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# Promotion paths for regional public brand development of agri-products in urban areas: resource and institutional perspectives

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This study aimed to find the determinants of regional public brand development of agri-products in urban areas and to explore the specific enhancement paths for the regional public brand development of agri-products. The regional public brand of agri-products in Shanghai was selected as the research object. The study utilized stratified and random sampling techniques to collect data from 320 questionnaires of agricultural business entities in Shanghai. Then a covariance-based structural equation model with institutional factors as mediating variables was constructed. Furthermore, the study empirically analyzed the mechanism of the role of resource endowment on regional public brand development of agri-products. The study showed that the main factors affecting regional public brand development of agri-products are market maintenance, public marketing, industrial resources, and regional resources, in order of importance. Regional and industrial resources positively affected agricultural regional public brand development through the masking effect of public marketing and the partially mediating role of market maintenance. Among them, market maintenance reversed the significant negative impact of regional resources on the regional public brand development of agri-products. The findings of the study contribute to enriching the existing theoretical literature on regional public branding of agri-products, and provide practical implications for the government to help formulate and improve regional brand development policies in urban areas.

## KEYWORDS

regional brand, agri-product brands, urban agriculture, resource endowment, institutional factors, mediating effect

## 1 Introduction

The high-quality development of modern urban agriculture is a proper part of global city building (Bi, 2020), emphasizing the greening, socialization, and branding of agricultural production (Tong, 2022). A common approach to agricultural branding is the creation of regional public brands of agri-products (hereinafter referred to as “regional brands<sup>1</sup>”). Regional brand building implements environmentally friendly production techniques (Li L. P. et al., 2022), encourages the seamless integration of agricultural science and technology chains and industrial chains, and facilitates the structural reform of contemporary urban agriculture (Zhang et al., 2018). Under the guidance of agricultural branding policy, regional brand building in the agricultural sector has been effective. However, most regional brand awareness and brand value are low,<sup>2</sup> especially in urban areas, where regional brands have little reach and are underdeveloped. Taking Shanghai as an example, the brand value of Shanghai’s leading regional brands “Nanhui Peach,” “Nanhui 8,424 Watermelon” in 2022 was 1,349 million yuan and 593 million yuan, respectively. This was much lower than the national average of 2.663 billion yuan for regional brand value of fruit products (Hu et al., 2022). By the end of 2022, Shanghai had a total of 22 regional brands, considerably lower than the average number of regional brands found across all provinces and cities, which was 126 (Wang X. J. et al., 2023).

What has led to the unsatisfactory situation of regional branding in urban areas? Some scholars believed that the reason for the lag in regional brand development was inappropriate positioning (Leng et al., 2021). Regional brand and local resource endowment have a certain deviation; this misalignment is not only a waste of resources but also hinders the competitiveness of regional brand products and the formation of advantages (Zheng et al., 2022). Some scholars believed that the reason for the lag in regional brand development was poor management and maintenance (Li, 2021). Regional brand development has neglected the importance of the main body, brand, and quality, so it cannot keep up with the management of the main body of production, branding, and quality control (Chen Y. F. et al., 2020). All this leads to some regional brand development that is weak or even disappears. Therefore, how to continuously enhance the influence and popularity of regional brands in urban areas on the basis of the existing brand of urban agricultural products is a realistic challenge that needs to be solved. To this end, this paper tries to identify the determinants that affect regional brand development and analyze the role path of these factors that exert influence on regional

brand development. First, relevant literature was systematically sorted out to analyze the intrinsic mechanisms of resource endowment and institutional factors affecting regional brand development. Then, the theoretical framework of the causal relationship between the variables “resource endowment—institutional factors—regional brand development” was constructed. Finally, the conceptual model and research hypotheses were empirically tested based on the research data of new agricultural business entities in Shanghai. The main purpose of this paper was to provide empirical research answers to the following questions: (1) What are the main factors affecting regional brand development? (2) How do regional and industrial resources in urban areas affect regional brand development? (3) How do public marketing and market maintenance play a mediating role between regional resources, industrial resources, and regional brand development? (4) What are the specific paths for promoting regional brand development?

This study contributes to both theoretical research and practical decision-making related to regional branding. In terms of theoretical research, previous literature has less explored the intermediary mechanism of resources for regional brand development. There is a lack of quantitative research on institutional factors contributing to regional brand development. There is a relative lack of research on regional brand development and construction in urban areas. This study took regional brands in urban areas as the object of study, took institutional factors as mediating variables, and explored in depth the internal mechanism of resource endowment-driven regional brand development. This study improved the applicability of regional brand development mechanisms in urban areas. In addition, research data and empirical analysis methods were utilized to scientifically validate this mechanism and improve academic credibility. In terms of practical decision-making, this study suggests requirements for governmental behavior. In addition, the results from this study can help the government formulate and improve regional brand development policies in urban areas and provide practical and feasible recommendations for high-quality development of the urban agricultural economy.

## 2 Theoretical background and hypotheses development

### 2.1 Theoretical background

The resource endowment theory was first proposed by the Swedish economist Ohlin, who used various factors of production, such as labor, capital, land, and technology, to explain the comparative cost advantage possessed by goods exchanged in international trade (Ohlin, 1933). With the advancement of research, the scope of resource endowment theory expanded beyond the field of international trade to the field of urban agriculture. The development of urban agriculture is largely dependent on local resource endowment conditions (Ding et al., 2021). To develop urban specialty agriculture, it is necessary to effectively combine brands and resources (Chen Z. F. et al., 2020) and, at the same time, emphasize policy protection and institutional supply (Wang et al., 2017). Regional branding of agri-products is a booster for the transformation and upgrading of urban agriculture (Chen Y. F. et al., 2020). In the process of regional branding, resource endowment conditions endow regional brands

1 The General Office of the Ministry of Agriculture and Rural Affairs Notice on Cultivation of Agricultural Brand Excellence in 2023 stipulates that a regional public brand of agri-products refers to a brand of agri-products possessed by relevant organizations and employed by multiple agricultural producers in a region with particular natural ecological, historical, and humanistic aspects. The product name is formed by combining the origin name with the name of the specific product, which is sourced from either county or prefecture level.

2 The 2020 China Agricultural Brand Development Report indicates that the mean brand influence index for the regional public brands of agri-products in China in 2019 was 75.043. Only 27 brands were valued at over 10 billion yuan, amounting to under 30% of the total. This suggests that the majority of regional public brands in China lack significant influence and value.

with attributes such as existence, accessibility, functionality (tangible), and experience (intangible) (Medway and Warnaby, 2014), which are the basis for establishing regional brands (Wang, 2014). When scholars studied the relationship between resource endowment and regional brand development, they focused on the direct effect of resource endowment on regional brand development. For example, Molina-Morales and Martínez-Fernández (2004) proposed the concept of shared resources from a resource-based viewpoint. Chen and Li (2014) drew on the “diamond model,” the GEM model, and the “industrial zone,” summarized five shared resources, such as resource endowment conditions and government policy influence, and then analyzed the multiple regression model to prove the direct and critical role of shared resources within the cluster on industrial cluster competitiveness in resource-based regions. Xiong and Xing (2017) argued that the resource endowments driving regional brand development are mainly in three categories: brand reputation, financial support, and technological factors, and proved that these resource endowments have a significant direct impact on regional brand development through regression analysis. Liu et al. (2021) developed a regional brand image scale using factor analysis, and they argued that regional brand image is directly constituted by four resource endowments: the regional economy, nature, industry, and enterprise.

In addition, the institutional theory perspective suggests that institutional forces are the key factors driving the continuous evolution of regional brand ecosystems (Xu et al., 2019). Regional branding is a management process (Gnoth, 2002), and regional branding also includes institutions such as politics (Lucarelli, 2018) and public diplomacy (de San Eugenio Vela et al., 2014). For agricultural products, their regional brand ecosystems have shared attributes, so the institutional theory perspective mainly emphasizes the involvement of governmental institutional forces (Wiedmann et al., 2011). Institutions tend to reinforce external logics so that the economic behavior of regional brands is externally represented as heterogeneous and isomorphic (Swagemakers et al., 2021). When scholars studied the relationship between government institutions and regional brand development, they focused on the influence of institutional factors on the business environment and corporate behavior, thus driving regional brand development. Lei (2015) empirically analyzed through regression analysis that local government behavior has an indirect impact on regional brand development, in which the market environment plays a mediating role. Zhao and Sun (2017) demonstrated by constructing a structural equation model that the institutional environment of a region would indirectly affect regional brand performance by influencing the relational governance strategy among firms. Li et al. (2020) also empirically analyzed the influence mechanism and role path between government behavior, the internal and external environment of enterprises, and the integration performance of regional public brands of agri-products by constructing a structural equation model. In addition, some scholars also conducted case studies using the grounded theory method to reveal the driving mechanism of the government’s institutional factors on regional brand development (Qi et al., 2021; Zhang et al., 2022; Li F. G. et al., 2022).

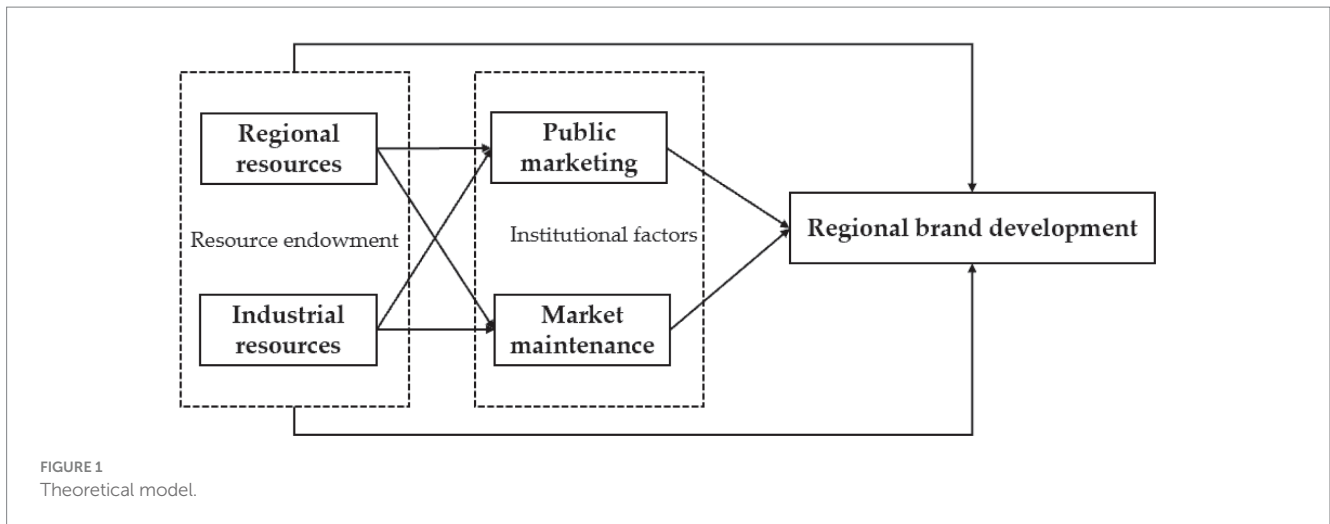
Other scholars studied the topic of regional branding from a combination of a resource perspective and an institutional perspective. On the one hand, there was research around the regional branding measurement scale. Zhao et al. (2015) developed a scale for measuring the driving factors of regional branding based on resource and

institutional perspectives, using a combination of qualitative research and empirical testing. On this basis, Zhao et al. (2016) continued to develop a dimensional model and measurement scale for eco-regional brands using grounded exploration and empirical testing methods. On the other hand, there was research around the willingness of enterprises to participate in regional branding. Zhao and Sun (2018) believed that the resource environment forms institutional pressure, and institutional pressure will positively drive enterprises to participate in regional branding, and they constructed a structural equation model in this logic. Tang et al. (2022) also distilled the source of institutional pressure from the resource environment, pointing out that the perceived governmental resource advantage contained in institutional coercive pressure can effectively drive agricultural business entities to participate in regional branding.

As seen in the above literature, scholars have conducted rich research on regional brand creation, management, and maintenance from resource and institutional perspectives. However, the following shortcomings remain: First, the resource perspective emphasizes the importance of resource endowment and focuses on the direct effect of resource endowment on regional brand development. These studies, however, ignore the real dilemma of the lack of resources faced by regional branding. Therefore, a suitable intermediary fulcrum has not been found between resource endowment and regional brand development on which resource endowment can be mobilized to pursue regional brand development. Second, the institutional perspective focuses on how institutional factors indirectly affect regional brand performance by influencing the corporate environment at the micro level. Research on the direct role of institutional factors on regional brand development is mostly qualitative and lacks empirical tests. Third, the integration perspective portrays the relationship between resources, institutions, and the willingness of enterprises to participate in regional branding. The portrayal of the relationship between resource endowment, institutional factors, and regional brand development has been neglected. Fourth, most of the studies on the construction of regional brands of agricultural products have focused on the main food-producing regions and ethnic areas. There is less academic research on regional branding for urban areas.

## 2.2 Theoretical model of regional public brand development of agri-products

Causality modeling is a significant method in quantitative predictive modeling that is usually used to demonstrate the relationship between multiple variables. Structural equation modeling is a typical causality model. Shen (2011) argued that resource base, industrial advantages, organizational management, innovation atmosphere, and marketing stimulation are the key factors constituting the regional brand equity of agricultural products, and there is a causal relationship between them and the regional brand equity of agricultural products, thus constructing a causal relationship structural equation model of regional brand equity of agricultural products. Li P. et al. (2022) constructed a causality model to measure the regional brand competitiveness of agricultural products from a causality perspective. With reference to this approach, this paper proposed a causal structural equation model for the regional brand development of agri-products (Figure 1).



## 2.3 Hypotheses development

### 2.3.1 Impact of resource endowment on regional brand development

“Resource endowment” is a comprehensive assessment of the quality of a country or region’s resources (Xiong and Xing, 2017). The state of resource endowment gives regional brand survival space and growth capacity, so it is reasonable and necessary to analyze the factors affecting regional brand development based on the resource perspective (Zhao et al., 2015). Scholars have not yet had a unified standard for the division of resource endowment dimensions, and it is generally believed that the resource endowment driving regional brand development consists of natural resources, human resources, scientific and technological resources, market resources, organizational resources, institutional resources, cultural resources, financial resources, industrial resources, brand resources, and other dimensions (Lei et al., 2012; Liu, 2016; Zheng, 2016; Lu and Sun, 2022). Sun (2006) pointed out the four basic characteristics of regional brands: regional nature, industrial nature, brand nature, and public nature. Among them, brand nature is reflected in the brand connotation, brand positioning, brand investment, brand image, and other aspects of the regional brand (Pan, 2019), which belong to the brand marketing content. Public nature indicates the necessity of the government as the main construction body (Lu and Sun, 2022), which belongs to the regional brand building main body selection problem. This paper focused on the two most basic dimensions of resource endowment: regional resources and industrial resources, combining the basic characteristics of regional brands from a resource perspective.

Regional resources are the material basis for the formation and development of regional brands of agri-products (Gao and Zhang, 2014). The strong natural link between agri-products and location is a prerequisite for the formation of regional brands for agricultural products (Cross et al., 2011). Regional resources comprehensively reflect both natural and non-natural factors in the region (Gao and Zhang, 2014). Natural factors include rain, soil, light, and other natural climatic environments. Non-natural factors refer to historical and cultural factors, transportation conditions, technological talents, and the local economic foundation. Specifically, it shows up in the following: unlike industrial products, natural resources such as water and soil and geographical features

such as climate and topography in a particular region give agricultural products their unique qualities (Liu and Song, 2017). The special cultural background, production, and lifestyle form the cultural characteristics of regional brands (Fei and Du, 2020). In urban areas, the development of agriculture has location-comparative advantages in terms of transportation, science and technology talents, capital, etc. Regional transportation conditions have a significant positive impact on regional brand development (Liu, 2016). The level of science and technology, talent reserves, and capital investment conditions will significantly affect the development capability of regional brands (Bennett and Harrel, 1975), and regional economic strength is an important driving force for regional brand development. Combined with the above analysis, this paper concluded that the richer the regional resources, the better the regional brand development.

Industrial resources refer to the resource elements that can embody the connotations related to industrial clusters, production enterprises, product advantages, and so on (Zheng, 2016). Agricultural industrial clusters are the foundation of regional brands of agricultural products (Yu and Li, 2015), and industrial clusters are conducive to the establishment of regional brands and the circumvention of the lemon problem (Liu and Wang, 2022). The healthy development of regional brand should be the formation of regional characteristic industries and their industrial clusters, with a number of representative strong enterprises as their backbone and core, and these industries, clusters, and enterprises building “regional brand” assets (Wang et al., 2022). Leading enterprises can broaden the industrial chain and extend to secondary and tertiary industries such as deep processing of agricultural products and rural tourism (Li, 2021), which is important for broadening the scope of sales of regionally brandy agricultural products. Supporting SMEs provides pre-production, in-production, and post-production services for leading enterprises to facilitate their rapid development (Zheng, 2016). In addition, the product itself is also very important for regional brand development; the quality of the product is directly related to the reputation of the regional brand (Qiu, 2017), and product market share reflects the market competitiveness of regional brands (Zhang, 2011). Combined with the above analysis, this paper concluded that the richer the industrial resources, the better the regional brand development.

Therefore, the following hypotheses are proposed:

*H1a:* Regional resources positively affect regional brand development.

*H1b:* Industrial resources positively affect regional brand development.

### 2.3.2 Impact of institutional factors on regional brand development

Institutional factors refer to a series of policy arrangements implemented by the government to expand the effect of regional brands and promote regional brand development. [Lei and Lv \(2023\)](#) pointed out that the level of institutionalization in the region affects the process and decision-making of regional branding. Institutional forces such as government policies and standards are key elements in the continuous development and upgrading of regional brand ecosystems ([Xu et al., 2019](#)). In terms of both the exploration and protection of agricultural markets, institutional factors can be categorized into two dimensions: public marketing and market maintenance ([Xiong and Xing, 2017](#)).

Public marketing, also known as “government marketing,” refers to the planning, creation, and marketing of public goods by the government to meet the specific needs of the region ([Kotler and Gertner, 2002](#)). Region-of-origin marketing enables agricultural products to interact and communicate with the outside world, which is one of the strategies for brand differentiation ([Anholt, 2008](#); [Bruwer and Johnson, 2010](#)). Public marketing can increase regional brand awareness and create a good regional brand image. The dissemination of regional brands involves topics such as agricultural product marketing, regional image, and balanced regional development, so government intervention is needed to ensure efficiency and fairness ([Liu and Zhong, 2021](#)). The brand marketing ability of agricultural business entities is weak, the brand image positioning is similar, and the core strength of the brand has not been formed ([Jiang et al., 2018](#); [Yang, 2019](#); [Thakur et al., 2023](#)). Therefore, the local government can play a role in public marketing. Create a brand culture and a unique brand image by tapping into local cultural heritage, folkways, and customs ([Dong, 2015](#)). Host and organize agricultural product festivals and fairs, and incorporate brand reputation into management to achieve brand dissemination and publicity ([Zhou and Fan, 2017](#); [Jiang et al., 2018](#)). Through these, regional brand awareness will be expanded, and the regional brand will further develop. Combined with the above analysis, this paper concluded that the more effectively the government’s public marketing function is played, the better the regional brand development will be.

Market maintenance is a normative, coordinating, and constraining system adopted by the government to promote the healthy development of the market and to avoid the opportunistic behavior of stakeholders ([Hou and Zhang, 2023](#)). The market mechanism can optimize the allocation of resources, but it will be ineffective in dealing with the externality of public goods, so the construction of regional brands also needs the government to guide industry associations and enterprises to form a wide range of brand effects ([Gao et al., 2015](#)). The government can take a number of measures to provide external support and maintenance for regional brand development. For example, the government can strengthen the construction of laws and regulations concerning regional brand protection and improve the monitoring system for the safety and

quality of regional brand agricultural products ([Fei and Du, 2020](#)). The government can give full play to the function of guidance and support, introduce advanced science and technology and a talent team ([Li et al., 2020](#)), and guide after-sales service. In addition, the government can effectively guide industry associations to participate in the management of regional brands ([Wang and Zhu, 2017](#)). Combined with the above analysis, this paper concluded that the more effectively the government’s market maintenance function is played, the better regional brand development will be.

Therefore, the following hypotheses are proposed:

*H2a:* Public marketing positively affects regional brand development.

*H2b:* Market maintenance positively affects regional brand development.

### 2.3.3 Impact of urban resource endowment on institutional factors

Resource endowment is significant for regional branding, but the dilemma facing regional branding is a lack of resources ([Li et al., 2023](#)). [Ma et al. \(2012\)](#) pointed out that institutional arrangements relying on government mediators can solve the problem of insufficient resource supply. The government is an indispensable mediating variable in the construction of regional brands ([Sun, 2009](#)). In unified government planning, mechanism design may efficiently integrate and regulate resource advantages while also acting as an incentive to encourage factor endowments to play a comparative advantage and promote economic growth ([Lin, 2008](#); [Gao and Zhang, 2014](#)).

Due to the externality of regional brands, microeconomic stakeholders will not actively establish and publicize the brand, but the government has more resources, power, and credibility compared to other institutions and usually undertakes the establishment, publicity, and maintenance of the regional brands ([Zheng and Gu, 2006](#)). [Li P. et al. \(2022\)](#) stated that regional resource capability makes a strong contribution to the formation of brand market capability. The influences of natural resources, such as geographical location, make characteristic agricultural products produce different quality effects and create a unique product image, which are conducive to regional marketing and promotion ([Dong, 2015](#)). [Martinovic \(2002\)](#) stated that rich regional resource advantages, advanced regional technology, or high levels of regional economic development are the main forces behind regional marketing. That is, regional marketing is the marketing of resources in the region, including basic resources such as local natural resources, history and culture, infrastructure, human factors, and industrial resources ([Jiang et al., 2005](#); [Liu and Zhong, 2021](#)). Combined with the above analysis, this paper concluded that the richer the regional and industrial resources, the better the government will build brand culture and brand image, organize brand exhibitions and brand promotion, as well as improve brand reputation cultivation.

In addition, resource endowment is linked to the support and maintenance behaviors adopted by the government for regional branding. For example, the regional economic foundation is considered an important factor influencing government behavior and policy formulation ([Wang and Pang, 2018](#)). The ecological environment of agricultural products can directly influence the

TABLE 1 Variable definitions.

Latent variables	Observed variables
Regional resources (RR)	natural climate environment (RR1), historical and cultural heritage (RR2), scientific and technological resources: seed breeding improvement (RR3), science and technology training (RR4), talent resources: agricultural business entities' quality (RR5)
Industrial resources (IR)	clustering of agricultural industries (IR1), driving role of leading enterprises (IR2), product market share advantage (IR3)
Public marketing (PM)	building of brand culture (PM1), creation of brand image (PM2), organization of brand exhibition (PM3), enhancement of brand promotion (PM4), maintenance of brand reputation (PM5)
Market maintenance (MM)	favorable government policies (MM1), improvement of quality and safety supervision systems (MM2), technology maintenance (MM3), talents maintenance (MM4), improvement of after-sales service (MM5), effectiveness of association management (MM6)
Regional brand development (RBD)	brand architecture (RBD1), brand experience (RBD2), brand identity (RBD3), brand communication (RBD4), brand price attractiveness (RBD5), brand relationship and leadership (RBD6), brand articulation (RBD7)

behavior of local governments (Li, 2017). In resource-rich regions, resource endowment may influence local government behavior by affecting its incentive structure and, thus, its behavior (Chen and Qiao, 2016). Adams et al. (2019) also suggested that the abundance of resource endowments has an impact on the quality of government systems. Combined with the above analysis, this paper concluded that the richer the regional and industrial resources, the more willing the government will be to adopt positive development policies, provide better technical and personnel maintenance, and formulate a more comprehensive standardization, quality and safety supervision, and after-sales service system.

Therefore, the following hypotheses are proposed:

*H3a:* Regional resources positively affect public marketing.

*H3b:* Regional resources positively affect market maintenance.

*H3c:* Industrial resources positively affect public marketing.

*H3d:* Industrial resources positively affect market maintenance.

### 3 Methodology

#### 3.1 Variable selection and questionnaire design

Regional brand development was selected as the dependent variable based on the previous theoretical model. Combining the branding understanding of Robert Siegel, president of Levi's, "Branding is Pricing," with the strategic place brand-management model (Hanna and Rowley, 2011), this study measured regional brand development in terms of seven indicators: brand architecture, brand experience, brand identity, brand communication, brand price attractiveness, brand relationship and leadership, and brand articulation. Resource endowment was selected as the independent variable. Concerning existing studies and taking into account the characteristics of urban resource endowment, a total of eight indicators were set in two dimensions: regional resources and industrial resources (Gao and Zhang, 2014; Zheng, 2016). Institutional factors were selected as mediating variables, and 11 indicators were set up in two dimensions: public marketing and market maintenance (Dong, 2015; Wang and

Zhu, 2017; Zhou and Fan, 2017; Fei and Du, 2020; Li et al., 2020). The definitions of the variables are shown in Table 1.

The study questionnaire had three sections. Section One proposed study goals and questionnaire guidelines. In the second section, respondents were asked to provide some demographic data. Section Three presented the study's main questions using a five-level Likert scale, where 1 means strongly disagree and 5 means strongly agree.

#### 3.2 Participants and data collection

This study took the regional brand of Shanghai's agricultural products as the research object for the following reasons: Firstly, it is a practical necessity to enhance the regional brand effect and promote regional brand development. Shanghai is an international metropolis, and competition for agricultural products is challenged not only by a surging domestic market but also by imported agricultural products. Secondly, Shanghai's agricultural development faces disadvantages such as scarce land resources and high labor costs, so the best way to develop agriculture is to develop a unique regional brand. Thirdly, it has the pre-existing power to develop regional brands because of its obvious advantages in science, technology, and talent resources. Shanghai has a high comprehensive score for scientific and technological talent resources, a high expenditure on science and technology, a high intensity of scientific research and development, and a large number of higher education institutions that are at a leading level in China.

The questionnaire research work for this paper was completed in February–March 2022. In this paper, regional brands of agri-products with a certain scale and foundation of agricultural industry clusters were selected as survey objects (regional brands such as Nanhui 8,424 watermelon, Nanhui peach, Pengzhen green lentil, Sanlin avalanche melon, etc.). Since new agricultural business entities are direct participants in the production of agricultural products and regional branding, the actual questionnaire respondents were new agricultural business entities producing these representative agricultural products (Weng and Li, 2016).

The research used a combination of stratified and random sampling methods. First, select eight agricultural production areas based on whether or not they have a regional brand, and then randomly select about 50 new agricultural subjects from each area. Questionnaires were issued in the form of an online electronic questionnaire. Questionnaires increased efficiency with the help of pre-, mid-, and post-control methods. Pre-control included controls

TABLE 2 Descriptive statistics of latent and observed variables.

Latent variables	Observed variables	Mean	STD	Latent variables	Observed variables	Mean	STD
Regional resources	RR1	4.14	1.05	Market maintenance	MM1	3.93	1.07
	RR2	4.07	1.11		MM2	3.99	1.00
	RR3	4.20	1.12		MM3	3.73	1.09
	RR4	4.10	1.11		MM4	3.84	1.03
	RR5	4.12	1.10		MM5	3.88	0.98
Industrial resources	IR1	4.02	1.11		MM6	3.87	1.15
	IR2	3.77	1.18	RBD1	3.69	1.02	
	IR3	3.97	0.96	RBD2	3.81	0.98	
Public marketing	PM1	4.04	1.09	Regional brand development	RBD3	3.72	1.00
	PM2	4.06	1.06		RBD4	3.79	1.00
	PM3	4.09	1.05		RBD5	3.66	1.01
	PM4	4.01	0.99		RBD6	3.95	0.99
	PM5	4.16	1.04		RBD7	4.15	1.08

Source(s): Authors' survey in 2022.

for respondents (limited to one response for the same ID) and questionnaire control (missing item questionnaires could not be submitted). Mid-control was that the questionnaires were sent out through the Rural Revitalization Young Talent Association via a WeChat group, whose members were representative and covered all types of new agricultural business entities in Shanghai. Post-control was manual screening to eliminate invalid questionnaires. A total of 390 questionnaires were recovered, and 320 valid questionnaires were finally obtained after excluding invalid questionnaires, with a validity rate of 82.05%. The descriptive statistics of the questionnaire are shown in Table 2.

### 3.3 Data analysis techniques

The data analysis methods in this paper include normality analysis, exploratory factor analysis, confirmatory factor analysis, reliability analysis, validity analysis, and structural equation modeling analysis. The data analysis software utilized in this paper is Statistical Package for the Social Sciences Version 26 (SPSS 26.0) and Analysis of Moment Structure Version 24 (AMOS 24.0).

Structural Equation Modeling (SEM) is often used to examine interdependencies between variables and is the best technique for path analysis and model fit assessment (Li P. et al., 2022). Therefore, this paper used SEM to study the relationship between resource endowment, institutional factors, and regional brand development. Estimation methods for SEM models can be categorized into covariance-based structural equation modeling (CB-SEM) and variance-based structural equation modeling (VB-SEM). In contrast to VB-SEM, the application of CB-SEM facilitates exploratory and validation analyses, makes it easier to assess the relative significance and causality of the underlying structures (Hair et al., 2010; Devellis and Thorpe, 2021), and is thought to correct for metrics.

The CB-SEM technique is more appropriate for this paper for the following reasons: (1) The relevant observational variables studied in this paper were defined as reactive, with the aim of validating the

theory. Then, the model of this paper was built on certain theoretical foundations, and the assumptions of the relationship between latent variables, and the external expression of the explicit variables to the latent variables were clearly and logically deduced (Qin, 2023). (2) In this study, the absolute value of the skewness coefficient of all measured variables is less than 3, and the absolute value of the kurtosis coefficient is less than 10, which is basically consistent with the normal distribution (Kline, 2023). Furthermore, the “Normaltest: a SPSS ( $\geq 26$ ) macro for univariate and multivariate normality test” plug-in (Zong, 2020) was used to test the multivariate normality of the five sets of observed variables, respectively. The results show that the points in the Chi-square versus Mahalanobis distance plot can almost form a straight line. Therefore, the variables in this paper can be considered to be multivariate normally distributed (Nor, 2015), and the residuals were distributed normally, which also suggests that the use of the CB-SEM technique would be more appropriate.

## 4 Results

### 4.1 Reliability and validity analysis

In terms of reliability, SPSS 26.0 software was used for analysis, and Cronbach's alpha coefficient was used as an evaluation criterion. The Cronbach's alpha coefficients for the five factors extracted range from 0.85 to 0.95, with an overall coefficient of 0.966, which is greater than the acceptable standard of 0.6 (Wu, 2010), indicating high reliability, consistency, and stability of the questionnaire data.

In terms of content validity, the measuring indicators were chosen from relatively mature theoretical studies conducted both at home and abroad and were changed in response to expert talks, pre-survey feedback, and the features of urban resource endowment. Therefore, the content validity of the scale is good.

In terms of construct validity, SPSS 26.0 software was used for analysis, and KMO value and Bartlett's test of sphericity values was used as evaluation criteria. The overall KMO value is 0.959, which

is greater than the acceptable standard of 0.6 (Kaiser, 1974). The overall Bartlett's test of sphericity value is 7021.261, and the significance probability of Bartlett's test of sphericity is 0.000. These indicators suggest that the questionnaire has good validity and is suitable for factor analysis. The 320-sample data were randomly divided into two groups. One of the sample data sets was subjected to exploratory factor analysis using the SPSS 26.0 software, with a maximum variance method for principal component analysis and a finite extraction of five factors. As shown in Table 3, of all 26 variables, 24 have factor loadings greater than 0.5 (Wu, 2010) and have no significant cross-loadings, which meets the extraction requirements. RBD6 (brand relationship with leadership) and RBD7 (brand articulation) variables have cross-loading, so the RBD6 and RBD7 variables need to be removed. After exploratory factor analysis, another set of sample data was then subjected to confirmatory factor analysis using AMOS 24.0 software. The results show that the factor loadings of the variables are in the range of 0.70 to 0.95 and the KMO values of the dimensions are greater than 0.7 (Kaiser, 1974), which indicates that the questionnaire scale has good structural validity.

In terms of convergent validity, AVE and CR values were used as evaluation criteria. As shown in Table 3, the AVE values for all dimensions are greater than 0.5 and the CR values are greater than 0.7 (Hair et al., 2010), indicating that the questionnaire scale has good convergent validity.

Overall, the variables can truly and effectively reflect their corresponding measurement items, and the scale and sample data in this study have good validity.

## 4.2 Structural equation model analysis

### 4.2.1 Model fit test

Based on the research hypotheses and using AMOS 24.0 software, the fitness test was performed on the initial model and the modified model that excluded two variables, RBD6 and RBD7.

As shown in Table 4, the indicator values of the modified model are in the range of the fitting standard values, and the GFI and AGFI fitting results do not meet the standard. However, many researchers interpreted AGFI and GFI indicator values in

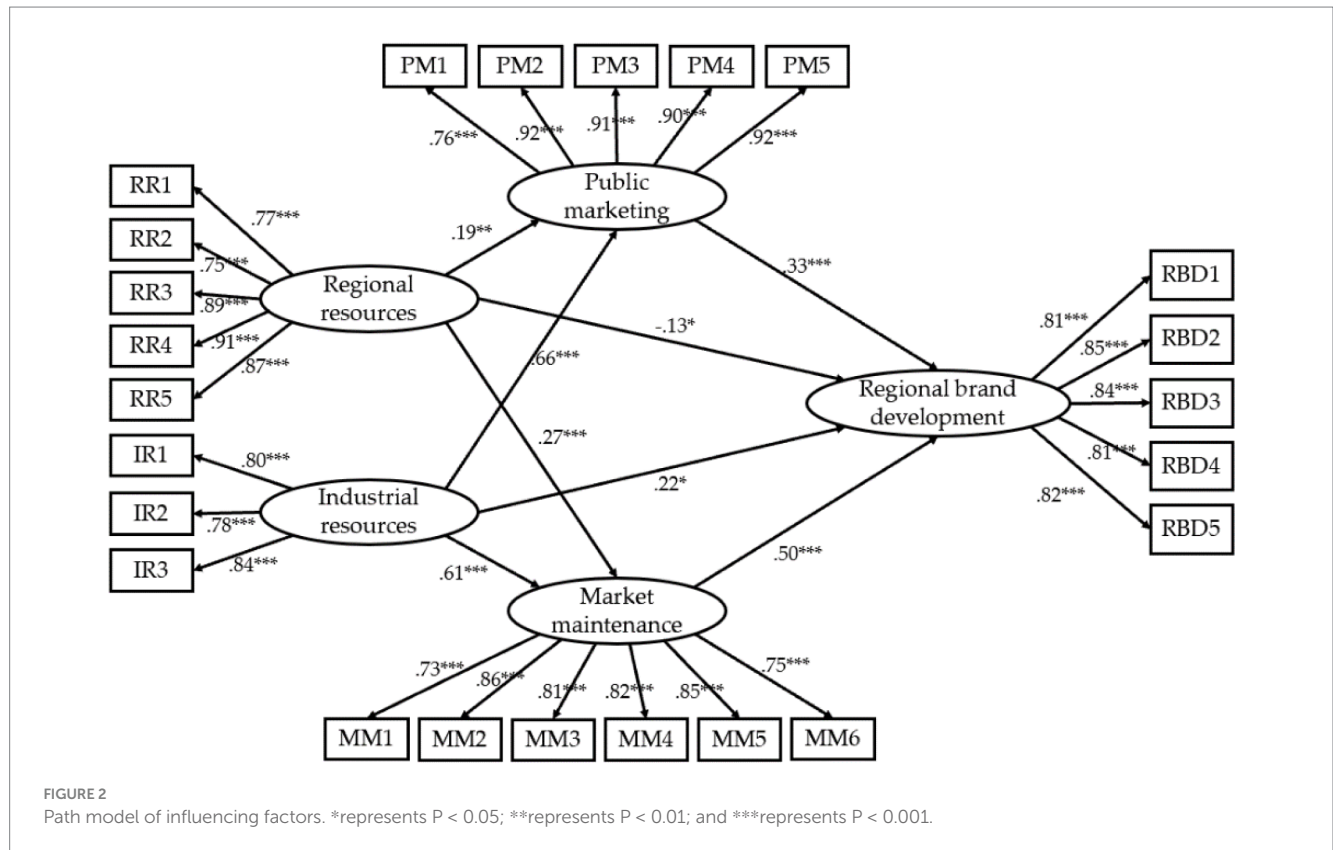
TABLE 3 Results of factor analysis and reliability and validity tests.

Latent variables	Observed variables	Exploratory factor loadings					Confirmatory factor loadings	Contribution rate %	Cronbach alpha	KMO	AVE	CR
		1	2	3	4	5						
Regional resources	RR1	0.768					0.789	59.181	0.926	0.889	0.698	0.920
	RR2	0.723					0.719					
	RR3	0.745					0.890					
	RR4	0.686					0.916					
	RR5	0.737					0.848					
Industrial resources	IR1					0.619	0.842	78.738	0.850	0.732	0.691	0.870
	IR2					0.791	0.824					
	IR3					0.538	0.827					
Public marketing	PM1			0.644			0.706	71.433	0.944	0.903	0.770	0.943
	PM2			0.712			0.941					
	PM3			0.750			0.896					
	PM4			0.794			0.895					
	PM5			0.768			0.929					
Market maintenance	MM1				0.631		0.701	75.965	0.914	0.900	0.636	0.913
	MM2				0.684		0.819					
	MM3				0.619		0.804					
	MM4				0.767		0.857					
	MM5				0.591		0.844					
	MM6				0.638		0.750					
Regional brand development	RBD1		0.791				0.809	66.164	0.911	0.881	0.654	0.904
	RBD2		0.576				0.843					
	RBD3		0.785				0.824					
	RBD4		0.741				0.768					
	RBD5		0.748				0.797					
	RBD6	0.513					-					
	RBD7	0.708					-					



TABLE 4 Results of model fitness test.

Test statistics	CMIN/DF	RMR	RMSEA	GFI	AGFI	NFI	TLI	CFI
Value	2.687	0.052	0.073	0.854	0.818	0.911	0.933	0.942
Reference standard	<3	<0.08	<0.08	>0.90	>0.90	>0.90	>0.90	>0.90
Fitting results	Ideal	Ideal	Ideal	Near	Near	Ideal	Ideal	Ideal



the range of 0.80 to 0.89 as representing a reasonable fit, with values of 0.90 or higher considered evidence of a good fit (Doll et al., 1994). Thus, the fitting results for GFI and AGFI can be considered “near,” while the fitting results for the other indicators all meet the standard and can be considered “ideal.” It indicates that the modified model has a good fit to the questionnaire data, with good incremental fit measures and absolute fit measures, and the modified model as a whole passes the fit test.

### 4.2.2 Model estimation results

After variable elimination and iterative fitting of the modified model, the final estimates are shown in Figure 2 and Table 5.

As shown in Figure 2 and Table 5, the path coefficient of regional resources on regional brand development is  $-0.13$  and is significant at the 0.05 level. The path coefficient of industrial resources on regional brand development is  $0.22$  and is significant at the 0.05 level. Therefore, hypothesis H1a is not validated, and hypothesis H1b is validated.

The path coefficient of public marketing on regional brand development is  $0.33$  and is significant at the 0.001 level. The path coefficient of market maintenance on regional brand development is

$0.50$  and is significant at the 0.001 level. Therefore, hypothesis H2a and H2b are both validated.

The path coefficient of regional resources on public marketing is  $0.19$ , and the path coefficient of regional resources on market maintenance is  $0.27$ , and they are significant at the 0.01 and 0.001 levels, respectively. The path coefficient of industrial resources on public marketing is  $0.66$ , the path coefficient of industrial resources on market maintenance is  $0.61$ , and both are significant at the 0.001 level. Therefore, hypothesis H3a, H3b, H3c, and H3d are all validated.

### 4.3 Mediating effect test

Mediating effects modeling can analyze the process and mechanism of influence of the independent variable on the dependent variable. Currently, it is widely accepted that the Bootstrap method is better at directly testing the significance of the product of coefficients (Zhao et al., 2010). Structural equation modeling is the most appropriate tool for analyzing the mediating effect.

To further test the mediating role of institutional factors between resource endowment and regional brand development, this study used

TABLE 5 Hypothesis test results.

Research hypotheses	Path relationships	Standardized path coefficients	C.R.	p	Conclusions
H3a	Public marketing ← Regional resources	0.19	2.83	0.005**	Support
H3b	Market maintenance ← Regional resources	0.27	3.94	***	Support
H3c	Public marketing ← Industrial resources	0.66	8.43	***	Support
H3d	Market maintenance ← Industrial resources	0.61	7.56	***	Support
H1a	Regional brand development ← Regional resources	-0.13	-2.09	0.036*	Not support
H1b	Regional brand development ← Industrial resources	0.22	2.11	0.035*	Support
H2a	Regional brand development ← Public marketing	0.33	4.61	***	Support
H2b	Regional brand development ← Market maintenance	0.50	6.06	***	Support

\* represents  $p < 0.05$ ; \*\* represents  $p < 0.01$ ; and \*\*\* represents  $p < 0.001$ .

TABLE 6 Analysis results of mediating effects of institutional factors.

Independent variables	Dependent variables			
	Public marketing	Market maintenance	Regional brand development	
			Public marketing	Market maintenance
Regional resources				
Direct effect	0.193	0.274	-0.128	
Indirect effect		-	0.063	0.138
Total indirect effects		-	0.201	
Total effects	0.193	0.274	0.073	
Industrial resources				
Direct effect	0.662	0.611	0.220	
Indirect effect		-	0.216	0.307
Total indirect effects		-	0.524	
Total effects	0.662	0.611	0.744	

TABLE 7 Mediating effect test of SEM model.

Independent variables	Mediating variables	Dependent variables	Bootstrap method		
			Lower bounds of the confidence interval	Upper bounds of the confidence interval	p
Regional resources	Public marketing	Regional brand development	0.002	0.159	0.042
Regional resources	Market maintenance	Regional brand development	0.033	0.282	0.012
Industrial resources	Public marketing	Regional brand development	0.088	0.393	0.001
Industrial resources	Market maintenance	Regional brand development	0.178	0.504	0.000

the bias-corrected Bootstrap method in AMOS 24.0 software, with 5,000 random repetitions and a 95% confidence level. The mediating effect was determined based on whether the confidence interval included 0. Finally, the analysis results of the mediating effects (Table 6), as well as the confidence intervals and p-values for the indirect effects (Table 7), were obtained.

As shown in Table 6, the direct effect of regional resources on regional brand development is -0.128, and the indirect effects on regional brand development through public marketing and market maintenance are 0.063 and 0.138, respectively, for a total effect of 0.073. The direct effect of industrial resources on regional brand development is 0.220, and the indirect effects on regional brand

development through public marketing and market maintenance are 0.216 and 0.307, respectively, for a total effect of 0.744. The research results indicate the existence of total, direct, and indirect effects of institutional factors on the relationship between urban resource endowment and regional brand development.

The direct effect of regional resources on regional brand development is negative, while the total indirect effect of institutional factors is positive. The sign of the direct effect is opposite that of the indirect effect, meaning that there is a “masking effect” (Weng and Li, 2016). Although the direct effect is negative, the positive indirect effect masks some of the negative direct effect, making the total effect slightly higher and positive compared to the direct effect (from -0.128

to 0.073). This suggests that regional resources promote regional brand development through institutional factors. Specifically, in terms of the impact of regional resources on regional brand development, public marketing has a masking effect. And the absolute value of the proportion of the indirect effect to the direct effect is 0.493, which is less than 1. Therefore, the masking effect of public marketing has not transformed the negative effect of regional resources on regional brand development. Similarly, market maintenance also has a masking effect, and the absolute value of the proportion of indirect effect to direct effect is 1.077, which is greater than 1. Therefore, the masking effect of market maintenance transforms the negative effect of regional resources on regional brand development.

The direct effect of industrial resources on regional brand development is positive, as is the total indirect effect of institutional factors. Thus, institutional factors play a partial mediating effect in the impact of industrial resources on regional brand development. As shown in Table 7, the biased-corrected confidence intervals corresponding to each research hypothesis do not contain 0. Therefore, the mediating effect played by institutional factors between urban resource endowment and regional brand development is significant.

## 5 Discussion

The hypothesis that regional resources positively affect regional brand development failed the test, a finding that contrasted with the findings of previous studies. However, the indirect effect of regional resources on regional brand development through institutional factors cannot be ignored. This suggested the following: Firstly, previous literature has proved that regional resources have a certain positive impact on regional brand development (Yu and Li, 2015; Liu and Song, 2017; Fei and Du, 2020). But based on the conclusions of this paper, the direct positive impact of regional resources on regional brand development in urban areas is weakened, and there is even a situation in which regional resources constrain regional brand development. Possible reasons for this are that urban agriculture faces increasing scarcity of land, environmental pressure constraints, and poor regional resource conditions (Zhang et al., 2018), and as noted by Li et al. (2023), the dilemma faced by regional branding is often a lack of resources. Therefore, it is challenging to promote the beneficial growth of regional brands when relying just on regional resources. Secondly, regional resources must draw on institutional factors (especially market maintenance) to better promote regional brand development. Compared to public marketing, the masking effect of market maintenance can transform the negative effect of regional resources on regional brand development. The implementation of institutions related to market maintenance can regulate production, help protect the regional ecological environment, and alleviate the contradiction of the shortage of agricultural land and other factor resources, thus strengthening the foundation of regional brand development. Thirdly, regional resources had a significant negative impact on regional brand development. However, this is not linearly expressed, as the worse the state of regional resources, the better the regional brand development. But rather, the present urban regional resources do not reach the critical point where they can positively affect regional brand development. In addition, the “resource curse” theory suggests that institutional regulation needs to be strengthened in regions with high resource abundance (Wang R. X. et al., 2023).

Eshuis et al. (2014) noted that national governments were increasingly using regional branding as a governance tool. Thus, if regional branding is viewed as an institutional regulatory tool of the government, the conclusion “that regional branding becomes better when natural resource abundance is low in urban areas” seems to be rationalized. In sum, this negative sign relationship also suggested that poorly protected resources in urban areas, such as deteriorating climatic environments and misuse of land resources, can become constraints to regional brand development (Zhang, 2015). Therefore, regional brand development will inversely require the cohesion of regional resources, which means the protection of the climatic environment and the protection of history and culture.

The finding that industrial resources had a significant positive impact on regional brand development was consistent with Li P. et al. (2022). It is worth noting that the direct effect of industrial resources on regional brand development (0.220) is smaller than the indirect effect of industrial resources on regional brand development through institutional factors (0.524). This suggested the following: Firstly, the formation of industrial clusters, the driving role of leading enterprises, and the occupation of leading market shares can positively promote regional brand development (Zheng, 2016; Li, 2021; Liu and Wang, 2022). Secondly, industrial resources can better promote regional brand development through public marketing and market maintenance. Public marketing can bring together high-quality agricultural resources to improve the industrialization of agriculture and the quality of agricultural products. Market maintenance can reduce the externality of agricultural development and prevent adverse selection, resulting in stronger and better industrial power support for regional brand development.

Institutional factors had a masking effect on the impact of regional resources on regional brand development and had a partial mediating effect on the impact of industrial resources on regional brand development. These suggest that resource endowments can promote regional brand development through institutional factors. First, market maintenance had a significant positive effect on regional brands, which was consistent with the findings of Wang and Zhu (2017) and Wang and Hu (2017). Second, in terms of the impact of regional resources on regional brand development, market maintenance not only transformed the negative effect of regional resources on regional brand development, but the total effect of market maintenance was also higher than that of public marketing. All these indicate that the impact of market maintenance is more effective than that of public marketing. Finally, in market maintenance, the improvement of the safety and quality supervision system had the highest influence path coefficient, indicating that the most important aspect of market maintenance is the quality and safety supervision of agricultural products. Improving the quality and safety supervision system will enable quality feedback information to be transmitted in the process from production to marketing. It is conducive to improving the quality level of regional agricultural products and enhancing the boutique status and competitive advantages of regional brands. In addition, public marketing also had a significant positive impact on regional brand development, which is consistent with Dong (2015) and Yang (2019). The highest influence path coefficient of brand image building in public marketing indicates the importance of establishing a unique and exclusive brand image in public marketing. Li and Yi (2007) also believed that shaping the brand image was the key to brand marketing of agricultural products. A high-quality brand

image can leave consumers with good brand impressions and associations, while a damaged brand image can lead to consumer aversion, which is not conducive to regional brand development.

From the perspective of the relationship between latent variables, the direct effects of regional resources, industrial resources, public marketing, and market maintenance on regional brand development are as follows:  $-0.13$ ,  $0.22$ ,  $0.33$ , and  $0.50$ , respectively. These results suggested that the factors that directly affect regional brand development are ranked in importance as follows: market maintenance, public marketing, industrial resources, and regional resources. It can be considered that the importance of institutional factors is higher than that of resource factors in urban areas. So, the government needs to play a role rather than relying solely on resource endowments to drive regional brand development in urban areas. As Li et al. (2023) demonstrated, the resource endowment of the region can be used as a power point, and the government can be used as a fulcrum of brand leverage to realize the mobilization of resources and ultimately promote the development of regional brands.

## 6 Conclusion and implications

### 6.1 Research conclusions

This paper combined the resource and institutional perspectives and constructed a CB-SEM model based on the survey data of 320 new agricultural business entities in Shanghai. Then this paper empirically analyzed the mechanism and influence path of resource endowment (regional and industrial resources) and institutional factors (public marketing and market maintenance) on regional brand development. The empirical results show that: (1) Market maintenance is the most favorable factor for regional brand development. Market maintenance itself has a significant positive impact on regional brand development. In addition, market maintenance not only plays a partially mediating role between industrial resources and regional brand development but also transforms the negative role of regional resources on regional brand development. The inspiration for the government is that, in the face of resource scarcity, market maintenance can be first considered to tap into and protect favorable factors in regional resources. (2) Public marketing is also a key factor in enhancing regional brand development. Although public marketing has not completely transformed the negative role of regional resources on regional brand development, it has weakened this negative role to some extent. Then, public marketing itself has a significant positive impact on regional brand development and plays a partially mediating role between industrial resources and regional brand development. The inspiration for the government is to play a good marketing role. Brand culture and brand image should be based on the characteristics of regional and industrial resources. It is also necessary to promote brand publicity through various activities such as exhibitions and sales, festivals and celebrations, and to rationally plan the path to enhance regional brand development. (3) Industrial and regional resources are the basic factors for regional brand development. Industrial resources have a positive impact on regional brand development, but regional resources have a negative impact on regional brand development. The implication for the government is that it should not only increase the cultivation of industrial resources

but also keep an eye on the state of regional resources and protect them through market maintenance.

### 6.2 Research implications

First, market maintenance parallels support and management functions to empower regional brand development. The ability of resource endowments without comparative advantage to drive regional brand development is weak but is enhanced by the introduction of market maintenance-mediating variables. Above all, it is necessary to formulate favorable fiscal, financial, and tax policies, as well as resolutely combat counterfeit and shoddy labeling. Furthermore, quality and safety supervision should be implemented in the whole process, from production to sales. A comprehensive quality and safety supervision system should be formulated for agricultural producers. Consumers should also be invited to participate in the operation and evaluation of regional brands. Feedback from both production and consumption should be synthesized to formulate a scientific regional brand evaluation index and management system. Finally, the development of regional brands requires support in terms of technology, information, and human resources. There are advanced Internet of Things, big data, artificial intelligence, blockchain, and other modern information technology and talent resources available in urban areas. It should rely on existing urban resources to achieve precise and scientific production, standardized and high-quality products, and further explore the high-end agricultural product market.

Second, public marketing highlights the cultural attributes of the resource endowment to enhance the appeal of the regional brand. Culture, as one of the basic elements of a brand, is the source of the brand's differential competitive advantage. Therefore, public marketing needs to dig deeper into the historical and human resources of the urban area. When consumers buy urban exquisite agricultural products, in addition to focusing on the quality of the agricultural products themselves, they are more in pursuit of the emotional and cultural factors carried by the agricultural products. Therefore, the regional brand should be integrated into the regional culture as well as tell the story of the urban agriculture brand. This can make agricultural products a direct emotional link between the products, the countryside, and consumers and constantly stimulate the consumers' desire to buy. The government and leading enterprises should take the lead in building a unified brand promotion platform. At the same time, the government should optimize the promotion and dissemination of regional brands by continuously publicizing the elements of brand culture, story, image, and packaging through official media.

Third, comprehensively improve the resource environment to strengthen the basic dynamics of regional brand development. It is easy to encounter the problem of insufficient resources in the process of regional brand building and development. In urban areas, it should rely on the rich scientific and technological resources, talents, and market resources of megacities to enhance the basic power of regional brand development. Continue to take the road of brand agriculture and continuously optimize industrial resources. In terms of cultivating advantageous products, optimize the planting pattern by adjusting the regional layout, quality, and variety structure of the products. In terms of industrial integration, the government should extend the

agricultural industry chain, increase the added value of agriculture, and promote a higher degree of integration of the three industries within the countryside. For example, the food supply function of agriculture can be expanded to include a variety of functions such as leisure, tourism, creativity, experience, and cultural heritage.

## 7 Limitations and future research scope

There are a few shortcomings in this paper. (1) This paper was based on the realistic background of regional brand development in China, and the sample used was limited to the Shanghai region only. The suitability of the empirical findings for other urban areas deserves further study. Therefore, it is recommended that future scholars conduct research from different regional and national perspectives or make global comparisons on specific topics. (2) The survey object of this paper was regional brands, while the actual respondents to the questionnaire were new agricultural business entities. The appropriateness of this measurement needs further validation and research. In addition, respondents' understanding and experience of regional branding may affect the completeness of the paper's conclusions, and inevitably, there are some limitations. (3) One of the conclusions of this paper was that "regional resources significantly and negatively affect regional brand development." This paper argues that this negative correlation cannot be understood simply in terms of a linear relationship. Then, in what way is this negative relationship understood? To what extent does the positive driving effect of regional resources on regional brand development change? It is also a direction for future research to explore.

## Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## Ethic 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

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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

PX: Conceptualization, Investigation, Writing – review & editing, Supervision. JH: Data curation, Formal analysis, Methodology, Writing – original draft. ML: Funding acquisition, Project administration, Writing – review & editing. YL: Funding acquisition, Project administration, Resources, 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.

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