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Effect of perceived government regulation on purchase intention for regional brand agricultural products: an empirical investigation of Qianjiang crayfish

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The consumption of regional brand agricultural products (RBAPs) has increased dramatically in China in recent years. However, due to insufficient government regulation and consumer perceptions, many unsuccessful RBAPs still face unfavorable attitudes toward purchase. Based on the stimulus–organism–response (SOR) theory, this study examined the effect of perceived government regulation—comprising perceived government regulation of production support (GP) and perceived government regulation of consumer protection (GC)—on the intention to purchase RBAPs. This study employed a partial least squares-structural equation model to quantitatively analyze a sample of 289 consumers of a typical regional brand of Qianjiang crayfish. Findings revealed that GP and GC had direct effects on perceived quality. GP, but not GC, had a direct effect on purchase intention. Furthermore, perceived quality and consumer trust both played partial mediating roles in the association between GP and purchase intention, and both fully mediated the relationship between GC and purchase intention. These findings are important for identifying and clarifying the effects of existing regulations to aid in promoting consumers' purchase intention and facilitating the long-term sustainable development of public regional brands.

KEYWORDS

perceived government regulation, regional brand agricultural products, SOR, purchase intention, perceived quality, consumers' trust, health consciousness

1 Introduction

Healthy food, emphasizing "food security" and "sustainable agriculture," is part of the United Nations' Sustainable Development Goals (SDG) global agenda (United Nations, 2019). To achieve the goals of sustainable agriculture and food security, agricultural regional brands are expanding rapidly. These brands are managed by local governments, relevant associations, enterprises, and farmers within specific regions. Strict standards and quality management are enforced across production, processing, brand licensing, and brand marketing to ensure the provision of high-quality food products and services to consumers (Zheng et al., 2022). By 2050, the majority of global food demand will originate from developing countries (Chu et al., 2023). In response, China has implemented a strategy of rural revitalization via the development of sustainable green agriculture through regional brands (Huang et al., 2023). Accordingly, the total number of agricultural regional brands has increased from 1,445 in 2012 to 3,912 in 2022, representing a compound annual growth rate of 10.47% in China over the

past decade. However, in practice, the performance and impact of agricultural regional brands in China are still limited; approximately 10% of regional brands are valued at over 20 billion CNY, with only approximately 4% exceeding a value of 50 billion CNY (Wang et al., 2023). This demonstrates that only a small proportion of regional brand agricultural products (RBAPs) have gained public consumer approval, achieving significant economic impact and brand premium. These facts indicate that customers' subjective perceptions and purchase intentions are key drivers of the sustainable development of high-quality food products. It is therefore imperative to investigate the purchase intention for RBAPs within the context of consumer perceptions.

The limited number of successful RBAPs is closely related to "free-riding," a parasitic behavior associated with the public goods attributes of regional brands and the credence goods attributes of agricultural products. Since regional brands are accessible across an entire region, some business owners act as "free-riders" and sell poor-quality products that fail to meet food standards, leading to "inferior products expelling good products." Furthermore, the characteristics of credence goods exacerbate the information asymmetry of agricultural products, making it difficult for consumers to ascertain the quality of RBAPs compared to search and experience goods (Yang et al., 2023). These market failures necessitate government regulation, which plays a significant role for regional brands that possess both credence and public good characteristics. Given that the Chinese government is regarded as the most trusted institution (compared to international organizations, local universities, and scientific institutions) with respect to food safety by 56.4% of consumers in China (Chu et al., 2023), it is essential to explore RBAP purchase intention from the perspective of consumer perceptions of government regulations and to identify the mechanisms influencing this relationship.

However, research on government regulation and its mechanisms of influence on purchase intention in the context of consumers' subjective perceptions is scarce. First, scholars in the field of agricultural products have primarily focused on objective government regulation and its influence on the supply side, such as farmers (Shen et al., 2023; Liu et al., 2021), cooperatives (Luo et al., 2022), and agribusinesses (Ben Amara and Chen, 2020). Existing research on perceived government regulation mainly centers on farmers' subjective perceptions (Yang et al., 2024; Teng et al., 2022), while the demand side has received little attention, with only one study investigating consumers' perceptions using the concept of "satisfaction with government regulation" (Chai et al., 2022). However, Chai et al. (2022) focused on food consumption in general, while the present research explores high-quality RBAPs. Second, research has typically overlooked the underlying mechanisms of influence and the boundary conditions that shape these relationships. Previous studies predominantly examined how objective government regulations impact consumers' consumption behavior without investigating the underlying mechanisms of influence. For instance, Yang et al. (2023) and Yang et al. (2022) explored how the three dimensions of government regulations affect residents' green consumption behavior using a simulation method. This approach lacks real-world model parameters, making it difficult to evaluate the effectiveness of the simulation results and leaving the influence of the underlying mechanisms unclear. Furthermore, few studies have investigated whether there is a potential moderating effect in the abovementioned mechanisms of influence regarding RBAPs.

To address these gaps, we propose a novel conceptual model that includes perceived government regulation of production support (GP), perceived government regulation of consumer protection (GC), consumers' perceived quality (CPQ), consumers' trust (CT), consumers' purchase intention (CPI), and health consciousness (HC), all based on the stimulus–organism–response (SOR) theory. This theory is a central framework of modern cognitive psychology, emphasizing that an environmental stimulus (S) can provoke changes in an individual's psychological state (O), resulting in that individual's behavioral responses (R). In the present work, consumers' perceived government regulation—comprising GP and GC—represents environmental stimulus factors; CPQ and CT reflect consumers' psychological changes or cognition; and CPI represents consumers' responses. The proposed model also extends the SOR theory by considering the interplay between the "O" factors CPQ and CT. Accordingly, this study's objectives are (1) to investigate the impact of perceived government regulation (GP and GC) on CPI, including the strength of these impacts; (2) to explore the influencing mechanism of perceived government regulation (GP and GC) on CPI by examining whether CPQ and CT serve as mediators in the relationship between GP/GC and CPI; (3) to test the moderating effect of HC on the relationship between CPQ and CPI. Furthermore, the study uses Qianjiang crayfish, a successful RBAP in China's Hubei province, as an example for collecting survey data from consumers. The data are then analyzed using the partial least squares-structural equation modeling (PLS-SEM) technique.

The contributions of this research are threefold: First, the SOR theory is extended by taking into account the link between the two mediators, CPQ and CT. Second, the internal mechanism is revealed by testing the mediating effects of both CPQ and CT on the relationship between GP and GC. Third, government regulation is classified into two dimensions (GP and GC) based on consumers' perceptions, and both dimensions are validated in the field of RBAP—this not only extends and clarifies the theoretical understanding of government regulation but also aids in relevant policymaking for promoting regional brands. In practice, this study provides valuable guidance to the government and agribusiness in formulating appropriate policies and countermeasures to encourage and enhance CPI for RBAPs. This is crucial for steering the direction of reform in promoting the sustainable development of RBAPs and helping to ensure food safety, food sustainability, and public health.

Table 1 provides all abbreviations used throughout this paper (also defined in the text).

2 Literature review, research framework, and hypothesis development

2.1 S-O-R framework for determining the variables of the research model

The "stimulus (S)–organism (O)–response (R)" framework, originating from the stimulus–response (S-R) behavior theory, was initially developed by Mehrabian and Russell (1974). In the classical SOR model, the stimulus (S) refers to what is "external to the individual" and can trigger an individual's interests or actions; the organism (O) refers to what is "internal to the individual" and represents the affective and cognitive intermediary between the

TABLE 1 Abbreviations and their definitions.

Abbreviation	Description	Abbreviation	Description
RBAP	Regional brand agricultural products	CB	Covariance-based
GP	Perceived government regulation of production support	SEM	Structural equation modeling
GC	Perceived government regulation of consumer protection	EFA	Exploratory factor analysis
CPQ	Consumers' perceived quality	CMB	Common method bias
CT	Consumers' trust	CR	Composite reliability
CPI	Consumers' purchase intention	AVE	Average variance extracted
HC	Health consciousness	VIF	Variance inflation factor
RCC	Rice–crayfish coculture	R^2	Determination coefficients
S	Stimulus	Q^2	Predictive relevance
O	Organism	f^2	Effect size
R	Response	CI	Confidence interval
PLS	Partial least squares		

external stimulus and the individual's final reactions (e.g., intentions or actions); and the response (R) represents the final outcome, which includes the behavioral intentions, reactions, or actions that ultimately result from the external stimulus and the internal processes (Tang et al., 2019). Overall, this model posits that the environmental element (S) can stimulate an individual's internal psychological cognition (O), resulting in the individual's behavioral responses (R).

A wealth of studies in the field of marketing have used the SOR model to analyze consumers' responses. Research in the information management discipline has demonstrated that social media images (stimulus) have a stimulating effect on consumers' engagement (organism), which influences consumers' electronic word-of-mouth (eWOM) (response) (Abbasi et al., 2023). In addition, in the field of tourism, Cheung et al. (2022) adopted the SOR framework to analyze how user-generated content (UGC) impacts tourists' behavioral responses, including impulse buying and future purchase intentions, via tourists' overall perceptions (including functional, relational, emotional, and entitative values) of the utility of activities on the tourism platform. Furthermore, in the field of agriculture, Yang et al. (2022) indicated that social media marketing (stimulus) influences new farmers' quality and safety knowledge levels (response) through their quality and safety cognition (organism). However, these studies either introduced only one mediator or overlooked the connections between the mediators (organisms).

As the intention to purchase RBAP is a psychological behavior, this study adopted the SOR model to analyze CPI. Specifically, in our paper, the stimulus (S) is perceived government regulation; the organism (O) is consumers' cognition or affection, comprising perceived quality and consumers' trust; and the response (R) is the CPI. After elaborating on the compatibility between these variables and the SOR framework, we present the posited cause–effect relationships (research hypotheses) between the variables below.

2.2 Perceived government regulation

Government regulation refers to a form of public policy whereby the government restricts or intervenes in microcosmic behaviors by virtue of its legal rights (Liu et al., 2021). According to Cunningham et al. (1982), regulation should be viewed as the public's perception of a method for controlling market behavior when competition is insufficient or certain segments of the population require protection. Accordingly, government regulation is important because it can protect consumers while also helping businesses thrive. For regional brand products that possess the characteristics of quasi-public goods, particularly those prone to market failure, government regulation is considered crucial (Klijn et al., 2012).

As the Chinese government plays a leading role in social governance and market supervision (Zhang et al., 2022), understanding the food consumption psychology of Chinese residents based on their perceptions can inform government policies and foster enterprise development in fast-growing markets (Chai et al., 2022). Since consumers often lack complete information about government regulations, indirect measures, such as their perceptions, may serve as their primary basis for comparing products. As explained by Wang et al. (2020), perceived government regulation differs from actual government regulation, relying more on perceptions than on objective facts. Wang et al. (2020) define perceived quality as "the quality of a product or service as perceived, with the potential for eventually influencing consumers' purchasing decisions," and the present study defines perceived government regulation as "the government regulation of an agricultural regional brand product as perceived by consumers, with the potential for eventually influencing consumers' purchasing intentions and decisions."

Much work has focused on the objective components of government regulation (Liu et al., 2021; Chai et al., 2022), but related research within the context of RBAPs is uncommon. Furthermore, existing research on subjective perceptions of government regulation is very limited. Lind and Arndt (2016) state that when citizens feel fairly treated in their encounters with government agencies, they are more likely to feel included in society, trust their government, and accept and comply with regulatory rules and decisions. It can therefore be inferred that when consumers feel they can purchase RBAPs fairly (i.e., pay more to purchase regional brand products of comparable quality), they are more likely to intend to accept these regional brand products and trust the brand. To this end, the present work attempts

to investigate and identify the detailed mechanism underlying the link between perceived government regulation and CPI.

Because the quality of regional brands' agricultural products is difficult to evaluate, perceived government regulation plays a more important role in purchase intention for these goods. However, insufficient attention has been paid to consumers' perceptions in this context. Furthermore, the internal mechanism by which perceived government regulation affects CPI remains unclear. With respect to the methods used to evaluate the effects of government regulation, some researchers adopt pure numerical simulation techniques to analyze the impact of simple indices of government regulation on CPI. This method has its limitations, however, because the parameters in the simulation model are challenging to determine. In this work, we will use first-hand survey data to identify the internal mechanism in detail.

2.3 Research hypotheses

2.3.1 S-O: the relationship among perceived government regulation, perceived quality and consumers' trust

Following the dimensions of government regulation proposed by Chai et al. (2022), whose study analyzed CPI in the context of organic food consumption, we establish GP and GC as the dimensions of perceived government regulation for our study. In our study, GP refers to government intervention in microcosmic behaviors during food production, such as supervising the use of drugs and feedstuffs, protecting the ecological environment, supporting scientific and technological research for agriculture, and providing agricultural subsidies (Chai et al., 2022). GC refers to government intervention in microcosmic behaviors related to food consumption, including inspection and testing, standardization and certification, information transparency, the enactment and enforcement of strict food safety laws, and publicity and education (Akber et al., 2022).

Teng et al. (2021) argued that, in the process of food production (GP), effective government regulation can prompt farmers to shift from non-green to green pesticide control behaviors, enhancing consumer perceptions of agricultural product quality. In addition, government support (a key aspect of GP) suggests that the government is prioritizing the development of a particular type of RBAP, leading consumers to perceive that RBAPs are of higher quality than less emphasized agricultural products. For example, Ma et al. (2021) stated that agricultural subsidies influence consumers' green consumption processes. Meanwhile, Xu et al. (2024) affirmed that environmental impact (another aspect of GP) is a primary concern affecting consumers' willingness to pay for sustainable aquatic food. Ko (2015) revealed that, in the process of food consumption (GC), product traceability systems (i.e., increasing information transparency) can be used to ensure quality as perceived by consumers. In addition, Zhang et al. (2019) proposed that authoritative food quality certifications serve as a fundamental form of communication between the government and the public, effectively reducing information costs and uncertainty regarding consumers' perceived quality.

Based on the findings mentioned above, we formulate the following hypotheses:

> *H1:* GP positively influences consumers' perceptions of quality.

> *H2:* GC positively influences consumers' perceptions of quality.

Government regulation also impacts CT. Ma et al. (2021) highlighted that, in the process of food production, supportive policies (e.g., agricultural subsidies) can alleviate public anxiety about food safety and enhance trust in agricultural products. In addition, Chai et al. (2022) noted that government regulation of food production (e.g., concerning the use of pesticides, environmental protection, and scientific and technological research) will increase consumers' confidence in green agricultural products. Yang et al. (2023) elucidated that quality certification methods such as ISO9001 effectively reduce information asymmetry by conveying accurate quality signals, consequently fostering CT and enabling food premiumization. Truong et al. (2022) also elaborated that food certification provides clear and visible information, improving CT in developing countries. Therefore, based on the above-cited literature, the following hypotheses are suggested:

> *H3:* GP positively influences consumers' trust.

> *H4:* GC positively influences consumers' trust.

2.3.2 O-R: the relationship among perceived quality, consumers' trust, and purchase intention

Perceived quality (PQ) is defined as the consumer's subjective and psychological perception of the quality of a product or service, which affects their purchase decisions (Chu et al., 2023). This study focuses on the PQ of Qianjiang crayfish, a regional brand of aqua-cultural food. Chu et al. (2023) concluded that the PQ of food, incorporating nutrition and sustainable ingredients, positively influences CPI. Furthermore, Teixeira et al. (2022) proposed that organic food quality and additional health benefits are the main factors influencing consumption intention in Portugal. Nevertheless, due to the low visibility of some regional brands, PQ negatively affected consumers' purchase intentions (Sun et al., 2022); however, this finding does not apply to high-visibility and successful regional brands. Ibrahim et al. (2023) argued that, from the perspective of retailers, who are also consumers buying products from producers, the PQ of rice, enhanced through standardization (one aspect of government regulation), mediates the influence on CPI. The relationship between CPQ and CPI is moderated by HC. According to Iqbal et al. (2021), HC is the extent to which an individual engages in interests, beliefs, attitudes, and perceptions toward healthy eating and living to achieve a high quality of life and maintain health. Gao and Jiang (2020) argued that the relationship between PQ and product premium is moderated by HC in the intelligent retail industry. Therefore, in accordance with the above discussions, we developed the following hypotheses:

> *H5:* Perceived quality has a positive effect on purchase intention.

> *H5a:* Perceived quality mediates the relationship between GP and purchase intention.

> *H5b:* Perceived quality mediates the relationship between GC and purchase intention.

> *H5c:* The link between CPQ and CPI is moderated by HC, such that the relationship is stronger at higher HC levels.

Notably, trust, as another organismic variable, is a key factor affecting CPI. Consumer trust, which has a direct impact on CPI, has been widely studied. For example, Kamboj et al. (2023) discovered that the level of consumers' green trust affects CPI for organic food. Garg et al. (2024) also verified that CT positively affects purchase intention for organic food. CT also plays a mediating role. For example, Liang et al. (2018) demonstrated that satisfaction impacts repurchase intention, mediated by CT. Lin et al. (2021) found that improved information transparency (e.g., food traceability) increases CT, leading to greater CPI. Truong et al. (2022) also stated that food certification addressing consumers' concerns about food quality and safety could increase CT and ultimately enhance consumers' purchase decisions. Based on this review, we developed the following hypotheses:

> *H6:* Consumer trust has a positive effect on purchase intention.
>
> *H6a:* Consumer trust has a positive effect on the relationship between GP and purchase intention.
>
> *H6b:* Consumers' trust has a positive effect on the relationship between GC and purchase intention.

Finally, in addition to the associations between stimulus (GP and GC) and organism (CPQ and CT), there is an influential relationship between the two mediators. For example, Wang et al. (2020) observed that CT is associated with the degree to which the quality of a product is perceived as trustworthy or stable. Nie et al. (2020) emphasized government regulation regarding the quality grading system, demonstrating a link between the quality of agricultural products and improved CT. In accordance with the above research, we formed the following hypothesis:

> *H7:* Consumers' perceived quality positively influences consumers' trust.

2.3.3 S-R: the relationship between perceived government regulation and purchase intention

Although existing studies on RBAPs, which possess the characteristics of credence goods, are limited, similar research has been conducted. Studies on the relationship between GP and CPI are constrained by the lack of a clear distinction between GP and GC. However, we can infer GP from the general content of government regulation. For example, Yang et al. (2023) and Zhang et al. (2023) aimed to analyze all green products subject to government regulations, including government subsidies, green product certification, publicity, and education, and found that these factors positively impact residents' green consumption. In addition, Chai et al. (2022) posited that a high level of satisfaction with GP would motivate CPI. Although research on the relationship between GC and CPI is limited concerning overall GC, some studies have verified the relationship between GC and CPI from different perspectives. For example, Yang et al. (2022) stressed that both green product certification and consumption subsidies can effectively increase green consumption intention. Yuan et al. (2020) noted that the food traceability system, as a form of government regulation, has a positive influence on CPI. In addition, in 2020, the Israeli government enacted new regulations mandating that products include red warning front-of-package labels (FOPL) and voluntary green FOPL. In response to the new regulation, Bromberg et al. (2022) interviewed 1,042 Israeli respondents and reported that 81.1% of them felt that their food buying habits had changed due to the new labels, leading them to purchase more green-labeled and fewer red-labeled products.

In accordance with the above discussion, the following hypotheses were formulated:

> *H8:* GP has a positive influence on purchase intention.
>
> *H9:* GC has a positive influence on purchase intention.

The main hypotheses formulated based on the literature review are summarized and presented as H1–H9. Figure 1 demonstrates the proposed conceptual model. It is emphasized here that perceived government regulation encompasses two dimensions—GP and GC. Figure 1 also presents all the variables associated with the SOR theory. "S" represents perceived government regulation (GP and GC); "O" denotes the psychological changes in consumers (CPQ and CT); and "R" represents CPI.

3 Research methodology

3.1 An overview of Qianjiang crayfish

The crayfish (*Procambarus clarkii*), native to Louisiana in America and northeastern Mexico, was introduced to China from Japan as a farmed aquatic product in 1930 (Oficialdegui et al., 2020; Xue et al., 2023). With its high levels of protein, trace elements, B3, vitamin E, low fat content, and unique flavor, the crayfish (*Procambarus clarkii*) is one of the most popular aquatic food products in China (Farrag et al., 2022). China is the largest producer of crayfish, with a yield of 2.63 million tons in 2021. As the Chinese economy develops, consumers have a greater demand for high-protein meat, such as crayfish (Li et al., 2023). In addition, the farmers of Qianjiang, located in Hubei province, were the first to adopt the ecological culture mode of rice–crayfish coculture (RCC) (Wang et al., 2018). This culture mode has made the regional brand of Qianjiang crayfish successful, valued at approximately 35 billion CNY in 2023, and it ranks first among aquatic products. Furthermore, the regional brand of Qianjiang crayfish is a typical representation of a government-led development model; its success could not have been achieved without government regulation. Therefore, Qianjiang crayfish was chosen for this study as a representative of other regional brand developments.

According to the field survey, 90% of the crayfish cultivation in Qianjiang County is represented by RCC. RCC refers to crayfish cultivated in rice fields, where crayfish and rice coexist symbiotically, representing a revolution in modern agriculture encouraged by the local government (Sun et al., 2022). In RCC, crayfish consume rice straw, mitigating environmental pollution caused by straw burning, and prey on pests, reducing the use of pesticides. In turn, crayfish excreta fertilizes the soil, decreasing the consumption of chemical fertilizers by 20–40% compared with rice monoculture (Hu et al., 2021). Meanwhile, the ecological growth of rice promotes water quality, providing ideal shelter for the crayfish. Thus, this integrated cultivation model represents an ecological cycle that is mutually beneficial for both crayfish and rice, improving crayfish production levels and achieving environmental sustainability (Xue et al., 2023).

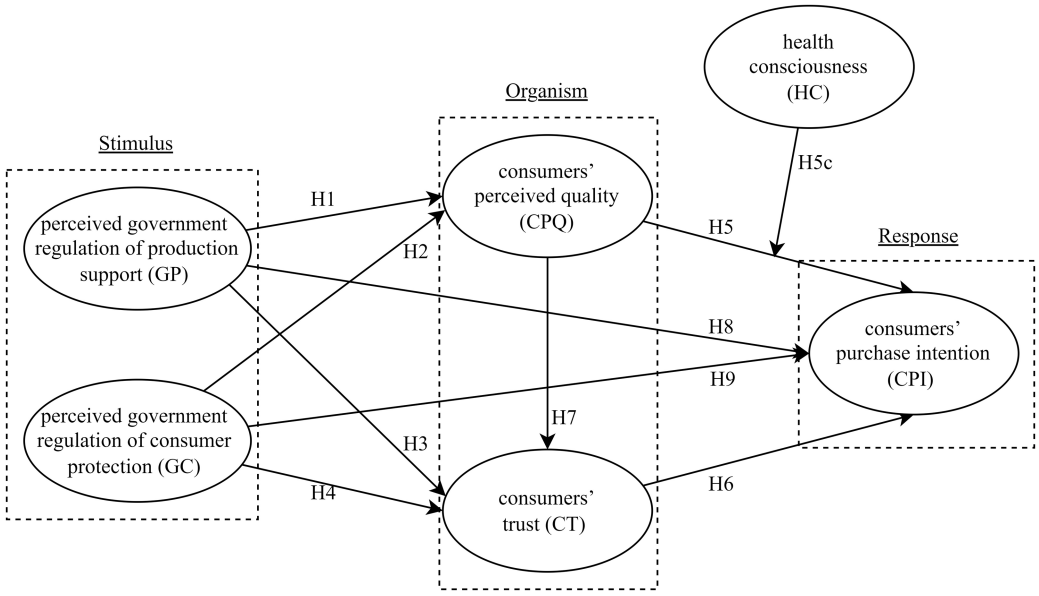

FIGURE 1
The proposed conceptual model.

Furthermore, the industrial chain development of the regional Qianjiang crayfish brand encompasses breeding, processing, logistics, packaging, catering, and more. The products of the regional Qianjiang crayfish brand include live crayfish, prefabricated food, crayfish seasoning, and crayfish cosmetics, among others.

3.2 Measurement of the constructs/ variables

The measurement scales for all constructs were adapted from previously validated studies and modified to fit the Chinese context. This adaptation was informed by two focus group discussions. All items for the constructs were measured using a seven-point Likert scale ranging from 1 = strongly disagree to 7 = strongly agree. The questionnaire, originally in English, was translated into Chinese by a bilingual researcher. The survey included measures of GP, GC, CPQ, CT, and CPI, along with a series of demographic variables, as shown in Table 2. We measured GP and GC using the five items presented in the paper by Chai et al. (2022). We adapted the five CPQ items from Liu et al. (2021), Sun et al. (2022), and Izquierdo-Yusta et al. (2022). We adapted the CT items from various sources (Kamboj et al., 2023; Sun et al., 2022; Liang et al., 2018). The CPI consisted of four items drawn from multiple studies (Chai et al., 2022; Yuan et al., 2020; Sun et al., 2022).

3.3 Questionnaire design

Before conducting the formal survey, we performed a pre-test and a pilot test of the designed questionnaire, using Qianjiang crayfish as an example. Both procedures were conducted by researchers, as noted in Liu et al. (2022). (1) For the pre-test, five professors and seven PhD students working in the field of agriculture and with experience consuming products from the regional Qianjiang crayfish brand were randomly invited to participate in an electronic survey to explore the hypotheses stated above. All items in the survey were translated and backtranslated into Chinese. To ensure the accuracy of the translation, we paid close attention to semantics, criteria, content, and conceptual equivalence between the two languages. Subsequently, we reworded and slightly revised the survey to improve its logical structure, excluding any repetitions, omissions, and easily misunderstood or ambiguous expressions, to ensure that respondents could understand the content and complete the survey as accurately as possible. The final questionnaire is presented in Table 2. (2) For the pilot test, we collected 53 valid responses from consumers in Wuhan city by asking them to complete an updated online survey anonymously. This pilot test was essential because, despite using established scales from peer-reviewed publications, subtle contextual differences may still exist in the scale items. To this end, we measured internal consistency and reliability by introducing a new label construct and calculating Cronbach's α before and after its inclusion in the model. We conducted this pilot test to verify that all items were contextually appropriate and to ensure a robust analysis. Using the reliability coefficient criteria suggested by Nunnally and Bernstein (1994), the Cronbach's α during our pilot test exceeded 0.7, confirming the survey's strong internal consistency and stability.

3.4 Data collection

After the questionnaire design phase, the formal survey was administered online in July 2024 through the professional survey platform Sojump. To guarantee the quality of the survey data, we chose Sojump because it is one of the largest online survey networks and a credible, trustworthy service (Xu and Zhao, 2023). To explore our research questions, we employed both the PLS-SEM method and purposeful sampling (Sharma et al., 2022). Purposeful sampling

TABLE 2 Construct items and literature sources.

Constructs	Items	Source(s)
GP	(1) The relevant government departments supervise the use of drugs for crayfish and rice production (GP1).	Chai et al. (2022)
	(2) The relevant government departments supervise the use of feedstuffs for crayfish and rice production (GP2).	
	(3) The relevant government departments protect the ecological environment for the growth of Qianjiang crayfish (GP3).	
	(4) The relevant government departments support scientific and technological research and development for Qianjiang crayfish industry (GP4).	
	(5) The relevant government departments provide agricultural subsidies or incentives for Qianjiang crayfish (GP5).	
GC	(1) There are adequate inspection and testing, as well as certification for the Qianjiang crayfish-related foods (e.g., pesticides, fertilizers, food additives, and sanitary conditions) (GC1).	Chai et al. (2022)
	(2) There are standardizations for Qianjiang crayfish-related foods (GC2).	
	(3) The information is transparent for the Qianjiang crayfish-related foods (GC3).	
	(4) There are strict food safety laws enacted and enforced for the Qianjiang crayfish-related foods (GC4).	
	(5) There are publicity and education for the Qianjiang crayfish-related foods (GC5).	
CPQ	(1) The Qianjiang crayfish-related foods have high nutrition (CPQ1).	Liu et al. (2021), Sun et al. (2022), and Izquierdo-Yusta et al. (2022)
	(2) The Qianjiang crayfish-related foods taste good (CPQ2).	
	(3) The Qianjiang crayfish-related foods are natural, green and ecological (CPQ3).	
	(4) The regional brand of Qianjiang crayfish can ensure public health and safety (CPQ4).	
	(5) The regional brand products of Qianjiang crayfish have reasonable price-quality (CPQ5).	
CT	(1) The regional brand products of Qianjiang crayfish are reliable (CT1).	Kamboj et al. (2023), Sun et al. (2022), and Liang et al. (2018)
	(2) The promise for the regional brand products of Qianjiang crayfish is true to consumers (CT2).	
	(3) I think the regional brand products of Qianjiang crayfish put emphasis on consumers' demand (CT3).	
	(4) I think the regional brand of Qianjiang crayfish has wish and ability on protecting consumers' benefits (CT4).	
HC	(1) Eating crayfish which is rich in protein is better to make me keep health, compared with pork, beef, and chicken (HC1).	Iqbal et al. (2021), and Gao and Jiang (2020)
	(2) I am very alert to my health variation (HC2).	
	(3) I tried all my best and all kinds of ways to keep healthy (HC3).	
	(4) I would like to pay some time to consider my health condition (HC4).	
	(5) I will pay attention to the healthy food information from short-videos in self-media such as Douyin, Xiaohongshu, or Wechat (HC5).	
CPI	(1) GP promote my willingness to buy the Qianjiang crayfish-related foods (CPI1).	Chai et al. (2022), Yuan et al. (2020), and Sun et al. (2022)
	(2) GC promote my willingness to buy the Qianjiang crayfish-related foods (CPI2)	
	(3) I would recommend the Qianjiang crayfish-related foods to relatives and friends (CPI3)	
	(4) When there is a different in price compared with crayfish of ordinary brands, I am willing to give priority to the regional brand products of Qianjiang crayfish (CPI4).	

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involves selecting the most suitable samples based on the research aims and objectives to facilitate more relevant suggestions and solutions. We chose consumers from Wuhan city for the following reasons: Wuhan ranks first in per capita crayfish spending, with consumers spending an average of 303.0 CNY and consuming 3 billion crayfish annually. Therefore, consumers from Wuhan city are representative of the crayfish market and suitable for our research needs. In addition, to ensure consumers can make accurate judgments, the questionnaire included one screening question: "Have you heard of the regional brand of Qianjiang crayfish?" The Sojump system was set up to prevent consumers who answered "No" from answering subsequent items, and their survey records were excluded from the analysis. As a result, the valid sample comprises only consumers who selected "Yes."

Random sampling was conducted, and 550 questionnaires (both "Yes" and "No") were distributed in August 2024. Consequently, 331 questionnaires (for "Yes") were collected, with 289 valid responses extracted after excluding those with missing values or unengaged or disingenuous responses (resulting in a valid response rate of 87.31%). There were 289 respondents for all 28 items shown in Table 2, satisfying 5–10 times the number of items on the instrumental scale (Hair et al., 2014; Ringle et al., 2020). In addition, Wixom and Watson (2001) confirmed that PLS-SEM is not sensitive to sample size, with a minimum sample size of 30. Therefore, the sample size of 289 is adequate for this research. The question "Type of consumption of Qianjiang crayfish" was a multiple-choice question; all others were single-choice questions. Table 3 depicts the demographic characteristics of the respondents, showing that there were more female (52.25%) than male (47.75%) consumers. Most consumers were aged between 31 and 40 (61.59%), followed by those aged 21–30 (29.07%). A majority of the respondents held a university degree (68.17%). Household income was concentrated between 20,000 and 30,000 CNY (33.22%). Most consumers preferred to consume live crayfish (93.77%), followed by consuming them in restaurants (84.08%). In addition, because families with children are concerned about nutrition, the questionnaire included a question about children, with results indicating that 85.47% of respondents had children under the age of 12.

4 Data analysis and results

4.1 Data analysis method

Structural equation modeling (SEM), which combines factor analysis and multiple regression, is one of the most popular methods

TABLE 3 Demographic characteristics of the consumers from Wuhan city.

Classification	Items	Frequency	Percentage
Sex	Female	151	52.25%
	Male	138	47.75%
Age (years)	Under 21	5	1.738%
	21–30	84	29.07%
	31–40	178	61.59%
	41–50	14	4.84%
	Older than 50	8	2.77%
Education	Junior school and below	6	2.08%
	High school	27	9.34%
	College graduate	35	12.11%
	University graduate	197	68.17%
	Postgraduate and above	24	8.30%
Household income (CNY)	Under 10,000	11	3.81%
	10,001–15,000	53	18.34%
	15,001–20,000	83	28.72%
	20,000–30,000	96	33.22%
	30,000–40,000	39	13.49%
	More than 40,000	7	2.42%
Type of consuming Qianjiang crayfish (multiple choices)	Live crayfish	271	93.77%
	Frozen crayfish	132	45.67%
	Restaurant crayfish	243	84.08%
	Prefabricated food of crayfish	105	36.33%
	Crayfish seasoning	136	47.06%
Numbers of children younger than 12 years	0	42	14.53%
	1	184	63.67%
	≧2	63	21.80%

for effectively investigating the causal relationships between latent variables and survey data. SEM consists of a measurement model and a structural model. In the measurement model, the relationship between the latent variables and a series of observable variables is specified, while in the structural model, the relationships among latent variables/constructs are hypothesized and denoted by several arrows (as shown in Figure 1). Based on different underlying statistical methods and software algorithms for estimating the path coefficients for each arrow, either PLS-SEM or covariance-based SEM (CB-SEM) can be utilized for different studies (Hair et al., 2011).

In this work, we adopted PLS-SEM to evaluate the hypotheses summarized in the conceptual model because of its ability and strength in handling complex structural relationships among all the latent variables (Chen et al., 2020). The PLS-SEM method has been widely used in research on food (Izquierdo-Yusta et al., 2022), regional brands (Charton-Vachet and Lombart, 2018), and government regulation (Shou et al., 2023). All the variables in the proposed model are latent variables, and the model is complex in that it includes causal relationships between two mediators. PLS-SEM can address the causal relationships among latent variables and complex models comprising mediation analysis (Hair et al., 2016). Additionally, PLS-SEM requires neither large samples nor normally distributed data to perform well (Ringle et al., 2020). Thus, PLS-SEM is appropriate for our data analysis, and we used the software SmartPLS 3.0 to perform the statistical analysis to examine the significance level of each path and the mediating effects based on 5,000 bootstraps.

4.2 Common method bias/variance test

Common method bias (CMB) can be an issue when the independent or dependent variables are measured using the same response method from a single respondent. To assess the degree of CMB, we conducted two statistical analyses. Initially, we performed Harman's single factor test (Podsakoff et al., 2003), loading all items into an exploratory factor analysis (EFA) to examine the results of the unrotated factor analysis and determine the minimum number of factors necessary to explain the variable's variance. If a factor has very large explanatory power or only one factor is extracted in the analysis, it indicates serious CMB. In our study, three factors were extracted; the first factor, which accounted for the largest variance, explained 38.67% of the total variance but did not reach the 50% benchmark level set by Podsakoff et al. (2003). Thus, it was confirmed that there was no obvious CMB. In addition, we adopted the marker variable method in Podsakoff et al. (2003) to test for CMB. Specifically, we supplemented the conceptual model with a marker variable as a predictor of the model's endogenous construct. The values of R^2 for the endogenous constructs before the marker variable was added were CPQ = 0.546; CT = 0.676; CPI = 0.651. After the marker variable was added, they were CPQ = 0.554; CT = 0.687; CPI = 0.662, indicating no variations. This result implies that there is no substantial CMB (Izquierdo-Yusta et al., 2022). Therefore, CMB was not a major concern in our research.

4.3 The measurement model

Before analyzing the structural model using PLS, we evaluated the validity of the measuring scale as presented in Table 2. Since all the constructs of GP, GC, CPQ, CT, HC, and CPI are reflective, we calculated the factor loading, Cronbach's α, composite reliability (CR), and average variance extracted (AVE) to assess the measurement scale and check whether they reliably reflect the model's convergent validity. In addition, we checked for possible collinearity problems by calculating the variance inflation factor (VIF) to determine whether it exists (Henseler et al., 2009).

4.3.1 Reliability test

In our study, factor loading, Cronbach's α, and composite reliability (CR) were used to test reliability. Table 4 presents the results, showing that most factor loadings of the remaining factors exceeded the cut-off value of 0.7 (Chin, 1998), except for GP1, GP5, CPQ3, CT2, HC1, HC2, CPI2, and CPI4, which were close to 0.7. As Hair et al. (2010) recommended a lower threshold of 0.6, we retained GP1, GP5, CPQ3, CT2, HC1, HC2, CPI2, and CPI4 (all above 0.6). Because the factor loadings of GP4, GC5, and HC4 were below 0.6, they were excluded. Thus, in the following analysis, we only tested the remaining items presented in Table 4. Furthermore, all factor loadings shown in Table 4 were statistically significant, indicating that the six latent variables (GP, GC, CPQ, CT, HC, and CPI) ideally represent each item. Cronbach's α values denote the internal consistency of the questionnaire. All Cronbach's α values of the remaining items in Table 4 exceeded the recommended threshold of 0.6 (Hair et al., 2014). We also measured internal consistency reliability using CR. The CR values of the six latent variables were higher than the standard of 0.7 (Fornell and Larcker, 1981), indicating that the composite reliability was good. In summary, the results demonstrated that the indicators had sufficient reliability.

4.3.2 Validity test

Both content validity and construct validity were tested. To ensure the content validity of the scales used in this study, we adopted established scales from published research and adjusted them by consulting experts in related fields. Construct validity can be accessed via convergence and discriminant validity. Table 4 shows that the AVE values ranged between 0.500 and 0.586, meeting the scholarly recommendation criteria of greater than 0.5, indicating good convergence validity (Fornell and Larcker, 1981).

We assessed the discriminant validity of the measurement model based on the widely adopted criterion established by Fornell and Larcker (1981), Izquierdo-Yusta et al. (2022), and Choi et al. (2018). Table 5 presents the detailed results of the discriminant validity evaluation. The correlations of each item are compared to its intended construct (where the item loading values are bolded in Table 5) and to all other constructs (these correlation values are known as cross-loadings). According to Chin (1998), for each particular construct column, the item loadings are all higher than the cross-loadings. In summary, the results demonstrate that the construct validity of the scale is very good.

4.4 Model fit analysis

Before presenting the results for hypothesis testing, it is important to present the VIF values to ascertain the presence of collinearity in the proposed research model. After calculation, the VIF values of the structural model test ranged from 1.189 to 1.678; these results are

TABLE 4 Assessment of the six constructs (GP, GC, CPQ, CT, HC, and CPI).

Constructs	Items	Loading	Cronbach's α	CR	AVE
GP	GP1	0.685***	0.666	0.800	0.500
	GP2	0.764***			
	GP3	0.724***			
	GP5	0.651***			
GC	GC1	0.777***	0.764	0.850	0.586
	GC2	0.740***			
	GC3	0.749***			
	GC4	0.793***			
CPQ	CPQ1	0.709***	0.767	0.843	0.518
	CPQ2	0.723***			
	CPQ3	0.693***			
	CPQ4	0.761***			
	CPQ5	0.710***			
CT	CT1	0.750***	0.751	0.843	0.573
	CT2	0.692***			
	CT3	0.780***			
	CT4	0.802***			
HC	HC1	0.677***	0.608	0.771	0.532
	HC2	0.669***			
	HC3	0.830***			
CPI	CPI1	0.710***	0.667	0.800	0.501
	CPI2	0.654***			
	CPI3	0.776***			
	CPI4	0.686***			

Number of bootstrap samples = 5,000; ***$p < 0.001$.

below the recommended threshold value of 3.3 (Petter et al., 2007). Therefore, collinearity is not an issue in this study.

We then calculated several parameters to further evaluate the model based on the survey data and PLS 3.0 software. To this end, the determination coefficients R^2 (Chin, 1998), effect size f^2 (Henseler et al., 2009; Hair et al., 2012), and Stone–Geisser test Q^2 (Geisser, 1974; Stone, 1974), which are suitable for endogenous constructs (including CPQ, CT, and CPI in this work), were calculated. After evaluation, the R^2 values of the CPQ and CPI were 0.546 and 0.676, respectively. These values are all above 0.33, indicating moderate explanatory power (Chin, 1998). The R^2 value of the CT was 0.676, exceeding the scholarly recommendation criterion of greater than 0.67 (Chin, 1998) and indicating strong explanatory power. Furthermore, the f^2 values of CPQ and CT were 0.351 and 0.473, respectively, reflecting the changes in R^2 in relation to the unexplained variance of the endogenous variable, signaling a large effect size (Cohen, 1988). The f^2 value of CPI was 0.204, indicating a medium effect size (Cohen, 1988). In addition, we obtained the Q^2 using blindfolding measures to assess the predictive relevance of the latent variables for the structural model (Matzler et al., 2016). The Q^2 values of the CPQ, CPI, and CT are 0.270, 0.308, and 0.315, respectively, all greater than 0, thus ensuring the model's predictive relevance (Chin, 1998; Table 6).

4.5 Structural model and hypotheses testing

Having evaluated all the measurement instruments, the next step was to assess the structural model for estimating all the hypotheses proposed in Figure 1. If the path coefficients are significant according to calculations in the software, the causal relationship and its intensity between the variables are confirmed. We carried out the estimation by resampling the data, where the estimated values were superior to the commonly used approximate limit values (Purvis et al., 2001). Hence, we utilized this resampling technique to determine the significance of the relationship between latent variables.

4.5.1 Path analysis of the proposed hypotheses

Table 7 summarizes the hypotheses tested in the study. First, the estimated standardized coefficients of GP and GC on CPQ were 0.429 and 0.370, which were significant at the 0.1% level, indicating that H1 and H2 were supported, and the influence of GP on CPQ was stronger than that of GC. This may be due to the widespread access to government publicity regarding supportive policies for production in the rural revitalization of China. Compared with ordinary agricultural products, the local government places greater emphasis on the construction of regional brands. For example, the central and regional

TABLE 5 Discriminant validity analyses of the six constructs, outer model loadings, and cross-loadings.

Items \ Constructs	GP	GC	CPQ	CT	CPI	HC
GP1	**0.685**	0.478	0.396	0.454	0.459	0.337
GP2	**0.764**	0.587	0.512	0.477	0.486	0.334
GP3	**0.724**	0.519	0.554	0.529	0.563	0.419
GP5	**0.651**	0.413	0.477	0.456	0.402	0.314
GC1	0.650	**0.777**	0.537	0.555	0.566	0.473
GC2	0.503	**0.740**	0.540	0.555	0.511	0.375
GC3	0.477	**0.749**	0.469	0.468	0.462	0.412
GC4	0.528	**0.793**	0.509	0.564	0.469	0.441
CPQ1	0.469	0.516	**0.709**	0.597	0.507	0.483
CPQ2	0.484	0.406	**0.723**	0.586	0.579	0.296
CPQ3	0.481	0.474	**0.693**	0.505	0.482	0.445
CPQ4	0.606	0.630	**0.761**	0.590	0.576	0.402
CPQ5	0.430	0.375	**0.710**	0.524	0.502	0.312
CT1	0.442	0.502	0.554	**0.750**	0.560	0.458
CT2	0.490	0.549	0.560	**0.692**	0.486	0.428
CT3	0.546	0.510	0.648	**0.780**	0.572	0.441
CT4	0.575	0.568	0.599	**0.802**	0.600	0.464
CPI1	0.462	0.429	0.480	0.526	**0.710**	0.464
CPI2	0.462	0.454	0.491	0.514	**0.654**	0.321
CPI3	0.528	0.543	0.601	0.597	**0.776**	0.466
CPI4	0.473	0.430	0.508	0.429	**0.686**	0.349
HC1	0.319	0.377	0.345	0.362	0.293	**0.677**
HC2	0.327	0.314	0.337	0.438	0.336	**0.669**
HC3	0.430	0.498	0.472	0.485	0.549	**0.830**

Bolded values are loadings and others are cross-loadings.

TABLE 6 Model fit.

Items	R^2	Q^2 (=1-SSE/SSO)	f^2
CPQ	0.546	0.270	0.351
CPI	0.651	0.308	0.204
CT	0.676	0.374	0.473

governments support the infrastructure of Qianjiang by constructing a high-speed railway station to attract consumers to experience crayfish, which is not the case for other products. On the other hand, due to the publicity surrounding the government's active participation in developing regional brands via media such as CCTV, local broadcast media, or popular online platforms like Tencent, consumers are unconsciously exposed to this information. GC also exerted a significant positive influence on CPQ. Because information released by local governments can signal the quality of regional brands—such as by offering and supervising authentic regional brand logos, setting planting and production standards for RBAPs, and providing standards for testing, inspection, and certification for RBAPs—consumers are more inclined to perceive the quality of RBAPs.

Second, the standardized estimated coefficients of GP and GC on CT were 0.149 and 0.257, which were significant at the 5 and 0.1% levels, respectively, indicating that H3 and H4 were valid. However, unlike the results regarding the impact of GP and GC on CPQ, the degree of influence of GC on CT was greater than that of GP. This may be because the consumption process is closely linked to consumers, making supervision over consumption more likely to lead to the production of trust in RBAPs. In addition, an interesting result was that the mediator CPQ exerted a positive and significant impact on the other mediator CT, indicating that H7 was valid, which reflects the importance of CPQ in shaping CT.

Third, the standardized estimated coefficients of CPQ and CT on CPI were 0.289 and 0.239, which were significant at the 0.1 and 1% levels, respectively, indicating that H5 and H6 were supported. The higher the CPQ and CT, the greater the satisfaction of consumers that their needs were met and that they had obtained benefits during the process of consuming RBAPs. Furthermore, the standardized coefficient of CPQ is greater than that of CT, indicating that

TABLE 7 Path coefficients.

Hypothesis	Path coefficient	t-value	95%Bias-corrected CIs	Results
Direct effects				
H1: GP → CPQ	0.429***	6.776	(0.297,0.550)	Supported
H2: GC → CPQ	0.370***	6.166	(0.253,0.488)	Supported
H3: GP → CT	0.149*	2.465	(0.034,0.270)	Supported
H4: GC → CT	0.257***	3.766	(0.122,0.392)	Supported
H5: CPQ → CPI	0.289***	4.426	(0.157,0.412)	Supported
H6: CT → CPI	0.239**	3.125	(0.085,0.387)	Supported
H7: CPQ → CT	0.505***	8.758	(0.391,0.617)	Supported
H8: GP → CPI	0.191**	2.828	(0.070,0.340)	Supported
H9: GC → CPI	0.089	1.333	(−0.032,0.230)	Not supported
Moderating effect				
H5c: CPQ × HC → CPI	−0.006	0.100	(−0.100,0.145)	Not Supported

Number of bootstrap samples = 5,000. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

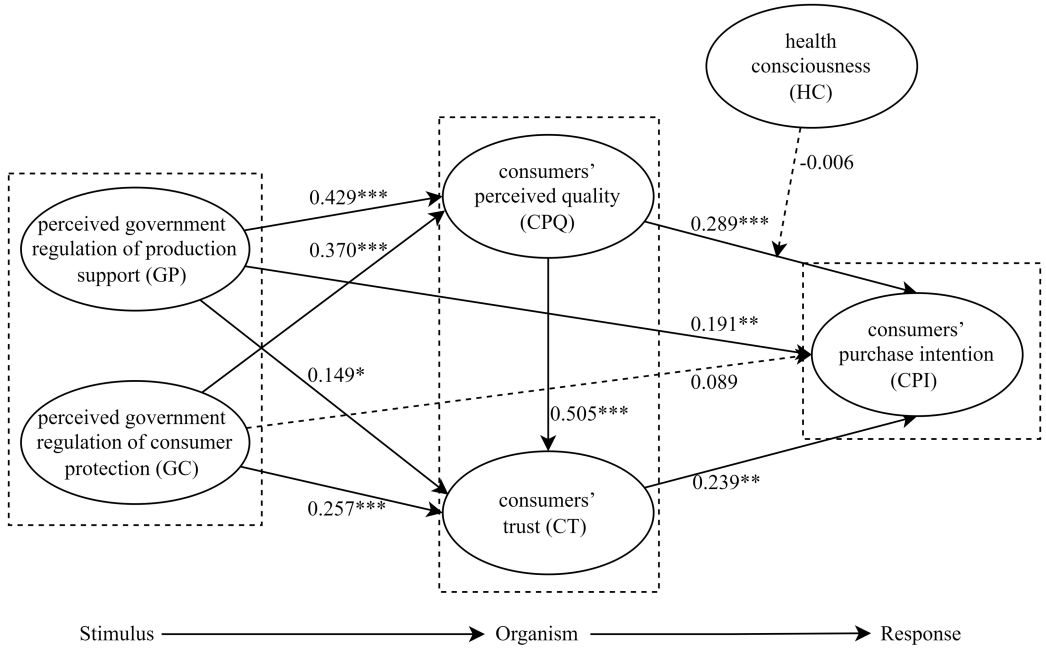

FIGURE 2
Results of SEM-PLS. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. Solid lines denote that the hypothesis is validated; dashed lines denote that the hypothesis is not validated.

consumers place more emphasis on the actual utility of RBAPs, such as high nutrition, better taste, good health, and reasonable price quality. On the other hand, the standardized estimated coefficient of GP was 0.191, which was significant at the 1% level, indicating that H8 was accepted. Due to inertia psychology, consumers perceived significant investment and effort from the government into RBAPs and believed that local governments would value their long-accumulated reputation and guarantee the quality of RBAPs, thus fostering a willingness to consume. Nonetheless, the effects of GC on CPI did not pass the significance test, indicating that H9 was not valid. This may be because consumers, despite perceiving certification from the government on food, may doubt its authenticity, leading to CPI still not being activated.

To summarize, based on the above analysis, as shown in Figure 2, all direct effects of H1-H8 were supported, with only H9 unsupported.

4.5.2 Testing the mediation and moderation effects

In this study, we used SmartPLS 3.0 software to verify the effects of CPQ and CT as concurrent mediating variables using bootstrapping (5,000 resamples). The results are presented in Table 8. The indirect effects of CPQ in the relationships between GP and CPI ($t = 3.886$)

TABLE 8 Analysis results of the mediating effects.

Indirect effect path	Indirect effect value	*t*-value	Bias-corrected 95% CI	Results
H5a: GP → CPQ → CPI	0.124	3.886	(0.069,0.194)	Supported
H5b: GC → CPQ → CPI	0.107	3.507	(0.054,0.176)	Supported
H6a: GP → CT → CPI	0.036	1.988	(0.008,0.086)	Supported
H6b: GC → CT → CPI	0.061	2.350	(0.021,0.126)	Supported

and between GC and CPI ($t = 3.507$) were significant, supporting H5a and H5b. Similarly, the indirect effects of CT in the relationships between GP and CPI ($t = 1.961$) and between GC and CPI ($t = 2.350$) were significant, supporting H6a and H6b. Furthermore, we adopted the 95% confidence interval (CI) of the specific mediating effects obtained with 5,000 bootstrapping resamples to investigate the mediating effects, and none of the ranges included 0, indicating that all indirect effects were significant. Hence, the mediation effects of CPQ and CT were confirmed.

As the direct effects of GP on CPI (H8) are supported, CPQ and CT play partially intermediary roles between GP and CPI. The indirect effect of CPQ accounted for 30.85% of the total effect, while the indirect effect of CT accounted for 8.96% of the total effect. However, as the direct effect of GC on CPI (H9) was not supported, CPQ and CT play a fully intermediary role between GC and CPI.

An additional test was performed to assess whether HC moderates the relationship between the mediated variables, CPQ and CPI. According to Osei-Frimpong et al. (2020), when testing the interactive effects, an interactive term is generated by multiplying the independent variable (i.e., CPQ) and the moderating variable (i.e., HC). As shown in Table 7, the moderating impact of HC on the relationship between CPQ and CPI was insignificant ($\beta = -0.006$, t-value = 0.100 < 1.96; the bias-corrected 95% CI including 0). Because the estimation of the interaction term is not significant, H5c was not supported. Accordingly, the influence of CPQ and CPI did not vary significantly across different HC levels.

5 Conclusion and implications

We presented, investigated, and validated scales regarding perceived government regulation. This represents a new construct worthy of attention for the quality development of RBAP. The proposed research model is based on the well-known SOR theory and adapted to fit novel scenarios in the context of agricultural regional brands. The survey questionnaire was designed to study consumer purchase intentions for RBAP, using Qianjiang crayfish—a typical agricultural public brand—as an example. This study established the link between macro-government behaviors (government regulation) and micro-individual intentions (CPI), aiming to open the "black box" of the influence paths based on subjective perception.

5.1 Conclusion and discussion

Enhancing consumers' purchase intention for RBAP is important for promoting a high-quality agricultural industry and the development of sustainable food. To this end, based on survey data from consumers of a typical successful RBAP, Qianjiang crayfish, in China, the study empirically analyzed the influence of perceived government regulation on CPI, tested the mediating roles of both CPQ and CT in the relationship between perceived government regulation and CPI, and further explored the relationship between the two mediators, CPQ and CT. This study yields interesting findings—except for hypotheses H9 and H5c, all the other proposed research hypotheses are accepted in the proposed conceptual model. A detailed conclusion and discussion are presented as follows.

First, aside from the unsupported effect of GC on CPI, all other direct effects are supported, with CPQ being the most influential independent variable. Among all the antecedent variables of CPI, CPQ exerts the strongest influence. This indicates that, in the context of RBAPs, perceived quality is the most essential factor in determining purchase intention in China. This finding aligns with García-Gallego et al. (2015), who demonstrated that perceived quality was also the most influential factor in determining purchase intention in their study of regional wines in Spain. However, in contrast, Sun et al. (2022) indicated that the perceived quality of RBAPs had no effect on purchase intention. The authors attributed this discrepancy to the low visibility of some RBAPs. In addition, potential reasons for the finding that GC had no effect on CPI may include (1) insufficient regulation by government agencies with regard to aspects of GC, resulting in low consumer awareness; (2) despite the government's substantial GC-related efforts, insufficient publicity has led to poor information dissemination. Consequently, consumers predominantly obtain information regarding GP through channels like newspapers, short videos, news media, or peer recommendations; (3) consumers suspect there may be certain vested interests between government agencies and regional brand enterprises (as explained in the regulatory capture theory) instead of a genuine commitment to protecting consumers' interests, which negatively affects consumer perception, thereby counteracting the influence of GC on CPI. It is possible that one or several of the aforementioned reasons jointly contributed to the failure to support H9.

Second, the mediating roles of both CPQ and CT in the association between perceived government regulation and CPI are supported. Meanwhile, CPQ and CT play partial intermediary roles between GP and CPI, while both play full intermediary roles between GC and CPI. Perceived quality demonstrated the strongest mediating effect between GP and CPI, further validating the significance of CPQ. Our conclusion is partially consistent with that of Ibrahim et al. (2023). Specifically, CPQ and CPI are mediating and outcome variables in the work of Ibrahim et al. (2023); however, their antecedent variable was standardization (one aspect of government regulations), which differs from our antecedent variable (perceived government regulations). Meanwhile, the research object of Ibrahim et al. (2023) was not RBAPs but general agricultural products. In addition, although the mediating effect of CT was not the strongest, it remained statistically significant, implying that local governments and market entities can still effectively promote purchase intention by enhancing CT. Additionally, our conclusion is also partially consistent with

that of Truong et al. (2022). The mediating and outcome variables in Truong et al. (2022) work were also trust and CPI, while the antecedent variable was food certification (one aspect of government regulations), which differed from our antecedent variable. Therefore, our research presents a novel explanation of the mechanism by which perceived government regulation impacts CPI in the context of RBAPs.

Third, contrary to our expectations and previous results, the moderating effect of HC on the path from CPQ to CPI was insignificant. This indicates that HC does not moderate the strength of the link between CPQ and CPI, which contradicts previous studies (Devi et al., 2023). We further interviewed some respondents to attempt to explain this phenomenon. This revealed that they placed greater emphasis on the social dimensions of crayfish consumption, particularly its ability to facilitate social interaction, relaxation, and the enjoyable experience of shell-peeling. They further explained that various culinary techniques elicited different aromatic profiles, and the vibrant red coloration of the carapace stimulates behaviors such as photo-taking and sharing, contributing to a ritualistic dining experience. Meanwhile, as Qianjiang crayfish represents an established brand with no recorded history of food safety incidents, respondents expressed no health-related concerns regarding its consumption.

5.2 Theoretical contributions

According to the aforementioned analytical framework and the empirical findings, the possible theoretical contributions of this study are as follows:

First, this study attempts to advance the SOR analysis framework by incorporating the relationship between two mediators (CPQ and CT) and a moderator (HC), thus extending the scope of SOR theory. The finding that CPQ positively impacts CT aligns with Chen et al. (2021) and represents the most significant direct effect, expanding the existing literature with a new research scenario. Additionally, although the moderating effect of HC was not supported, consistent with Gao and Jiang (2020), it aimed to extend SOR theory by establishing boundary conditions for the relationship between CPQ and CPI.

Second, this study enriches the concept of government regulation by specifying it as GP and GC based on consumer perceptions, and extends the application of government regulations to RBAPs, while past research has mainly focused on simple, objective indicators of government regulation, such as incentives and penalties (Yang et al., 2023). While prior research has investigated organic food (Chai et al., 2022) and private brand agricultural products (Nguyen-Viet, 2022), no studies have examined RBAP. Thus, this study fills that gap and validates its findings with empirical evidence. Aside from the effect of GC on CPI, which was not supported, the other effects of GP and GC on CPI through CPQ and CT were significant, suggesting that it is reasonable to categorize government regulation into GP and GC based on consumer perception in the context of regional public brand agricultural products. Therefore, this study complements existing research on government regulation.

5.3 Managerial implications

Based on the conclusions presented above, this paper proposes the following policies and strategies for promoting CPI, which will be particularly beneficial for helping developing and underdeveloped countries expand their regional economies.

Whether directly or indirectly, the effect of CPQ is stronger than that of GP, GC, and CT, reflecting the fact that CPQ is the most important antecedent construct. Thus, it is important to further analyze each item of CPQ to formulate detailed policies for business owners and government agencies. According to the answers from the surveyed consumers regarding the five items of CPQ, 96.85% prefer taste, 93.33% prefer ecology and health, 91.93% prefer quality price, and 91.24% prefer nutrition. Therefore, business owners should make an effort to improve taste by developing additional flavors to meet consumers' varying preferences. The price should align with the quality, and both freshness and nutrition should be ensured. Accordingly, business owners should adopt techniques to maintain freshness and prevent nutrient loss during transportation. Government agencies should encourage farmers to adopt environmentally friendly cultivation methods to ensure the ecology and healthiness of the crayfish food at the source.

In addition, the second- and third-most significant effects were the influence of GP on CPQ and GC on CPQ, respectively. This indicates that consumers endorse government regulation because the variable of government regulation was measured from the perspective of the "audience"; that is, the effectiveness of government regulation was assessed based on consumers' answers. The corresponding suggestions are made as follows. According to the validated items of GP, as shown in Table 4, including GP1 (the use of drugs), GP2 (the use of feedstuffs), GP3 (the ecological environment), and GP5 (agricultural subsidies or incentives), government agencies should provide funds to establish pilot projects to promote existing regional brands, supervise the use of drugs and feedstuffs, and encourage farmers to protect the environment for the growth of high-quality animals. According to the validated items of GC, as shown in Table 4, including GC1 (inspection, testing, and certification), GC2 (standardizations), GC3 (transparent information), and GC4 (strict enforcement of food safety laws), the government should increase testing items, improve standards, and implement digital inspections via video. Additionally, enterprises should pursue third-party certification for organic foods, such as ISO 9001 certification. Furthermore, firms should adopt digital traceability techniques for agricultural products to enhance CT.

6 Limitation and future prospects

This study explored the mechanisms by which perceived government regulations drive purchase intention via CPQ and CT, drawing conclusions of theoretical and practical value. However, there are some limitations and a need for further investigation. First, we designed our theoretical model for a specific aquatic product (Qianjiang crayfish) in Wuhan, China; therefore, the generalizability of the results requires further study. It would be interesting to apply the SOR framework to regional brands in other countries or regions, or to other regional brands in different industries, especially in underdeveloped and developing nations, to further investigate the effects of government regulations. Second, due to limitations in terms of time and resources, cross-sectional survey data were used in this research to investigate the influences of existing government regulations. However, the dynamic effects of government regulations were not taken into account, and future research should explore how

consumers' decision-making might evolve in response to potential future changes in various dimensions of government regulations. Third, based on Maslow's hierarchy of needs, which comprises five levels, the top level for consuming RBAPs is to satisfy the needs of food culture or self-identity. Since Chinese consumers primarily focus on lower levels of food needs, such as safety, taste, health, and nutrition, the factor of food culture is not fully explored due to their economic status. Thus, future studies can improve upon and explore the influence mechanism model by incorporating a food culture factor and surveying consumers from developed nations or affluent cities such as Shanghai or Beijing in China.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent from the patients/participants or patients/participants legal guardian/next of kin was not required to participate in this study in accordance with the national legislation and the institutional requirements.

Author contributions

NX: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Software, Visualization, Writing – original draft. YZ: Conceptualization, Validation, Writing – review & editing. MC: Conceptualization, Funding acquisition, Project administration, Supervision, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

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