy on the one hand, and on the other hand, consumers will be less likely to encounter objective obstacles in purchasing organic agricultural products, and even try to overcome the obstacles and choose to purchase organic agricultural

Table 7. Regression analysis of consumers' attitudes, subjective norms, perceptual behavioral control and willingness to purchase of organic agricultural products before the COVID-19 epidemic

Models	Unstandardized Coefficients		Standardized Coefficients	t	P	Collinear statistics	
	B	Std. Error	Beta			Tolerance	VIF
	(Constant)	.628	.134				4.704
Attitude	.300	.064	.314	4.692	.000	.339	2.953
Subjective norms	.244	.066	.262	3.685	.000	.300	3.336
Perceptual Behavioral Control	.292	.059	.318	4.934	.000	.365	2.741

Dependent variable : Willingness to purchase

products. Therefore, in this study, we analyzed the subjective norms of consumers and their willingness to purchase, shows a significant positive correlation. Third, perceptual behavioral control is expressed as the ability of consumers to control their own actual situation when purchasing organic agricultural products and the ease of implementing the behavior. If consumers perceive that they have sufficient conditions to support themselves or the external environment is favorable, they will have more control over the actual situation when purchasing organic agricultural products and will be more willing to purchase organic agricultural products. From the results of the analysis in Table 9, there is a significant relationship between perceptual behavioral control and willingness to buy before the COVID-19 epidemic (significance is 0.000, less than 0.01), and the pearson coefficient is 0.751, so there is a significant positive relationship between perceptual behavioral control and willingness to buy organic agricultural products at the 0.01 level.

2. Regression analysis of consumers' attitudes, subjective norms, perceptual behavioral control and willingness to purchase of organic agricultural products before the COVID-19 epidemic

From the perspective of the Theory of Planned Behavior, attitude, subjective norms, and perceptual behavior control jointly influence consumers' willingness to purchase. From the previous correlation analysis, we can see that there is a significant positive correlation between consumers' attitudes, subjective norms, perceptual behavioral control and willingness to purchase of organic agricultural products. Therefore, in this study, regression analysis was conducted to investigate the relationship between consumers' attitudes toward organic agricultural products, subjective norms, perceptual behavioral control and willingness to purchase. As shown in Table , the standardized coefficients of the models of consumers' attitudes, subjective norms,

Table 8. Correlation analysis of consumers' attitudes, subjective norms, perceptual behavioral control and willingness to purchase of organic agricultural products after the COVID-19 epidemic

Pearson Correlation		Attitude	Subjective norms	Perceptual Behavioral Control	Willingness to purchase
Attitude	Pearson Correlation	1			
	Significance (two-tailed)				
Subjective norms	Pearson Correlation	.912**	1		
	Significance (two-tailed)	.000			
Perceptual Behavioral Control	Pearson Correlation	.900**	.889**	1	
	Significance (two-tailed)	.000	.000		
Willingness to purchase	Pearson Correlation	.919**	.908**	.898**	1
	Significance (two-tailed)	.000	.000	.000	

** . At the 0.01 level (two-tailed), the correlation is significant.

perceptual behavior control and willingness to purchase of organic agricultural products before the COVID-19 epidemic were all positive, with Y representing the dependent variable "willingness to purchase" and the independent variables being X1 "attitude", X2 "subjective norms" and X3 "perceptual behavior control". The regression equation of the model is: Y (willingness to purchase) = $0.628 + 0.3X_1 + 0.244X_2 + 0.292X_3$, and the regression coefficient of X1 (attitude) is 0.3, $p = 0.000 < 0.001$, which is very significant; X2 (subjective norm) is 0.244, $p = 0.000 < 0.001$, which is very significant; The regression coefficient of X3 (perceptual behavioral control) is 0.292, $p = 0.000 < 0.001$, which is highly significant. This indicates that consumers' attitudes, subjective norms and

perceptual behavioral control of organic agricultural products can positively influence willingness to purchase.

3. Correlation analysis of consumers' attitudes, subjective norms, perceptual behavioral control and willingness to purchase toward organic agricultural products after the COVID-19 epidemic

In this study, we analyzed whether there is a correlation between each variable by examining consumers' attitudes, subjective norms, perceptual behavior control and willingness to purchase of organic

Table 9. Regression analysis of consumers' attitudes, subjective norms, perceptual behavioral control and willingness to purchases of organic agricultural products after the COVID-19 epidemic

Coefficients ^a	Unstandardized Coefficients		Standardized Coefficients	t	P	Collinear statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.283	.088		3.226	.001		
Attitude	.384	.062	.398	6.175	.000	.130	3.708
Subjective norms	.297	.059	.309	5.052	.000	.144	2.963
Perceptual Behavioral Control	.255	.055	.266	4.621	.000	.163	2.144

Dependent variable : Willingness to purchase

agricultural products after the COVID-19 epidemic, and conducted variable correlation tests, the specific effects of which are shown in Table 9. From the analysis results in Table 10, it can be seen that the significance between attitude, subjective norm, perceptual behavior control and willingness to purchase is less than 0.01, and the pearson coefficients are all positive, so there is a significant positive correlation between consumers' attitude toward organic agricultural products, subjective norm, perceptual behavior control and willingness to purchase at the 0.01 level after the COVID-19 epidemic. There is a significant relationship between consumers' attitudes toward organic agricultural products and willingness to purchase (significance is 0.000, less than 0.01) and the pearson coefficient is 0.919, so there is a significant positive relationship between consumers' attitudes toward organic agricultural products and willingness to purchase at the 0.01 level after the COVID-19 epidemic. Secondly there is a significant relationship between subjective norms and willingness to purchase (significant is 0.000, less than 0.01) and the pearson coefficient is 0.908, therefore there

is a significant positive relationship between consumers' subjective norms towards organic agricultural products and willingness to purchase at the 0.01 level after the COVID-19 epidemic. Third, there is also a significant relationship between perceptual behavioral control and willingness to purchase (significance is 0.000, less than 0.01) and the pearson coefficient is 0.898, so there is a significant positive relationship between perceptual behavioral control and behavioral willingness of consumers towards organic agricultural products after the COVID-19 epidemic at the 0.01 level.

4. Regression analysis of consumers' attitudes, subjective norms, perceptual behavior control and willingness to purchase of organic agricultural products after the COVID-19 epidemic

Table 9 shows that the standardized coefficients of the models of consumers' attitudes, subjective norms, perceptual

behavioral control and willingness to purchase of organic agricultural products after the COVID-19 epidemic are all positive, Y represents the dependent variable "willingness to purchase", and the independent variables are X1 "attitude", X2 "subjective norms" and X3 "perceptual behavioral control". The regression equation of the model is: Y (willingness to purchase) = $0.283 + 0.384X_1 + 0.297X_2 + 0.255X_3$, and the test of the model shows that the regression coefficient of X1 (attitude) is 0.384, $P = 0.000 < 0.001$, which is very significant; the regression coefficient of X2 (subjective norms) is 0.297, $P = 0.000 < 0.001$, which is very significant. The regression coefficient of X3 (perceptual behavioral control) was 0.255, $p=0.000 < 0.001$, which was highly significant. This indicates that consumers' attitudes, subjective norms, and perceptual behavioral control can positively influence the willingness to purchase of organic agricultural products after the COVID-19 epidemic.

V. Conclusion and Implications

1. Conclusion

This paper constructs a theoretical framework based on the Theory of Planned Behavior, and through the empirical analysis of the factors influencing Chinese consumers' purchase intention of organic agricultural products, it can be seen that attitude, perceived behavioral control and subjective norms all positively influence purchase intention. Attitude is the most influential factor, indicating that consumers have a positive perception of organic agricultural products, and this recognition largely

influences consumers' willingness to purchase. Perceived behavioral control was the second most influential, indicating that consumers' personal financial resources, time, and the convenience of the external environment also had a greater impact on willingness to purchase. The influence of subjective norms on purchase intention should not be ignored, i.e., the perceived experience of consumers' friends and relatives on organic agricultural products has a certain influence on consumers' purchase intention. Specifically, (1) the COVID-19 epidemic had a significant effect on consumers' willingness to purchase organic agricultural products, and most consumers agreed with the value and role of purchasing organic agricultural products and chose to purchase organic agricultural products. These findings show that Chinese consumers have a strong intention to maintain their health by purchasing organic agricultural products, although the COVID-19 pandemic has forced them to temporarily reduce their household income. (2) The three factors of consumers' attitudes, subjective norms, and perceptual behavioral control on organic agricultural products before and after the COVID-19 epidemic all had significant positive effects on willingness to purchase. Despite the difficult situation in the wake of the pandemic, consumers seem to have responded appropriately to feedback from the past. Therefore, since Chinese consumers favor organic agricultural products, consumer attitude seems to have emerged more clearly through behavioral stimulation. Second, subjective norms refer to an individual's influence on the behavior of close friends, family, and community members, and the results of the study confirmed that subjective norms have a positive effect on organic products. Finally, it was confirmed that

perceptual behavioral control was related to behavioral ability and confidence in the achievement of behavioral control. Therefore, it was confirmed that consumers demonstrated a positive attitude toward purchasing organic products through perceptual behavior control. (3) After the COVID-19 epidemic, consumers' attitudes, subjective norms and perceptual behavioral control of organic agricultural products have significantly improved compared with those before the COVID-19 epidemic. In China, which suffered relatively less direct damage from COVID-19, consumer attitudes, subjective norms, and perceptual behavioral controls all had a positive effect on purchasing organic agricultural products despite the ongoing pandemic.

2. Implications

The theoretical contribution of the study is as follows. First, we demonstrated that Chinese consumers' attitudes toward organic agricultural products before and after COVID-19 had a significant positive effect on their purchase intentions. Consumers showed a willingness to purchase organic agricultural products to maintain physical health despite a temporary decrease in imports due to COVID-19. Therefore, this study empirically confirmed that Chinese consumers are quite willing to purchase organic agricultural products based on planned behavior despite COVID-19. Second, it was empirically confirmed that subjective norms for organic agricultural products before and after COVID-19 had a significantly positive effect on Chinese consumers' purchase intentions. Although Chinese consumers have had a lot of difficulties consuming organic agricultural products due to COVID-19, the subjective norm is that they can protect their individual

health by purchasing healthy agricultural products. Thus, it was confirmed that Chinese consumers are willing to continuously purchase organic agricultural products due to individual subjective norms despite COVID-19. Third, the perceptual behavioral control of organic agricultural products before and after COVID-19 had a significant positive effect on Chinese consumers' purchase intentions. It seems that consumers have concluded that they can overcome the situation on their own and successfully control the results through their own efforts, even when all consumers suffer the same due to COVID-19. Therefore, the control of perceptual behavior of organic agricultural products had a positive effect on Chinese consumers' planned purchase behavior.

The practical implications of the study is as follows. In the context of the COVID-19 epidemic, in order to promote the rapid and high-quality development of the organic agricultural products industry, we should first increase the supervision of organic agricultural products production and improve the safety certification system. The research results show that attitude has the greatest influence on consumers' willingness to purchase organic agricultural products. Organic agricultural products sales enterprises should devote themselves to improve the safety certification system, eliminate counterfeit and shoddy organic agricultural products, and enhance consumers' trust in organic agricultural products. Secondly, they should broaden the sales channels of organic agricultural products and improve the convenience of purchase. Distributors need to diversify their sales strategies by expanding sales channels so that consumers can purchase organic agricultural products not only in large

discount stores, but also in traditional retail and online markets. Research results show that perceived behavioral control has a greater impact on willingness to purchase, so the convenience of organic agricultural products should be improved, and the price of organic agricultural products should be reasonably positioned to eliminate malicious price increases. Thirdly, the service level should be upgraded to improve consumer satisfaction. Subjective norms positively affect the willingness to buy, so organic agricultural products sales enterprises should strive to improve the level of service, so that consumers have a pleasant and satisfying shopping experience, so as to attract more consumers. Finally, we should also strengthen the publicity work, so that green consumption, especially the safety and health of organic agricultural products is deeply

rooted in people's hearts.

Despite the above implications, this study has certain limitations. First, the survey does not represent all Chinese consumers. Therefore, in future studies, it is necessary to increase the objectivity of the study by expanding the scope of the survey so that more Chinese consumers can participate. Second, the study was conducted during the pandemic. Therefore, if a substantial number of COVID-19-related questions had been included, more meaningful research results could have been produced; however, I would like to clarify that there is a limitation that this special situation has not been reflected much. In future studies, it is necessary to conduct in-depth research on how consumer attitudes and subjective norms affect the purchase of organic products under situations such as the ongoing pandemic.

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