

Literature Graph Analysis of Research Progress and Trend of Agricultural Brands Based on CNKI and WOS Databases

Zixiang Yu¹ Zhixiong Huang²

^{1,2} Fuzhou University Xiamen Academy of Arts and Design, Xiamen, Fujian, China

ABSTRACT

This article aims to depict the development process and knowledge graph of global agricultural brand construction. Using CNKI and papers on the theme of "agricultural brand" in the Web of Science database as data sources, CiteSpace is used to construct a knowledge graph with keywords, inter-country cooperation relationships, and other nodes, elucidating the hot evolution and research pattern of global agricultural brand construction research, revealing the keyword groups in the field of global agricultural brand construction, reviewing the research progress of agricultural brand construction, and proposing forward-looking prospects for the development direction and urgent problems to be solved of China's agricultural brand based on actual and socio-economic development needs.

Keywords: *Agricultural brand, Bibliometrics, Graph research, CiteSpace.*

1. INTRODUCTION

The agricultural brand construction is an important engine for China to comprehensively promote rural revitalization in the new development stage. The in-depth study of agricultural brands is conducive to driving industry upgrading and promoting high-quality and efficient development of agriculture. Traditional agricultural brand research mainly focuses on analyzing the existing problems and current situation of global agricultural brands, proposing ideas or summarizing experiences, and often only provides suggestions from macro levels such as market laws and government functions. However, it is rare to outline the development context and hot topic evolution trends of global agricultural brand research from a large number of global literature and make more micro feasible research prospects based on local actual situations. Literature graph analysis is a method of transforming scientific and technological literature into visual graphs to reveal the correlation in literature. Through this method, researchers can quickly understand the current research status and hot issues in the field, and grasp the development trends and cutting-edge

developments in the research field. Therefore, this article attempts to clarify the current status of global agricultural brand research, sort out the evolution process of global agricultural brand research, and clarify the cutting-edge hotspots of global agricultural brand research from the perspective of bibliometrics and systematic review, in order to provide valuable reference and inspiration for the subsequent theoretical, methodological, and practical innovation of agricultural brand research in China.

2. RESEARCH METHODS AND DATA SOURCES

This section describes the tools used primarily in the study and the main sources of literature used for data analysis.

2.1 Research Methods

This article uses the mainstream bibliometric analysis tool CiteSpace (version 6.1.R6) to visually analyze the current research status of global agricultural brands, including the annual growth pattern of literature, research output and cooperation relationships between countries,

research keywords and burst words, and other different nodes. Through comparative analysis, it reviews the current status of global agricultural brand research, explores the differences in global agricultural brand research, points out potential existing problems in Chinese agricultural brand construction research, and looks forward to future research prospects.

2.2 Data Sources

To ensure the credibility and high-exploration value of the sample data sources, data retrieval and screening were conducted on Chinese and foreign language journals from 2003 to 2023 in globally authoritative databases. On February 20, 2023, a Chinese literature search was conducted on CNKI with "agricultural brand" as the keyword, and the source category was selected from China Social Science Citation Index (CSSCI) and core journals, resulting in a total of 341 related papers. By selecting titles and abstracts one by one, irrelevant papers were eliminated and duplicates were removed, resulting in 185 pieces of valid literature. In the authoritative foreign database Web of Science, the WOS core collection was used as the data source, with the search formula of "academic brand" or "rural brand", the language used was English, and the source was limited to papers and review papers, then a total of 1,735 relevant papers were retrieved. After manually removing irrelevant papers and removing duplicates, 1,412 representative papers were ultimately obtained for visual analysis and literature review.

3. RESEARCH PROGRESS AND TREND ANALYSIS ON GLOBAL AGRICULTURAL BRAND CONSTRUCTION

This part analyzes the selected literature from the aspects of publication volume, academic achievements and cooperation networks between countries, research keywords and mutant words.

3.1 Differences in Number of Published Papers and Time Distribution

The number of Chinese agricultural brand research published papers has been generally low since 2003, with an average annual output of about 14 papers, and the growth rate is relatively slow, as shown in "Figure 1". In contrast, the number of research published papers on foreign agricultural brands has shown a clear and sustained trend of

continuous annual growth over time, reaching the highest of 177 papers in 2021. In 2017, the number of published papers even doubled compared to the previous year, and the average annual published papers remained around 155 in the following five years. Overall, foreign research on agricultural brands has maintained a high level of attention and has rapidly heated up since 2017, gradually forming a research boom. The growth of Chinese agricultural brand research published papers is slow. The rural revitalization strategy proposed in the report of the 19th CPC National Congress in 2017 has attracted widespread attention from all sectors of society, and in 2017, the number of published papers on agricultural brand research in China also significantly improved, but in the following years, it has fallen back to a lower level, with fewer high-quality academic achievements.

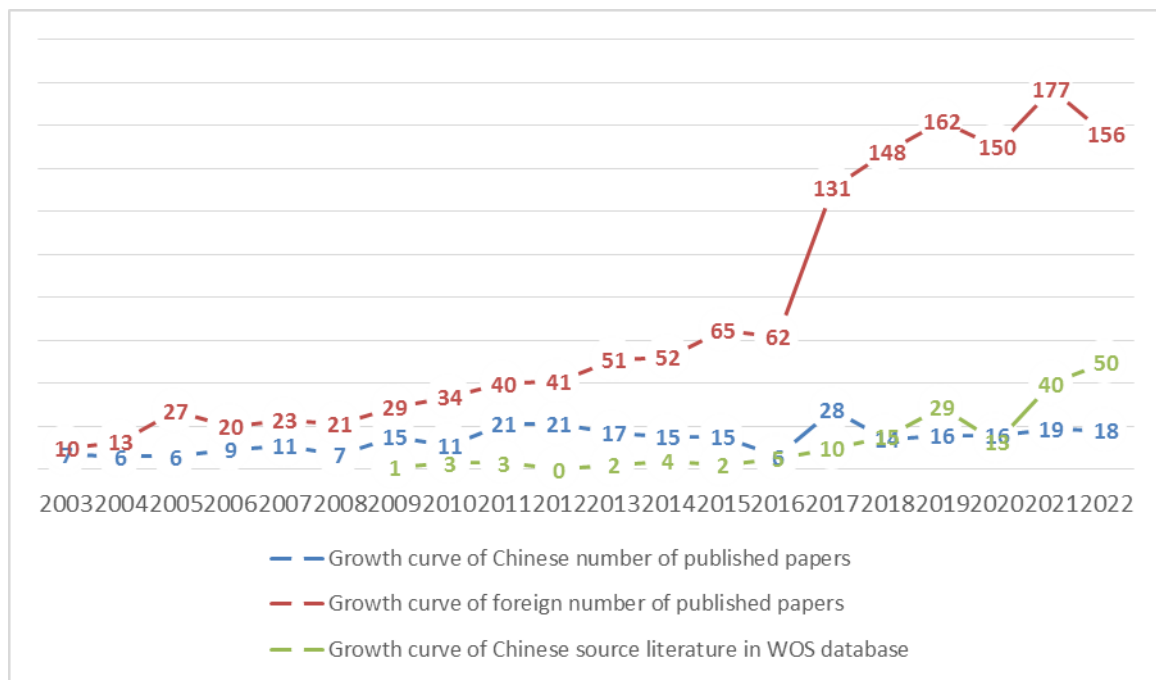


Figure 1 Broken line graph of the number of global agricultural brand research published papers.

It is worth mentioning that the number of Chinese agricultural brand research published papers in the Web of Science search results has shown a significant upward trend since 2009, and its proportion in the total number of foreign published papers has gradually increased with the year. This phenomenon not only demonstrates the preferences of Chinese authors for high-quality research results, but also indicates that the academic level of Chinese agricultural brand research is gradually improving due to various factors such as national investment and support in the agricultural field, academic institution development, and policy adjustments. In addition, Chinese agricultural brand research has also received increasing attention and recognition internationally.

3.2 Research Output and Cooperation Relationships Between Countries

A total of 1,412 valid sample data downloaded from the Web of Science citation index database were imported into CiteSpace software, and relevant threshold parameters were set to draw a graph of research output and cooperation relationships between countries. As shown in "Figure 2", the research results on agricultural brands in the database come from 87 countries or regions. At present, the United States and China are the main contributors to the number of published

papers of this research field, with 341 and 177 articles respectively, accounting for 24.15% and 12.53% of the total literature volume. Countries or regions with a literature volume of over 50 articles include the United Kingdom, Germany, Canada, India, Spain, Italy, Australia, etc.

In CiteSpace software, nodes with intermediary centrality exceeding 0.1 are referred to as critical nodes. The software calculation results show that among the top ten countries in terms of the number of agricultural brand research published papers, the United States (0.85), China (0.37) and the United Kingdom (0.32) have the highest intermediary centrality. On the one hand, this data reflects the good academic atmosphere and frequent open exchanges among the United States, China and the United Kingdom, which have close cooperation relations with other countries. On the other hand, some other countries, such as Italy, Australia, Spain, Germany, etc., although their number of published papers is not as high as that of the United States, China, and the UK, their intermediary centrality also exceeds 0.1, also being critical nodes. It can be seen that the research results of these countries generally have high academic value, and are therefore cited and referenced by scholars from multiple countries.

CiteSpace, v. 5.10.R1 (64-bit) Basic
 March 1, 2023 at 12:27:47 AM CST
 WoS: CiteSpace
 Timespan: 2003-2022 (Slice Length=1)
 Selection Criteria: g-index (k=25), LRF=3.0, UN=10, LBY=5, w=1.0
 Network: N=357, E=1332 (Density=0.0065)
 Largest CC: 534 (94%)
 Nodes Labeled: 1.0%
 Pruning: None

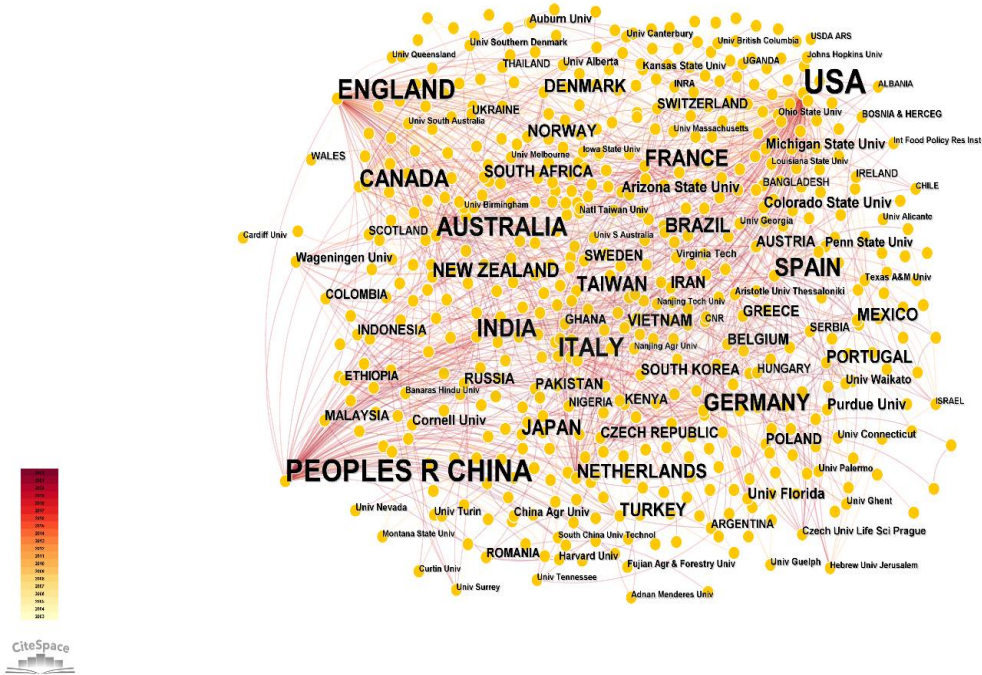


Figure 2 Research output and cooperation relationships between countries.

3.3 Keyword Research Hotspots and Frontiers

This part studies the frontier hotspots of global agricultural brand research from China's domestic and foreign regions, and analyzes the internal reasons and future trends.

3.3.1 Research Hotspots in Chinese Agricultural Brand Construction

This study adds Pathfinder algorithm to search and cluster keyword collinear networks to highlight the main structural features of Chinese agricultural brand research direction. Keywords such as regional brand, brand agriculture, leisure agriculture, ecological agriculture, geographical indication, public brand, brand strategy, and industrialization are high-frequency words in Chinese agricultural brand research, and are hot topics in Chinese agricultural brand research. Among them, regional brand intermediary centrality is the highest, at 0.38, and the intermediary centrality of modern agriculture and brand strategy is 0.19 and 0.12, respectively. In

addition, research on green agriculture, ecological protection, quality and safety of agricultural products has also attracted more and more attention.

Top 20 Keywords with the Strongest Citation Bursts

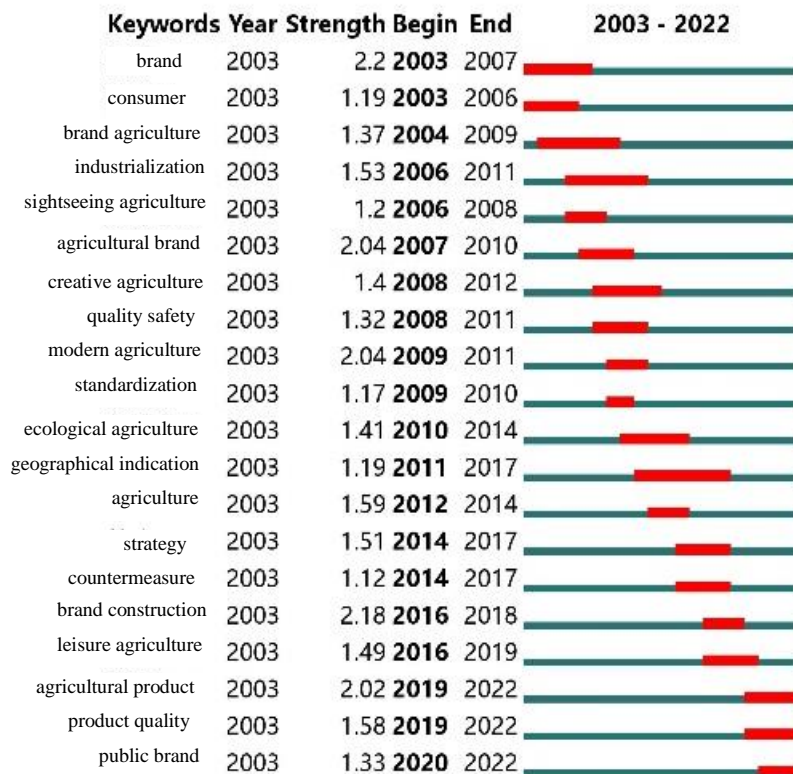


Figure 3 Burst words in Chinese agricultural brand research.

By observing the keyword clustering diagram and burst words, and considering the three dimensions of time, clustering, and intermediary centrality, China's agricultural brand research can be roughly divided into three main clusters, namely agricultural industrialization and brand construction, modern leisure agriculture, and public cluster brands, which also reflects the evolution process of the main research directions of Chinese agricultural brands.

Agricultural industrialization and brand construction were the early main research directions of Chinese agricultural brand research, which were clustered by keywords such as brand construction, consumers, brand agriculture, industrialization, and construction system. In the early 1990s, China began implementing the strategy of agricultural industrialization, encouraging the development of rural enterprises, accelerating the process of agricultural modernization, and later proposed the goal of building internationally

renowned agricultural brands. In addition, with the intensification of global market competition and the improvement of consumer awareness of brands, Chinese agricultural enterprises have also begun to realize the importance of brand construction, and studying how to carry out brand construction has become an urgent problem faced by agricultural enterprises.

Modern leisure agriculture was once another hot topic in Chinese agricultural brand research, clustered by keywords such as modern agriculture, agricultural tourism, leisure agriculture, ecological agriculture, development strategy, sightseeing agriculture, and resource integration. The development of modern leisure agriculture requires resource integration and industrial collaboration, closely integrating agriculture with tourism, culture, health care, and other service industries to create competitive agricultural brands. Therefore, these contents have become the focus of agricultural brand research at this stage in China.

The public cluster brand aims to enhance brand value and market competitiveness by integrating resources, optimizing layout, and increasing added value, which is a relatively new research focus of Chinese agricultural brands, and is clustered by keywords such as regional brands, geographical indications, industrial clusters, leading enterprises, brand alliances, and regional culture. With the proposal of new requirements for improving quality, reducing costs, and increasing efficiency in the new development stage, and the further improvement of consumers' requirements for food safety and quality, China has gradually formed a boom of public cluster brand research. The topic selection of such research directions in China covers a wide range and has a solid theoretical foundation. The mutual verification of theory and practice, the combination of qualitative and quantitative research, and the intersection and integration of different disciplines reflect the broad research perspective and rich research connotation and extension of Chinese public cluster brand research.

According to the research on burst words ("Figure 3"), it can be seen that there were studies on the role of consumers in brand construction in China between 2003 and 2006. Xia Xunfeng et al. (2003) argued in their Green Brand Management — An Important Strategy for Developing Ecological Agriculture Industrialization that implementing green brands is beneficial for consumers to monitor the quality of agricultural products and transmit brand and product information to consumers. A Yingping (2006) proposed in Brand Building in the Process of Agricultural Industrialization in China that the construction of agricultural product brand

awareness helps consumers feel the unique advantages of brand products and strengthen their loyalty to the brand. The consumer research in Chinese agricultural brand research is still mainly from the perspective of brand, focusing on agricultural brand information dissemination, marketing effect, brand loyalty building, and other aspects, while there is less research on consumer preferences, willingness to pay, satisfaction and other practical experiences. In addition, from the perspective of keywords and burst words, there is a lack of exploration on the relationship between agricultural brands and sustainability in China's agricultural brand research.

3.3.2 Research Hotspots in Foreign Agricultural Brand Construction

The keyword clustering and timeline chart ("Table 1" and "Figure 4") of foreign agricultural brand research show that in addition to focusing on brand and product quality, price, and market, foreign agricultural brand research also focuses more on consumer behavior and user experience. By observing the 11 keyword clustering generated, the top five are: consumer preferences, organic farming, place branding, sustainable consumption, and consumer behavior. According to the keyword frequency and intermediary centrality, the focus of foreign agricultural brand research can be divided into: agricultural brand and sustainable development, agricultural brand and consumer modality, agricultural brand and service design.

Table 1. Keyword clustering of foreign agricultural brand research

Number	Cluster label	Cluster contour value	Number of articles (pieces)	Keyword clustering
#0	consumer preference 消费者偏好	0.747	80	Consumer preference, clustering analysis, product source, random parameter logit model, consumer behavior, food safety, experimental economics, media information, product origin, etc.
#1	organic farming 有机农业	0.703	70	Integration, manufacturer competition, venue branding, marketing venues, internal regions, rural identity, marketing orientation, etc.
#2	place branding 地方品牌	0.646	70	Place branding, rural tourism, Percy semiotics, Land Care Association, cultural diversity, rural development, economic nationalism, food citizenship, economic internationalism, cross-border cooperation, etc.
#3	sustainable consumption 可持续消费	0.687	68	Brand trust, brand loyalty, brand attachment, customer experience, hotel selection attributes, agricultural products, blockchain technology, cross-border e-commerce, incentive alignment, business failure, etc.

Number	Cluster label	Cluster contour value	Number of articles (pieces)	Keyword clustering
#4	consumer behavior 消费者行为	0.74	59	Consumer behavior, consumer choice, consumer purchasing decision, unrelated regression, wine marketing, brand loyalty, private label, food retail, hazard analysis, destination brand positioning, etc.
#5	quality 质量	0.682	30	Quality attraction model, attitude, result, emotion, rural development, offshore fishing, etc.
#6	standards 标准	0.925	25	Affect preferences, sensory perception, pollution, inhalation of anesthetics, gas, adsorption, etc.
#7	brand management 品牌管理	0.862	23	Consumer behavior, multivariate statistics, consumer impression, berry, brand management, Fast Moving Consumer Goods, regression analysis, brewing industry, food marketing, etc.
#8	national brand 国家品牌	0.909	19	Health gap, tobacco prevention, rural health, social marketing, health research, private label, national brand, price adjustment, energy shock, persistent organic pollutants, etc.
#9	age 年龄	0.995	12	Breeding grounds, teenager smoking, performing color castration, etc.
#10	cocoa 热可可	1	3	Fair trade, chocolate cocoa, farmers' ownership, brand participation, mainstreaming, competitive governance, etc.

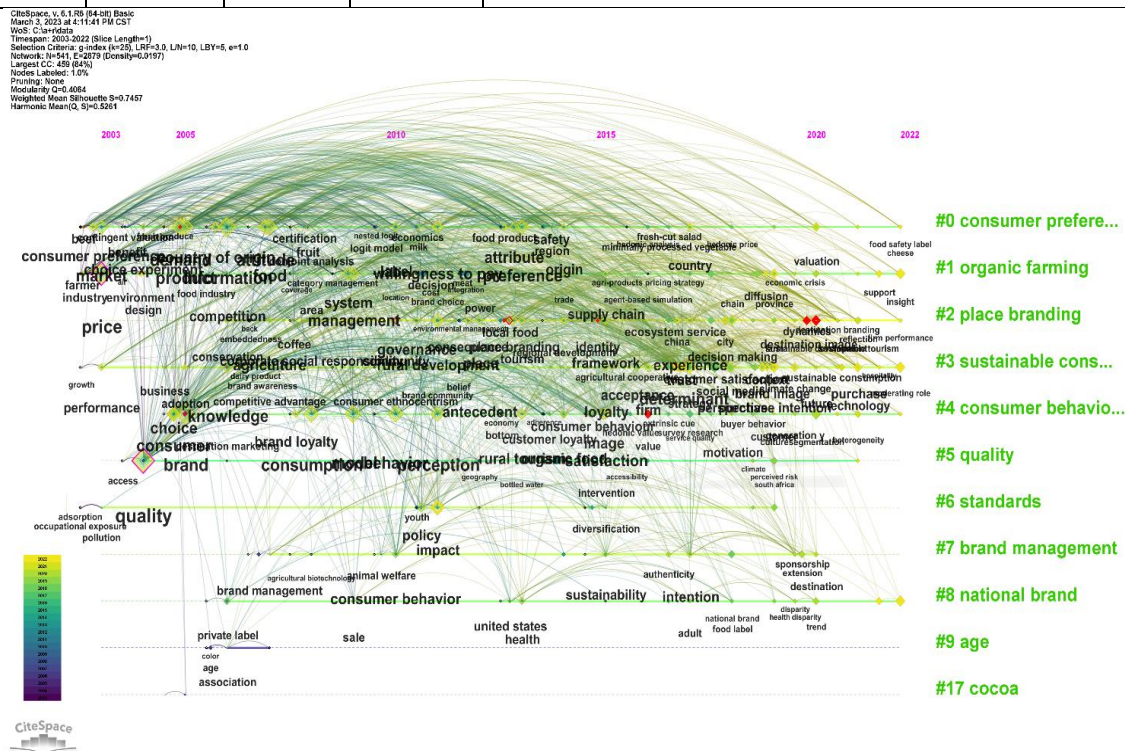


Figure 4 Timeline chart of foreign agricultural brand research.

Firstly, agricultural brand research should be combined with sustainable development. Agricultural brand construction is not only a marketing strategy, but also an important component of sustainable agricultural development.

In this context, agricultural brand research needs to pay more attention to sustainability and fully leverage the role of brand construction in sustainable agricultural development. Agricultural brand research needs to focus on environmental

protection. Agriculture is an important ecosystem, and production methods and processes can have an impact on the environment. Brand research should focus on how to reduce environmental damage and achieve the protection and restoration of the ecological environment through production methods, raw material selection, and production process optimization. Only in this way can agricultural brands truly conform to the concept of sustainable development and receive recognition and support from consumers.

Secondly, consumer modality research can help agricultural enterprises understand consumer purchasing psychology and needs, and then design brand marketing strategies based on consumer modality. For example, different product positioning can be determined based on the modality of different consumers to meet their different needs and psychological states. Or by analyzing consumer modality, a brand image that meets the psychological needs of consumers can be designed, and consumers' awareness and trust in the brand can be enhanced. Different marketing channels can also be determined based on the modality of different consumers to better reach the target consumer group. Consumer modality research can also help enterprises better maintain and manage their brands. By studying consumer modality, enterprises can understand consumer feedback and evaluation, adjust products and services in a timely manner, and enhance consumer satisfaction and loyalty.

Thirdly, the thinking of service design should emphasize user centered, and pay attention to the discovery and solution of user needs. In the construction of agricultural brand, the thinking of service design can help brand side to deeply understand the needs and feelings of consumers, and then provide them with products and services more in line with actual needs. The thinking of service design can also be applied to brand promotion and marketing. By conducting comprehensive research on the purchasing process of consumers and understanding their needs and issues, the brand side can better meet their needs and improve their satisfaction and loyalty. In addition, the thinking of service design can also be applied to the provision and management of brand services. By conducting comprehensive research on consumer service experience and understanding consumers' needs and issues during the service process, the brand side can improve service quality and satisfaction, and enhance the brand's competitiveness. For example, in the provision and

management of brand services, the thinking of service design method can be used to optimize the service process and service experience, improve service quality and efficiency, and thus enhance the brand's service quality and user experience.

4. MAIN RESEARCH CONCLUSIONS AND PROSPECTS

Through analyzing the literature graph of global agricultural brand research in the past 20 years, it is found that from the perspective of research progress, China's agricultural brand research is still in the pre-disciplinary stage. Although China has made some progress in the development of agricultural brands, there is still a significant gap compared to foreign countries. Chinese research focuses more on the brand perspective, which emphasizes brand construction and brand strategies of enterprises, while foreign research focuses more on the consumer perspective, which emphasizes consumer cognition of brands and factors that influence consumer behavior. In terms of cutting-edge research hotspots, global agricultural brand research is focusing on issues such as brand image, brand trust, and brand loyalty. Chinese research focuses more on the dissemination and maintenance of brand image, while foreign research focuses more on the establishment and maintenance of brand trust and loyalty.

5. CONCLUSION

In the new stage of development, agricultural brand construction has new era goals and historical missions. This article uses the current relatively cutting-edge bibliometrics research methods to draw a literature graph for the status quo of global agricultural brand research, sort out and outline the evolution of research in the field of global agricultural brands from a macro perspective, and provide new ideas and references for China's agricultural brand research. In future research, Chinese research should maintain good cooperative relationships with other countries while also embracing and observing the cutting-edge trends of the discipline from a broader perspective. It should also expand the depth and extension of local research based on actual situations, and assist in the specialization and internationalization of local research.

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