





ORIGINAL ARTICLE

The future of sustainable food consumption in China

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Abstract

Food production is one of the main contributors to greenhouse gas emissions and climate change. China, as a rapidly developing economy, contributes to an unsustainable food system as its consumption of animal products and meat has continued to grow in recent decades. Using the extended theory of planned behavior as the conceptual framework, this paper examines factors influencing consumers' intention to purchase sustainable food in China. To this end, a population-based face-to-face survey was conducted with 2422 respondents in five provinces spanning the north and south of China. The results showed that the traditional constructs of behavioral attitude, subjective norms, perceived behavioral control, and the additional construct of perceived quality are significant in inducing such intentions. This paper suggests that to enhance consumers' willingness to shift to sustainable food consumption, appropriate regulation and monitoring framework is needed to increase consumers' trust toward sustainable food. The government can also cooperate with the media, experts, and social media opinion leaders to ensure that messages on sustainable development are promoted in effective ways.

KEYWORDS

food consumption, food security, sustainable food, theory of planned behavior

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1 | INTRODUCTION

Food sustainability is one of the priorities of the global sustainability agenda, with United Nations' Sustainable Development Goals (SDG) highlighting “food security” and “sustainable agriculture” (United Nations, 2019). However, the growing size of the population is constantly increasing the demand for food which makes the guarantee of the availability of food challenging. By 2050, global food production is expected to increase by as much as 110%, with most of this demand coming from developing countries (Garnett, 2013). At the same time, while plant-based diets are more beneficial to the environment as their production tends to consume fewer resources and produce lower greenhouse gas (GHG) emissions compared with animal-based products (Lacour et al., 2018), as countries become richer, people's diets tend to become more animal protein-based. The growing demand for beef is of particular concern because bovine meat is associated with higher GHG emissions and intensive use of agricultural resources compared with other meat types including chicken, fish, and pork (Poore & Nemecek, 2018). For example, 100 g of protein from beef herd produces about eight times more GHG emissions than 100 g of chicken or fish protein (Poore & Nemecek, 2018). This dietary shift and hence changes in food consumption behavior can potentially cause significant environmental damage (Herrero & Thornton, 2013; Poore & Nemecek, 2018).

China, as a rapidly developing economy and the most populous country in the world, without exception is encountering challenges to sustainable food production. According to the Food and Agriculture Organization Statistics (FAOSTAT, 2018), land use associated with agricultural activities in China accounts for 55% of the country area. While water resources available for agriculture purposes in China remain scarce (Yang et al., 2021), pollution problems have imposed a serious threat to agriculture production (Lu et al., 2015). Furthermore, China's continuous economic and population growth has induced an increasing trend of animal product consumption (He et al., 2018; Herrero & Thornton, 2013), with the rapid increase in meat consumption of particular concern as a recent study suggests that meat-intensive diets in China are closely related to higher ammonia emissions from agriculture (Liu et al., 2021).

To reduce the negative environmental impacts of agriculture, strengthened efforts to maintain a sustainable food system and a change in consumer habits such as a shift to a lower animal-based diet have been proposed (Garnett, 2013; Ivanova et al., 2020). Since the last decade, a new approach focusing on sustainable food consumption has emerged (Bilali et al., 2018;

Lang & Barling, 2012). Sustainability, as defined by Solow (1991), is an obligation to conduct ourselves responsibly so that we leave to the future the option or the capacity to be as well off as we are. In relation to food consumption, this concept encompasses the responsibility to protect the environment and public health and to provide continued and reliable access to food (Capone et al., 2014). For example, a diet that is low in animal protein, high in vegetable protein, and within the limits of GHG emissions is considered sustainable (Carlsson-Kanyama, 1998). The concept of sustainable food also encompasses a variety of ideas such as economic viability, social justice principles (Gao et al., 2016), animal health and welfare, and labor rights (von Meyer-Höfer et al., 2015). To narrow the scope of the study, this study adopts a narrower definition of sustainable food as environmentally friendly food produced in a way that protects the environment and natural resources, such as air, water, and soil, and consumes less energy.

To devise viable solutions to food insecurity and unsustainability, two ideas proposed by Garnett (2013) are relevant to this paper. The first idea is demand constraint, which is the “conviction that excessive consumption, particularly of high-impact foods such as meat and dairy products, is a leading cause of [our] environmental crisis” (p. 33). This perspective focuses on the choice of consumers—if consumers can shift to sustainable food, environmental problems can be better addressed. The second idea is food system transformation, which supports the notion that food sustainability can only be realized “by changing the socio-economic governance of the food system” (Garnett, 2013, p. 34). To this end, various “hard” and “soft” measures, such as regulations, fiscal instruments, and education, are proposed to incentivize society to consume sustainable food. However, it remains uncertain whether these measures can motivate consumers to adjust their sustainable food consumption intention. This study aims to fill this identified gap in the literature.

This study adds to the understanding of sustainable food consumption behavior by investigating the factors that motivate individuals' willingness to consume sustainable food. The theoretical framework underpinning this research is the extended theory of planned behavior (TPB) (Ajzen, 1985; 1991; Wang et al., 2020), which captures the influence of attitudes, subjective norms (SNs), perceived behavior control, and perceived quality (PQ) in people's intentions toward performing a behavior. The research question about consumers' intention to shift to sustainable food consumption relates to Garnett's (2013) “demand constraint” in the sense that it seeks to understand consumers' motivation to consume more sustainable or less unsustainable food, and “food system

transformation” (Garnett, 2013) that the effectiveness of government policies and business activities are studied. In addition, the study contributes to the literature by examining whether the variables in TPB affect sustainable food purchase intention (Liu et al., 2012; Wang et al., 2020; Zhao et al., 2014), and expanding the scope of the literature on food preferences by examining the extent to which Chinese consumers are willing to purchase sustainable food and determining the factors that lead to this willingness.

2 | LITERATURE REVIEW AND THE CONCEPTUAL FRAMEWORK

The TPB is a well-developed social psychological model to explain the antecedents of behavior (Dowd & Burke, 2013). TPB posits that intentions are the determinants of behaviors, while intentions are predicted by attitude toward the behavior (BA), perceived behavioral control over the behavior (PBC), and SNs (Ajzen, 1985, 1991). Based on TPB, previous studies have examined the green consumption behaviors of Chinese consumers (Sheng et al., 2019; Wang et al., 2021), which refers to an ecological consumption model that seeks to minimize the negative impacts of individual behaviors on the ecological environment while meeting human needs (Carlson & Adriano, 1993; Pieters, 1991). Previous studies have suggested that an individual who has a positive attitude toward green consumption (Wang & Wang, 2013), aligns with social norms that support green consumerism (Sheng et al., 2019), and is conscious about its positive factors (Zhang & Li, 2017) are more likely to have a positive intention toward green consumption.

Although TPB is widely used in different contexts including consumers' willingness and decision to purchase certified food, organic food, or green products (Rezai et al., 2012; Vassallo et al., 2016), there is a lack of coverage of sustainable food. For example, Kalafatis et al. (1999) analyzed purchases of environmentally friendly products in the United Kingdom and Greece using TPB and found the framework to be more appropriate in well-established markets. Yadav and Pathak (2016) argued that people's environmental concerns could be used to predict the intention of young Indian consumers to purchase green products. In the Chinese context, Liu (2008) used the TPB framework to explain green behaviors; Chan and Lau (2002) found that both SNs and PBC influence Chinese consumers more than they influence their American counterparts in green purchases. As the essence of intention to purchase sustainable food is a kind of environmental behavior; therefore, we perceive TPB as an appropriate model to analyze consumers' sustainable food purchase decision.

2.1 | TPB constructs and the hypotheses

To measure the latent variables in the model, previous studies have been taken into reference (Ajzen et al., 2004; Conner & Norman, 1996; Dowd & Burke, 2013; Nurse Rainbolt et al., 2012; Vermeir & Verbeke, 2008; Wang et al., 2018, 2020, 2021; Yadav & Pathak, 2016) to develop various manifest variables which could be directly observed or measured.

With respect to the three traditional constructs of TPB, first, behavioral attitude (BA) is associated with the positive or negative attitude of an individual toward a specific idea, object, or behavior. In this study, BA refers to one's attitude toward sustainable food, which is measured by three manifest variables related to environmental issues, namely concerns about the deforestation of agricultural land, concerns about land and water resources, and concerns about drying lakes and rivers. The more positive the consumers' attitude toward sustainable food, the higher the possibility of forming sustainable food consumption intention. The following hypothesis is thus proposed:

H1 *Consumers' behavioral attitude has a positive impact on their willingness to pay for sustainable food.*

Second, SN refers to the interpersonal or social pressure that an individual is exposed to when deciding whether to consume sustainable food. In this study, this variable is defined as the influence from others including the government, media, experts, international organizations, and social media opinion leaders. The higher the influence from others, the greater an individual's intention to proceed with sustainable food consumption behavior. The study thus proposes the following hypothesis:

H2 *Subjective norm has a positive impact on consumers' willingness to pay for sustainable food.*

Third, perceived behavioral control is defined as the extent to which individuals perceive themselves as being able to take an action. In this research, we interpret and measure the participants' perceived behavioral control with factors such as the cost of purchase, the level of convenience in purchasing, recognizability of the certifications, and conditions of purchase. The following hypothesis is proposed:

H3 *Consumers' perceived behavioral control has a positive impact on their willingness to pay for sustainable food.*

Previous research has also suggested that the addition of the construct of PQ strengthens the predictive power

of TPB (Wang et al., 2020), and that the construct serves as an antecedent of satisfaction and behavioral intention (BI) and potentially leads to a purchase decision (Cronin et al., 2000). PQ refers to both the consumers' subjective perception and the inherent quality of a product or service in question, which appeals to the consumers and eventually influences their purchase decision (Jin & Gu, 2005; Kotler et al., 1990). In this study, PQ refers to consumers' judgment on the nutritional benefits and values of sustainable food. Notably, trust is a key factor affecting consumers' PQ, which is related to the degree to which the quality of the product is trustworthy or performs consistently well (Wang et al., 2020). In view of the close connection between PQ and trust, this study will also measure the trust level of consumers toward sustainable food certified by different certifying bodies including international organizations, the Chinese central government, and local universities and scientific institutions. The following hypothesis is further proposed:

H4 *Consumers' perceived quality has a positive impact on their willingness to pay for sustainable food.*

TPB also assumes that there may be interactions among exogenous variables. Wang et al. (2020) showed that the four constructs interact with each other in relation to consumers' willingness to buy certified pork. Separately, Sweeney and Soutar (2001) suggested that the

perceived values of certain products lead to positive and proactive BA for consumer buying behavior. The role of SNs varies. In the field of green products, it is a mediator between consumers' attitude and perceived value (Li & Mattsson, 1995). Furthermore, consumers' purchase intention depends on their consumption culture and perceptions, with their consumption attitude being influenced by PBC (Dong et al., 2010). In summary, although interrelated, the constructs distinctly determine consumers' purchase intention and behavior.

Figure 1 summarizes the conceptual framework of the research. The next sections will proceed to test the hypotheses proposed in the study.

3 | MATERIALS AND METHODS

3.1 | Data collection

Data for this study were collected using a face-to-face survey in five Chinese cities between July and August 2019. These cities, namely Beijing, Nanchang, Xian, Taiyuan, and Shenyang, are located in five provinces spanning the north and south of China. These cities represent the different income levels of Chinese cities and China's economic disparities. In 2019, Taiyuan, Beijing, Xian, Nanchang, and Shenyang had GDPs per capita of CNY88,272 (approximately USD12,642), CNY140,211 (approximately

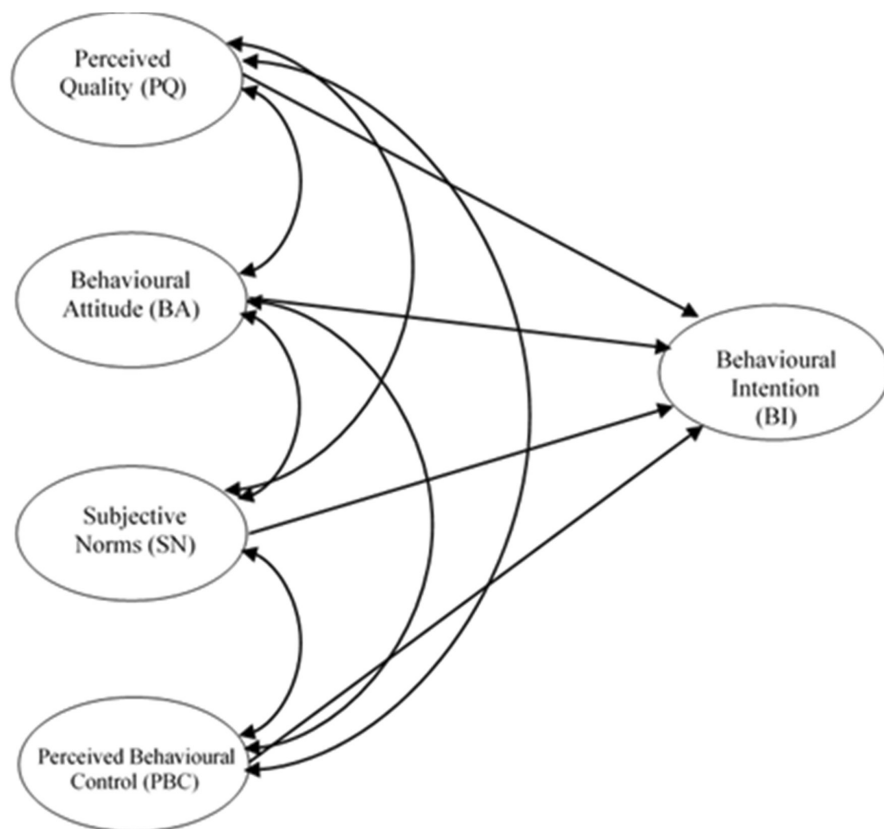


FIGURE 1 The conceptual model of the research based on TPB

USD20,081), CNY85,114 (approximately USD12,190), CNY95,825 (approximately USD13,724), and CNY75,766 (approximately USD10,851), respectively (National Bureau of Statistics of China, 2020). Using stratified sampling, one rural and one urban district were selected in each city, with the rural district located approximately 50 km from the urban center of the same city. To represent the population distribution of the country, the number of respondents from urban districts was double that from the rural districts.

The respondents were selected as follows to ensure a representative sample. First, we randomly chose the respondents based on their addresses. The respondents were located through local officials, such as village chiefs, officials in charge of the communities, and heads of local health authorities. The officials concerned had a list of villagers or residents that lived in their areas. Based on the address list, we randomly selected our respondents. Second, when there were inadequate respondents recruited by the first approach, we visited public areas frequently visited by residents and randomly invited them to participate.

Each interview lasted 20 to 25 min. Before the start of the questionnaire, the researchers verbally familiarized the respondents with the concepts of sustainable food and production, and the questionnaire provided a definition of sustainable food and/or environmentally friendly food choices. The researchers explained the definition of “sustainable food” as “food produced in a way that protects the environment and natural resources such as air, water and soil, and consumes less energy.” The survey consists of two parts: The first part asks about different dimensions related to the latent variables BA, SN, PBC, PQ, and BI, followed by some demographic questions in the second part. As shown in Table 1, BA, SN, PBC, PQ, and BI were measured by different items or manifest variables.

Of the collected 2492 questionnaires, we identified 70 invalid questionnaires, which were discarded, and 2422 valid questionnaires, which were included in the analysis of this study.

3.2 | Instrumentation

The questionnaire was designed to reflect the theoretical basis of this study. Based on previous studies (Ajzen et al., 2004; Conner & Norman, 1996; Dowd & Burke, 2013; Nurse Rainbolt et al., 2012; Vermeir & Verbeke, 2008; Wang et al., 2018, 2021, 2020; Yadav & Pathak, 2016), we have identified various manifest variables as indicators to measure the five latent variables in the model through direct measurement or observation. Each manifest variable was measured using a 5-point Likert scale (e.g., 1: strongly

disagree; 2: moderately disagree; 3: neutral; 4: moderately agree; 5: strongly agree).

For BI which indicates a respondent's intention to pay, it was measured by whether a respondent is willing to pay more for sustainable food certified by different certifying bodies. Behavioral attitude was measured by the positive or negative attitude of consumers toward agricultural food production, toward the effects of agriculture on the environment, and toward the use of pesticides, chemicals, and carbon emissions in agriculture. SNs were measured by questions concerning one's social circles, covering information provided by, and influence of the government, media, experts, social media opinion leaders, sales, and international organizations. Perceived behavioral control was measured by respondents' convenience to purchase food including the distance between one's home and shops selling different food items, and the costs of food. Manifest variables utilized to measure the latent variable of PQ include nutritional value, nutritional benefits, being healthy, brand-attitude, ingredients, expiry date, and origin of food.

Table 1 summarizes the mean, standardized mean, and standard deviation of the manifest variables included in the model. Some manifest variables that we thought might measure the four constructs are excluded from Table 1 and the model because of the result of the exploratory factor analysis (EFA).

4 | RESULTS

4.1 | Descriptive statistics

Table 2 shows the respondents' demographic information, namely gender, age, living area, education level, employment status, family size, family income, and the ages of any young family members. The sample of this study largely corresponded to the Chinese population, with the exceptions of gender ratio and employment status. In the sample, 35.2% of the respondents were men and 64.8% were women, resulting in a gender ratio of 54.3 men to 100 women. However, the gender ratio in China was about 105 men to 100 women in 2017 (Textor, 2020). The discrepancy could be explained by the fact that women are more likely to take responsibility for housework in China (Lu et al., 2000; Zhang, 2017), who are categorized as unemployed or retired in the survey. For the same reason, unemployed women, who had a higher chance to stay at home or go for shopping, were more likely to be selected for responding to our face-to-face survey. After careful consideration, we perceive this discrepancy to be acceptable, as the responsibility for food purchasing in the household usually falls on women or the retired, whose

TABLE 1 Descriptive statistics of manifest variables

Latent variable	Manifest variable	Mean	Standardized mean	Standard deviation
PQ	Q15_1 Ingredients will influence my food choice	4	4	1.05
	Q15_6 Health benefits (e.g., lowers cholesterol and is good for bones) will influence my food choice	3.78	3.78	1.03
	Q15_7 Nutritional facts/value (e.g., protein and fat content) will influence my food choice	3.79	3.79	1.06
	Q15_8 Nutritional benefits (e.g., low fat, reduced salt, and low calories) will influence my food choice	3.75	3.75	1.04
	Q15_10 The brand will influence my food choice	3.77	3.77	1.02
BA	Q12_1 I am concerned about deforestation for agricultural land	3.1	3.1	1.16
	Q12_4 I am concerned about the damage and use of land and water resources in agricultural food production	3.16	3.16	1.14
	Q12_6 I am concerned about drying lakes and rivers due to agricultural food production	3.15	3.15	1.18
SNs	Q28_3 Government promotions can influence my decision to purchase certified food	3	3	1.02
	Q28_4 Information provided in the media can influence my decision to purchase certified food	2.89	2.89	1.01
	Q28_5 Information provided by experts and academic organizations can influence my decision to purchase certified food	2.97	2.97	1.03
	Q28_7 Information provided by social media opinion leaders on social media can influence my decision to purchase certified food	2.86	2.86	1.01
PBC	Q1 My home is far from the shops/stores where I buy vegetables and fruits	4.5	3.75	1.62
	Q2 My home is far from the shops/stores where I buy meat	4.41	3.68	1.59
	Q3 My home is far from the shops/stores where I buy fast-food/hot meals	4.27	3.56	1.71
BI	Q21 I am willing to pay more for environmentally friendly food, even if both environmentally friendly and ordinary food products come from the same origin, with similar packages and appearance	1.67	1.39	1.42
	Q24_1 I am willing to pay more for environmentally friendly food certified by the government	2.24	1.87	1.36
	Q24_2 I am willing to pay more for environmentally friendly food certified by international organizations	2.18	1.82	1.31
	Q24_3 I am willing to pay more for environmentally friendly food certified by food safety accreditation organizations (e.g., research institutes and universities)	2.2	1.83	1.34

perspectives, intentions, and behaviors of food purchase are highly valued by our study compared with the remaining groups. In general, the sample was representative of Chinese consumers across the country.

Trust, as a key factor influencing consumers' PQ, affects consumers' intention to purchase sustainable food. Once trust does not exist between consumers and

certification bodies, respondents will make different purchase choices. Table 3 indicates that the respondents showed a fairly high level of trust in food certification bodies. The three types of bodies presented to the respondents were international organizations, China's central government, and local universities and scientific institutions. The percentages of respondents

TABLE 2 Respondent demographic information

Variable	Category	Frequency	Percentage (%)
Gender	Male	806	35.2
	Female	1485	64.8
Age	Below 18 years old	4	0.2
	18–30 years	641	26.4
	31–45 years	650	26.8
	46–60 years	666	27.5
	60+	465	19.2
Residence	Urban area	1580	69.1
	Rural area	705	30.9
Education level	Middle school or below	882	38.5
	High school (vocational senior high schools included)	453	19.8
	College diploma	420	18.3
	Undergraduates	433	18.9
	Postgraduate or above	103	4.5
Employment status	Full-time employed	1060	46.3
	Part-time employed	92	4
	Self-employed	61	2.7
	Employer	32	1.4
	Unemployed/retired	1042	45.6
Family size	1 member	51	2.2
	2 members	349	15.2
	3 members	690	30.1
	4 members	534	23.3
	5 members or above	667	29.1
Children under 18	< 6 years	623	27.2
	6 >= < 12 years	452	19.7
	13 >= < 18 years	373	16.3
	No children < 18 years	1219	53.2
Family income (RMB)	4000 or below	351	15.3
	4001–7000	354	15.5
	7001–10,000	314	13.7
	10,001–14,000	287	12.5
	14,001–20,000	138	6
	20,001–30,000	76	3.3
	30,001–50,000	38	1.7
	50,001–80,000	20	0.9
	80,001–100,000	15	0.7
	Above 100,000	14	0.6
	Prefer not to answer	680	29.7

Note: 1 RMB = 0.157 USD.

who found them trustworthy or highly trustworthy were similar in each category, namely 54%, 56.4%, and 51.2%, respectively.

The results of this study are in line with the current trend (Rupprecht et al., 2020; Wang et al., 2020). Indeed, although the difference in trust between the different agencies is

TABLE 3 Respondents' level of trust in different food certification bodies

	International organizations (%)	China's central government (%)	Local universities and scientific institutions (%)
Highly untrustworthy	2.5	2.2	2.5
Untrustworthy	7.7	7.7	8.4
No opinion	28.4	26.2	30.5
Trustworthy	33.7	32.9	31.4
Highly trustworthy	20.3	23.5	19.8

	Factor loading				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Q12_1	0.168	0.048	0.072	-0.041	0.8
Q12_4	0.133	0.091	0.078	-0.021	0.873
Q12_6	0.152	0.097	0.097	-0.021	0.871
Q15_1	0.712	0.013	0.056	-0.037	0.149
Q15_6	0.847	0.084	0.062	0.008	0.121
Q15_7	0.889	0.083	0.1	-0.018	0.111
Q15_8	0.879	0.076	0.07	-0.024	0.133
Q15_10	0.657	0.102	0.086	0.013	0.023
Q21	0.149	0.736	0.06	0.022	0.077
Q24_1	0.052	0.938	0.056	0.063	0.065
Q24_2	0.068	0.931	0.087	0.07	0.064
Q24_3	0.07	0.933	0.074	0.059	0.053
Q28_3	0.092	0.045	0.842	-0.021	0.066
Q28_4	0.083	0.051	0.882	-0.032	0.073
Q28_5	0.107	0.082	0.886	-0.007	0.069
Q28_7	0.076	0.095	0.882	-0.029	0.065
q_1	-0.025	0.071	-0.035	0.934	-0.025
q_2	0.001	0.063	-0.015	0.927	-0.032
q_3	-0.024	0.055	-0.031	0.905	-0.028

TABLE 4 Rotated component matrix

Note: Extraction method: principal component analysis. Rotation method: Varimax with Kaiser normalization. Rotation converged in five iterations.

small, Chinese consumers regard China's central government as the most trustworthy food certification body; in other words, this agency has received an increasing level of trust from consumers in recent years (Wang et al., 2020). This trust distribution is also consistent with the findings of other studies. For example, Zhang et al. (2016) found that the government is the most trustworthy institution in terms of food safety; Ortega et al. (2011) suggested that Chinese consumers are more willing to pay for food certified by the government than for food certified by other bodies, and Bai et al. (2013) showed that consumers value certificates issued by the government for traceability more than those issued by third parties (Bai et al., 2013).

However, in comparison to consumers in other countries, Chinese consumers in general have a lower level

of trust in food certification. For instance, in Greece, Krystallis and Chryssohoidis (2005) found a 74.2% consumer trust level in institutions certifying food products, and in Malaysia, Nawi and Nasir (2014) found that 86% of consumers trust the quality of government-certified food for its cleanliness and safety.

4.2 | Exploratory factor analysis

To examine the structure and internal reliability of the measures, we first conducted EFA. This consists of organizing the data to obtain a smaller set of summary variables. To achieve this, we used varimax rotation. The results are presented in Table 4, which shows that the proposed

variables corresponded statistically to their associated manifest variables. This confirmed that our grouping of manifest variables in the five constructs under study was appropriate.

4.3 | Reliability and validity tests

To test the applicability of the variables, we performed reliability and validity tests. As shown in Table 5, Cronbach's α values for the five latent variables exceeded 0.83, falling in the range of acceptable reliability values and indicating good internal consistency between the variables.

Furthermore, Table 5 shows that the standardized factor loadings of most of the manifest variables were above 0.5. Table 5 also shows that all of the composite reliability (CR) values were above 0.8 and that the average variance extracted (AVE) values exceeded 0.6. These results showed the strong association of the manifest variables with the latent variables. The latent variables therefore had good convergent validity.

To further confirm construct validity, we performed discriminant validity tests. Table 6 shows the square root

of the AVE of the latent variables and reveals that the values on the diagonal exceeded the maximum coefficients in the associated rows and columns, indicating good discriminant validity.

4.4 | Confirmatory factor analysis (CFA)

After confirming the EFA results, we performed CFA to measure the adequacy of the manifest variables in explaining the constructs and to ascertain whether the number of factors and the factor loadings of the manifest variables were in line with our expectations. Figure 2 illustrates the measurement model of the determinants of consumers' willingness to pay more for sustainable food.

4.5 | Model fit measurement

We further confirmed the model fit by calculating the fit indices. Table 7 shows the results, indicating a well-fitting model (CMIN/DF = 2.643; GIF = 0.983; RMSEA = 0.027; NFI = 0.987; CFI = 0.992; IFI = 0.992; RFI = 0.985).

TABLE 5 Reliability and validity test results

Latent variable	Manifest variable	Standardized factor loading	Cronbach's α	CR	AVE
PQ	Q15_1	0.53	0.873	0.89911	0.643793
	Q15_6	0.641			
	Q15_7	0.681			
	Q15_8	0.665			
	Q15_10	0.506			
BA	Q12_1	0.631	0.839	0.88521	0.720257
	Q12_4	0.707			
	Q12_6	0.696			
SNs	Q28_3	0.602	0.906	0.92771	0.762452
	Q28_4	0.639			
	Q28_5	0.63			
	Q28_7	0.648			
PBC	q_1	0.671	0.914	0.94453	0.850236
	q_2	0.652			
	q_3	0.64			
BI	Q21	0.512	0.917	0.93703	0.789698
	Q24_1	0.63			
	Q24_2	0.618			
	Q24_3	0.617			
Overall			0.809		

Variable	PQ	BA	SNs	PBC	BI
PQ	0.802				
BA	0.321**	0.849			
SNs	0.210**	0.198**	0.873		
PBC	-0.032	-0.061**	-0.053*	0.922	
BI	0.196**	0.179**	0.166**	0.120**	0.889

TABLE 6 Discriminant validity test results

**The correlation is significant at the 0.01 level (two-tailed); *The correlation is significant at the 0.05 level (two-tailed).

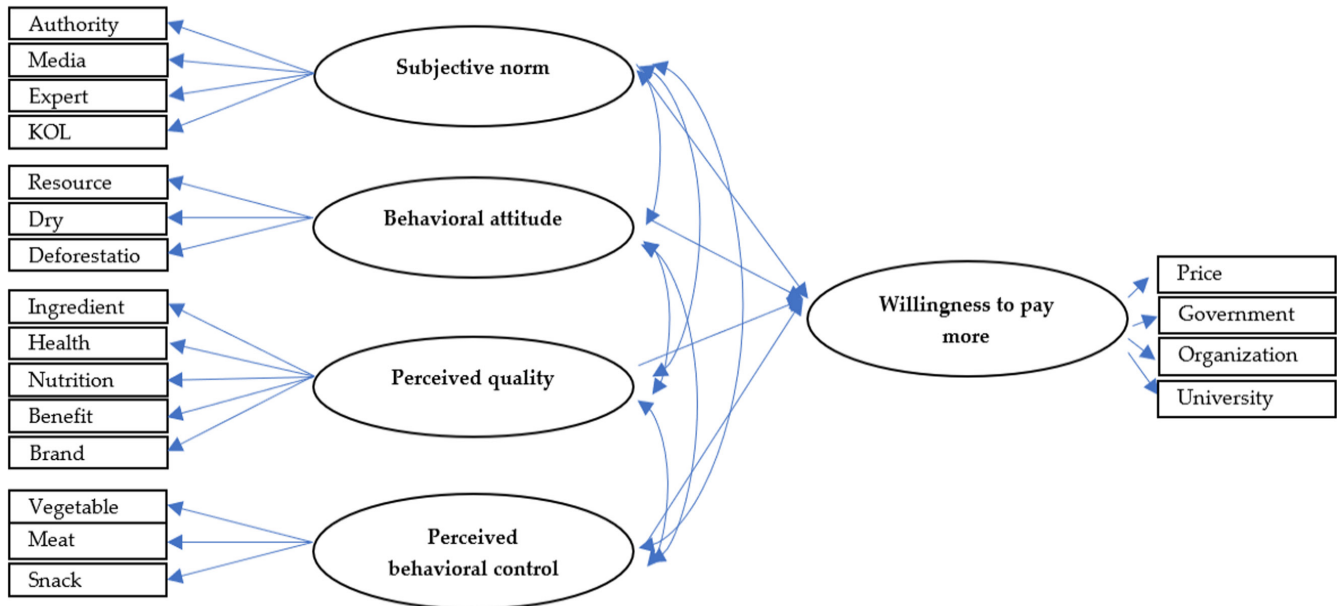


FIGURE 2 Measurement model of the determinants of consumers' willingness to pay more for sustainable food

4.6 | Hypotheses testing

Table 8 reports the results of structural equation modeling. The standardized path coefficients from PQ, SNs, and BA to BI were positive, while that of PBC was negative. They were all statistically significant at the 0.001 level.

Among the four constructs, the results showed that BA had the most significant and positive effect on consumers' willingness to pay more for sustainable food, with its standardized path coefficient as 0.133. H1 is therefore supported. The three manifest variables related to BA, namely concerns about deforestation for agricultural land, damage caused by the use of land and water resources in agricultural food production, and drying lakes and rivers caused by agricultural food production, contributed positively to the latent variable.

The next contributing factor to willingness to pay more was SNs, with a standardized path coefficient of 0.129. H2 is therefore supported. The four manifest variables concerned were positive. This finding indicates that government promotions and information provided in the media by experts, academics, and social media opinion leaders

influence Chinese consumers' conception of SNs and therefore increases their readiness to pay more for environmentally friendly food.

The third most influential factor was PQ, with a standardized path coefficient of 0.115. H4 is therefore supported. The contributing manifest variables were ingredients, health benefits, nutritional facts or values, and nutritional benefits, with path coefficients of 0.621, 0.828, 0.886, and 0.54, respectively. Of the four manifest variables, ingredients had the least impact on the latent variable.

The final latent variable was PBC. Its standardized path coefficient was -0.155, indicating that the variable was negatively associated with consumers' intention to purchase sustainable food. Referring to its manifest variables that measured the distance between the respondents' homes and markets for various types of food, the result showed that increased difficulty in accessing food decreased their willingness to purchase sustainable food. In other words, increased convenience in assessing food would increase consumers' intention to purchase sustainable food. Therefore, H3 is supported.

TABLE 7 Summary of the fit indices from CFA

Index	Recommended value	Observed value	Acceptance
Chi-square likelihood ratio (CMIN)		375.352	
Degree of freedom (DF)		142	
CMIN/DF	<3	2.643	Good
Goodness of fit (GFI)	>0.9	0.983	Good
(Adjusted) goodness of fit (AGFI)	>0.9	0.977	Good
Root mean square residual (RMR)	<0.05	0.036	Good
Root mean square error of approximation (RMSEA)	<0.05	0.027	Good
Normed fit index (NFI)	>0.9	0.987	Good
Relative fit index (RFI)	>0.9	0.985	Good
Incremental fit index (IFI)	>0.9	0.992	Good
Comparative fit index (CFI)	>0.9	0.992	Good
Parsimony goodness-of-fit index (PGFI)	>0.5	0.735	Good
Parsimonious normed fit index (PNFI)	>0.5	0.820	Good
Parsimony comparative fit index (PCFI)	>0.5	0.824	Good
Non-centrality parameter (NCP)	^{a)}	233.352	
Expected cross-validation index (ECVI)	^{a)}	0.206	
Akaike information criterion (AIC)	^{a)}	471.352	
Consistent Akaike information criterion (CAIC)	^{a)}	794.611	
Browne-Cudeck Criterion (BCC)	^{a)}	472.199	
Bayesian Information Criterion (BIC)	^{a)}	746.611	

Note: ^{a)}Smaller value implies better model fit.

The interactions among PQ, SNs, and BA were positively correlated at a statistically significant level of 0.001. The strongest association was between PQ and BA. The standardized path coefficient was 0.282. The relationship could be two-way. On the one hand, consumers may perceive a clean environment as an enabling condition for growing quality food as they become more concerned about the health benefits and nutritional value (i.e., PQ) of their food. On the other hand, consumers may become more observant of the ingredients used in their food as their concern for the environment increases.

In summary, the four hypotheses proposed in the study were all supported, indicating that the four constructs proposed for use in the TPB model were validated.

5 | DISCUSSION

The above results confirm that Chinese consumers are prone to purchase sustainable food. Compared with Vermeir and Verbeke's (2008) work with the context of Belgium, our results show that the proportion of people willing to purchase sustainable food in China is higher than Belgium. While Chinese consumers pay more attention to the quality of sustainable food, Belgian consumers

focus on the availability of sustainable food. Our findings echo with Vermeir and Verbeke's (2008) study that people's willingness to purchase sustainable food is affected by those around them, and an individual's attitude also significantly affects their intentions.

Prior research on purchasing intention of consumers toward certified food, green food and organic food (e.g., Thøgersen & Zhou, 2012; Wang et al., 2020; Zhou et al., 2013) mainly considers consumers' personal health concerns; however, in this study, the focus on sustainable food considers more about pro-environment values and behaviors of consumers. While the former is more related to individual benefits, the latter inclines to prioritize collective interests such as the well-being of the future generations and the environment over individual interests. The results also showed that the respondents had different levels of willingness to purchase sustainable food depending on the certification agency involved. Unlike previous findings (Wang et al., 2020; Xiong & Yang, 2011), this study suggests that consumers trust government certification the most and are thus willing to pay more for government-certified sustainable food. The level of trust among the respondents was even higher than that in international organizations, shown to enjoy high trust among Chinese consumers

TABLE 8 Path analysis results

Path	Standardized path coefficient	Standard error	CR	p value
BI←PQ	0.115	0.031	4.927	***
BI←PBC	−0.155	0.02	−7.209	***
BI←SN	0.129	0.032	5.733	***
BI←BA	0.133	0.039	5.471	***
Q15_1←PQ	0.621	0.02	33.874	***
Q15_6←PQ	0.828	0.016	55.21	***
Q15_8←PQ	0.886	0.015	62.56	***
Q15_10←PQ	0.54	0.02	27.961	***
Q15_7←PQ	0.92			
q_3←PBC	0.838	0.019	54.15	***
q_2←PBC	0.897			
q_1←PBC	0.924	0.016	62.388	***
Q28_3←SN	0.781	0.02	45.029	***
Q28_5←SN	0.871			
Q28_4←SN	0.849	0.019	50.861	***
Q28_7←SN	0.863	0.018	53.316	***
Q12_6←BA	0.868	0.038	33.98	***
Q12_4←BA	0.843	0.035	34.073	***
Q12_1←BA	0.689			
Q24_3←BI	0.937	0.012	85.341	***
Q24_1←BI	0.937			
Q24_2←BI	0.939	0.011	85.802	***
Q21↔BI	0.638	0.019	36.916	***
PQ↔PBC	0.05	0.031	1.606	0.108
PBC↔SN	0.072	0.029	2.458	0.014
SN↔BA	0.168	0.019	8.88	***
PQ↔SN	0.209	0.022	9.545	***
PBC↔BA	0.071	0.027	2.652	0.008
PQ↔BA	0.282	0.021	13.176	***

*** $p < 0.001$.

in previous studies (Wang et al., 2020; Wu et al., 2014; Xiong & Yang, 2011; Yin et al., 2017).

Among the four constructs in TPB considered in this study, BA contributed the most to the respondents' willingness to purchase sustainable food. In this study, attitude referred to their concerns about the impact of food production on the environment, in the form of deforestation, damage to land and water resources, and drying lakes and rivers. In other words, consumers with high BA are highly concerned about the impact of their food consumption on the environment, rather than simply considering personal benefits such as food safety. They limit their demand for non-sustainable food (Garnett, 2013) and replace their needs with sustainable alternatives. In this sense, this finding is consistent with studies suggesting that these consumers are more likely to be socially concerned rather

than individually concerned (Xu et al., 2012). This willingness to spend extra for sustainable food may be a result of "green consumerism" (Sachdeva et al., 2015). This is similar to buying fair trade products from which consumers derive no extra benefits in terms of food quality or which may instead incur additional monetary costs. Despite this asymmetric relationship, consumers are still satisfied with such "expensive" purchases.

In this study, PQ was also found to have a positive impact on food choice. This factor was measured by the respondents' perceptions of the health benefits and nutritive value of food products. This finding aligns with studies showing that when it comes to food choice, food safety is often one of the main considerations of Chinese consumers (Fabinyi, 2016; Xu & Wu, 2010; Tait et al., 2016). However, healthy food means more than just being safe

to consume. Other than causing no harm, consuming healthy food may improve health. This concern about healthy food could also translate into BA toward sustainable food, as consumers may consider that the long-term supply of healthy products can be achieved through sustainable food consumption. Our finding on the interaction between the two constructs supports such a correlation. Consumers concerned about food safety and food quality may be more easily convinced to pay more for sustainable food (Fabinyi, 2016; Gao et al., 2016).

As predicted by TPB, PBC influenced the respondents' willingness to pay. This variable measured the convenience with which the respondents could purchase different types of food. Sustainable food in China is new; it is therefore not widely available. This type of food may be more easily found in larger shops and stores that sell a variety of products, such as supermarkets. People who have less access to different types of food have less intention of consuming sustainable food. This finding is similar to that of Thøgersen and Zhou (2012) who found that the low availability of organic food hinders consumers' purchase intention.

6 | CONCLUSION AND POLICY IMPLICATIONS

Based on TPB, this study explores the willingness of consumers to purchase sustainable food in China. While previous studies on food purchase intention mainly focus on consumers' individual health concerns; this study, examining sustainable food, is novel in the sense that it has examined the extent to which consumers are willing to spend more for protecting the environment. The results reflect the current spending power of consumers and the monetary sacrifice that they are willing to make for the common good (i.e., sustainable development in this study). In addition, this study offers a countrywide perspective on Chinese consumers' willingness to pay more for sustainable food. Unlike studies focusing on one specific city or region (e.g., Liu et al., 2012; Thøgersen & Zhou, 2012; Wang et al., 2020), this study's sample was drawn from five provinces spanning the north and south of the country with different income levels, covering both rural and urban areas. The sample is also in general more representative than other studies which relied on online surveys for data collection (e.g., Sheng et al., 2019; Zhu et al., 2021, 2022), which is inadequate in capturing the views of the elderly and people living in rural areas with unavailable or limited internet access.

Given its external validity, the findings of the study could be generalized to a wider population in China as well as countries or regions with a similar context in the world. To

a certain extent, we predict that countries with higher education and economic levels than that of China would have a similar or even higher intention to shift to sustainable food consumption, in view of the positive linkage between income growth, education level, and the demand for environmental quality and sustainability (Ready et al., 2002).

The findings of this study have certain policy implications for the development of sustainable food. First, our findings show that PQ and SNs have a positive effect on inducing sustainable behavior. If the parties that disseminate information about sustainable food are considered trustworthy, then consumers' exposure to information is more likely to generate social pressure leading to purchase intention. In this sense, information disseminated by the government, media, experts, and social media opinion leaders could create social pressure and ultimately affect the intention and behavior of consumers. As suggested by previous studies (Moragues et al., 2013; Toussaint et al., 2021), the influence and pressure of these parties on consumers may also mean that the government can cooperate with them to ensure that messages on sustainable development are promoted in various ways. A relatively lower level of trust in food certification in China is also well worth exploring because some environmentally conscious consumers might be reluctant to spend more if they are uncertain of the food packaging claims (Chan, 2000). Consumers' trust in sustainable food is a long-term accumulation process. Regulation and its monitoring framework may also affect consumers' trust toward sustainable food.

In the future, studies may further explore the most effective strategies to communicate the concept of sustainable food effectively with consumers and hence promote their intention to consume sustainable food.

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CONFLICT OF INTEREST

The authors have stated explicitly that there are no conflicts of interest in connection with this article.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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REFERENCES

- Ajzen I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action control*. SSSP Springer Series in Social Psychology (pp. 11–39). Springer.
- Ajzen, I. (1991). The theory of planned behaviour, organizational behaviour and human decision processes. *Journal of Leisure Research*, 50(2), 176–211.
- Ajzen, I., Brown, T. C., & Carvajal, F. (2004). Explaining the discrepancy between intentions and actions: The case of hypothetical bias in contingent valuation. *Personality and Social Psychology Bulletin*, 30(9), 1108–1121.
- Bai, J., Zhang, C., & Jiang, J. (2013). The role of certificate issuer on consumers' willingness-to-pay for milk traceability in China. *Agricultural Economics*, 44(4–5), 537–544.
- Bilali, H. E., Callenius, C., Strassner, C., & Probst, L. (2018). Food and nutrition security and sustainability transitions in food systems. *Food and Energy Security*, 8(2), e00154.
- Capone, R., Bilali, H. E., Debs, P., Cardone, G., & Driouech, N. (2014). Food system sustainability and food security: Connecting the dots. *Journal of Food Security*, 2(1), 13–22.
- Carlsson-Kanyama, A. (1998). Climate change and dietary choices—How can emissions of greenhouse gases from food consumption be reduced? *Food Policy*, 23(3–4), 277–293.
- Carlson, C. L., & Adriano, D. C. (1993). Environmental impacts of coal combustion residues. *Journal of Environmental Quality*, 22(2), 227–247.
- Chan, R. Y. K. (2000). An emerging market in China: Myth or reality? *Business Horizons*, 43(2), 55–60.
- Chan, R. Y. K., & Lau, L. B. Y. (2002). Explaining green purchasing behavior. *Journal of International Consumer Marketing*, 14(2–3), 9–40.
- National Bureau of Statistics of China (2020). *China City Statistical Yearbook 2019 (in Chinese)*. Beijing: China Statistics Press.
- Conner, M., & Norman, P. (1996). *Predicting health behaviour: Research and practice with social cognition models* (2nd ed.). Open University Press.
- Cronin, J. J., Brady, M. K., & Hult, G. T. M. (2000). Assessing the effects of quality, value, and customer satisfaction on consumer behavioral intentions in service environments. *Journal of Retailing*, 76(2), 193–218.
- Dong, J. D., Wang, Q. L., & Zhang, L. (2010). A study on spending culture and purchasing intention (in Chinese). *Economical Exploration*, 9, 73–77.
- Dowd, K., & Burke, K. J. (2013). The influence of ethical values and food choice motivations on intentions to purchase sustainably sourced foods. *Appetite*, 69, 137–144.
- Fabinyi, M. (2016). Sustainable seafood consumption in China. *Marine Policy*, 74, 85–87.
- Food and Agriculture Organization of the United Nations. (2018). *FAOSTAT Statistical Database*. <https://www.fao.org/faostat/en/#home>
- Gao, Z., Li, C., Bai, J., & Fu, J. (2016). Chinese consumer quality perception and preference of sustainable milk. *China Economic Review*, 59, 100939.
- Garnett, T. (2013). Food sustainability: Problems, perspectives and solutions. *Proceedings of the Nutrition Society*, 72(1), 29–39.
- He, P., Baiocchi, G., Hubacek, K., Feng, K., & Yu, Y. (2018). The environmental impacts of rapidly changing diets and their nutritional quality in China. *Nature Sustainability*, 1, 122–127.
- Herrero, M., & Thornton, P. K. (2013). Livestock and global change: Emerging issues for sustainable food systems. *Proceedings of the National Academy of Sciences of the United States of America*, 110(52), 20878–20881.
- Ivanova, D., Barrett, J., Wiedenhofer, D., Macura, B., Callaghan, M., & Creutzig, F. (2020). Quantifying the potential for climate change mitigation of consumption options. *Environmental Research Letters*, 15, 093001.
- Jin, B., & Gu, S. Y. (2005). Integrating effect of consumer perception factors in predicting private brand purchase in a Korean discount store context. *Journal of Consumer Marketing*, 22(2), 62–71.
- Kalafatis, S. P., Pollard, M., East, R., & Tsogas, M. H. (1999). Green marketing and Ajzen's theory of planned behaviour: A cross-market examination. *Journal of Consumer Marketing*, 16(5), 441–460.
- Kotler, P., Armstrong, G., Harker, M., & Brennan, R. (1990). *Marketing: An introduction* (Vol. 1). Prentice-Hall.
- Krystallis, A., & Chrysosoidis, G. (2005). Consumers' willingness to pay for organic food: Factors that affect it and variation per organic product type. *British Food Journal*, 107(5), 320–343.
- Lacour, C., Seconda, L., Allès, B., Hercberg, S., Langevin, B., Pointereau, P., Lairon, D., Baudry, J., & Kesse-Guyot, E. (2018). Environmental impacts of plant-based diets: How does organic food consumption contribute to environmental sustainability? *Frontiers in Nutrition*, 5, 8.
- Lang, T., & Barling, D. (2012). Food security and food sustainability: Reformulating the debate. *The Geographical Journal*, 178(4), 313–326.
- Li, C. Z., & Mattsson, L. (1995). Discrete choice under preference uncertainty: An improved structural model for contingent valuation. *Journal of Environmental Economics and Management*, 28(2), 256–269.
- Liu, X., Tai, A. P., Chen, Y., Zhang, L., Shaddick, G., Yan, X., & Lam, H. M. (2021). Dietary shifts can reduce premature deaths related to particulate matter pollution in China. *Nature Food*, 2(12), 997–1004.
- Liu, X., Wang, C., Shishime, T., & Fujitsuka, T. (2012). Sustainable consumption: Green purchasing behaviours of urban residents in China. *Sustainable Development*, 20(4), 293–308.
- Liu, Y. W. (2008). An integrated model of behavior of China's green consumers based on TPB. *China Business and Market*, 2008(8), 66–69.
- Lu, Y., Song, S., Wang, R., Liu, Z., Meng, J., Sweetman, A. J., Jenkins, A., Ferrier, R. C., Li, H., Luo, W., & Wang, T. (2015). Impacts of soil and water pollution on food safety and health risks in China. *Environment International*, 77, 5–15.
- Lu, Z. Z., Maume, D. J., & Bellas, M. L. (2000). Chinese husbands' participation in household labor. *Journal of Comparative Family Studies*, 31(2), 191–215.

- Moragues, A., Morgan, K., Moschitz, H., Neimane, I., Nilsson, H., Pinto, M., Rohrer, H., Ruiz, R., Thuswald, M., Tisenkopfs, T., & Halliday, J. (2013). Urban Food Strategies: the rough guide to sustainable food systems. Document developed in the framework of the FP7 project FOODLINKS (GA No. 265287). https://orgprints.org/id/eprint/28860/1/foodlinks-Urban_food_strategies.pdf
- Nawi, N. M., & Nasir, N. I. M. (2014). Consumers' attitude toward the food safety certificate (FSC) in Malaysia. *Journal of Food Products Marketing*, 20, 140–150.
- Nurse Rainbolt, G., Onozaka, Y., & McFadden, D. T. (2012). Consumer motivations and buying behavior: The case of the local food system movement. *Journal of Food Products Marketing*, 18(5), 385–396.
- Ortega, D. L., Wang, H. H., Wu, L., & Olynk, N. J. (2011). Modeling heterogeneity in consumer preferences for select food safety attributes in China. *Food Policy*, 36(2), 318–324.
- Pieters, R. G. (1991). Changing garbage disposal patterns of consumers: Motivation, ability, and performance. *Journal of Public Policy & Marketing*, 10(2), 59–76.
- Poore, J., & Nemecek, T. (2018). Reducing food's environmental impacts through producers and consumers. *Science*, 360(6392), 987–992.
- Ready, R., Malzubris, J., & Senkane, S. (2002). The relationship between environmental values and income in a transition economy: Surface water quality in Latvia. *Environment and Development Economics*, 7(1), 147–156.
- Rezai, G., Teng, P. K., Mohamed, Z., & Shamsudin, M. N. (2012). Consumers' awareness and consumption intention towards green foods. *African Journal of Business Management*, 6(12), 4496.
- Rupprecht, C. D., Fujiyoshi, L., McGreevy, S. R., & Tayasu, I. (2020). Trust me? Consumer trust in expert information on food product labels. *Food and Chemical Toxicology*, 137, 111170.
- Sachdeva, S., Jordan, J., & Mazar, N. (2015). Green consumerism: Moral motivations to a sustainable future. *Current Opinion in Psychology*, 6, 60–65.
- Sheng, G., Xie, F., Gong, S., & Pan, H. (2019). The role of cultural values in green purchasing intention: Empirical evidence from Chinese consumers. *International Journal of Consumer Studies*, 43(3), 315–326.
- Solow, R. (1991). *Sustainability: An economist's perspective. The eighteenth J. Seward Johnson lecture*. Woods Hole Oceanographic Institution.
- Sweeney, J. C., & Soutar, G. N. (2001). Consumer perceived value: The development of a multiple item scale. *Journal of Retailing*, 77(2), 203–220.
- Tait, P., Saunders, C., Guenther, M., & Rutherford, P. (2016). Emerging versus developed economy consumer willingness to pay for environmentally sustainable food production: A choice experiment approach comparing Indian, Chinese and United Kingdom lamb consumers. *Journal of Cleaner Production*, 124, 65–72.
- Textor, C. (2020). Sex ratio in China from 1953 to 2018. <https://www.statista.com/statistics/251102/sex-ratio-in-china/>
- Thøgersen, J., & Zhou, Y. (2012). Chinese consumers' adoption of a 'green' innovation—The case of organic food. *Journal of Marketing Management*, 28(3–4), 313–333.
- Toussaint, M., Cabanelas, P., & González-Alvarado, T. E. (2021). What about the consumer choice? The influence of social sustainability on consumer's purchasing behavior in the food value chain. *European Research on Management and Business Economics*, 27(1), 100134.
- United Nations. (2019). *Sustainable development knowledge platform*. <https://sustainabledevelopment.un.org/sdg2>
- Vassallo, M., Scalvedi, M. L., & Saba, A. (2016). Investigating psychosocial determinants in influencing sustainable food consumption in Italy. *International Journal of Consumer Studies*, 40(4), 422–434.
- Vermeir, I., & Verbeke, W. (2008). Sustainable food consumption among young adults in Belgium: Theory of planned behaviour and the role of confidence and values. *Ecological Economics*, 64(3), 542–553.
- von Meyer-Höfer, M., Juárez Tijerino, A. M., & Spiller, A. (2015). Sustainable food consumption in China and India. *Global Food Discussion Papers*, 60.
- Wang, J., Chu, M., Deng, Y., Lam, H. M., & Tang, J. (2018). Determinants of pesticide application: An empirical analysis with theory of planned behaviour. *China Agricultural Economic Review*, 10(4), 608–625.
- Wang, J., Shen, M., & Chu, M. (2021). Why is green consumption easier said than done? Exploring the green consumption attitude-intention gap in China with behavioral reasoning theory. *Cleaner and Responsible Consumption*, 2, 100015.
- Wang, J., Tao, J., & Chu, M. (2020). Behind the label: Chinese consumers' trust in food certification and the effect of perceived quality on purchase intention. *Food Control*, 108, 106825.
- Wang, Y. H., & Wang, Q. (2013). Factors affecting Beijing residents' buying behavior of new energy vehicle: An integration of technology acceptance model and theory of planned behavior. *Chinese Journal of Management Science*, 21, 691–698.
- Wu, L., Yin, S., Xu, Y., & Zhu, D. (2014). Effectiveness of China's organic food certification policy: Consumer preferences for infant Milk formula with different organic certification labels. *Canadian Journal of Agricultural Economics*, 62(4), 545–568.
- Xiong, W., & Yang, Y. (2011). Analysis on influencing factors for purchase intention of Non-pollution agricultural products. *Journal of Anhui Agricultural Sciences*, 33, 20800–20801.
- Xu, L., & Wu, L. (2010). Food safety and consumer willingness to pay for certified traceable food in China. *Journal of the Science of Food and Agriculture*, 90(8), 1368–1373.
- Xu, P., Zeng, Y., Fong, Q., Lone, T., & Liu, Y. (2012). Chinese consumers' willingness to pay for green- and eco-labeled seafood. *Food Control*, 28(1), 74–82.
- Yadav, R., & Pathak, G. S. (2016). Young consumers' intention towards buying green products in a developing nation: Extending the theory of planned behavior. *Journal of Cleaner Production*, 135, 732–739.
- Yang, X., Steenhuis, T. S., Davis, K. F., van der Werf, W., Ritsema, C. J., Pacenka, S., Zhang, F., Siddique, K. H. M., & Du, T. (2021). Diversified crop rotations enhance groundwater and economic sustainability of food production. *Food and Energy Security*, 10(4), e311.
- Yin, S., Chen, M., Xu, Y., & Chen, Y. (2017). Chinese consumers' willingness-to-pay for safety label on tomato: Evidence from choice experiments. *China Agricultural Economic Review*, 9(1), 141–155.
- Zhang, L., Xu, Y., Oosterveer, P., & Mol, A. P. J. (2016). Consumer trust in different food provisioning schemes: Evidence from Beijing, China. *Journal of Cleaner Production*, 134, 269–279.

- Zhang, Y., & Li, X. (2017). Exploring the gap between consumers' green purchase intention and purchase behavior. *Resource Development & Market*, 33, 343–348.
- Zhang, Z. (2017). Division of housework in transitional urban China. *Chinese Sociological Review*, 49(3), 263–291.
- Zhao, H. H., Gao, Q., Wu, Y. P., Wang, Y., & Zhu, X. D. (2014). What affects green consumer behavior in China? A case study from Qingdao. *Journal of Cleaner Production*, 63, 143–151.
- Zhou, Y. F., Thøgersen, J., Ruan, Y. J., & Huang, G. (2013). The moderating role of human values in planned behavior: The case of Chinese consumers' intention to buy organic food. *Journal of Consumer Marketing*, 30(4), 335–344.
- Zhu, Y., Wen, X., Chu, M., & Sun, S. (2022). Consumers' intention to participate in food safety risk communication: A model integrating protection motivation theory and the theory of reasoned action. *Food Control*, 138, 108993.
- Zhu, Y., Wen, X., Chu, M., Zhang, G., & Liu, X. (2021). Consumers' food safety risk communication on social media following the Suan Tang Zi accident: An extended protection motivation theory perspective. *International Journal of Environmental Research and Public Health*, 18(15), 8080.

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