REVIEW ARTICLE

Knowledge Mapping Analysis of Research Hotspots and Development Trends in Green Consumption in China—A CiteSpace-Based Study

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Abstract

The global sustainability paradigm, catalyzed by environmental degradation since the 1960s, has positioned green consumption as a critical strategy to reconcile economic growth with ecological preservation. While international scholarship extensively explores this field, China's unique socioeconomic trajectory—marked by rapid industrialization, centralized governance, and the "dual carbon" (carbon peak and neutrality) targets—necessitates a dedicated investigation into its indigenous knowledge system. Leveraging CiteSpace, this scientometric study systematically analyzes 2,793 core journal articles from the Chinese National Knowledge Infrastructure (CNKI, 1994–2024) to map the intellectual evolution of green consumption research. Key findings reveal three developmental phases: initial conceptualization (1994–2000), rapid expansion (2001–2011), and thematic stabilization (2012–2024). Cluster analyses identify dominant research foci, including green marketing, circular economy, and ecological civilization, with emerging frontiers in carbon neutrality and digital economy. Despite high scholarly output, collaboration networks exhibit sparse connectivity (density = 0.0004–0.0005), reflecting structural barriers in China's academic evaluation system that prioritizes first-author publications over interdisciplinary synergy. Methodologically, this study advances a systematic knowledge map to guide future research and policy formulation, emphasizing the synergistic potential of digital innovation and green finance in implementing sustainable consumption. The findings underscore China's policy-driven research paradigm, contrasting with Western market-centric approaches, and provide actionable insights for global sustainability governance.

Keywords: green consumption; sustainable consumption; knowledge mapping; CiteSpace; digital innovation.

1 Introduction

The escalating climate crisis, evidenced by a 1.1°C global temperature rise [7], underscores the urgency of transitioning from traditional consumption models

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to sustainable paradigms. Green consumption, rooted in the 1992 Rio declaration [17], has gained traction as a mechanism to align consumer behavior with environmental stewardship. The concept of green consumption is not only derived from the Rio Declaration, but also closely related to the theoretical framework of sustainable development economics [6, 8]. While global research on green consumption has proliferated, China's unique socioeconomic context—marked by rapid industrialization and recent carbon neutrality commitments—warrants a dedicated analysis.

China's green consumption research has evolved under a distinct policy paradigm shaped by its rapid industrialization, and the integration of socialist ecological civilization into national strategies [12]. Unlike Western contexts, where market-driven sustainability dominates [4], China's indigenous knowledge system reflects a hybrid model blending state-led initiatives (e.g., the 'dual carbon' goals) with localized adaptations of global sustainability frameworks [10]. This study will focus on this evolving knowledge system and, based on the influence trajectory of relevant policies and cultural factors, explore insights that differ from the international paradigm. Leveraging CiteSpace [2, 11], this study employs CiteSpace-based scientometric analysis to systematically map the knowledge structure, thematic evolution, and collaboration patterns within China's green consumption research, offering actionable insights to advance interdisciplinary scholarship and evidence-based policy formulation.

2 Methodology

2.1 Data Sources and Research Methods

In this study, CiteSpace was used for scientific knowledge graph analysis, which has been widely verified in multi-field research and has been widely recognized in the academic field [1, 2]. This study uses the literature included in the Chinese National Knowledge Infrastructure (CNKI) as the data source, focusing on core journals and CSSCI source journals. To ensure a comprehensive and accurate retrieval of relevant literature, keywords such as "green consumption," "low-carbon consumption," and "sustainable consumption" were used for literature retrieval. The literature retrieval was conducted from the Chinese Social Sciences Citation Index (CSSCI) and the core journal database of Peking University, with no starting year limit and an ending year of 2024. A total of 3,293 domestic core journal literature records were retrieved from 1994 to 2024, and after removing some duplicate records, 2,793 literature records were finally retained for analysis.

2.2 Publication Analysis

2.2.1 Publication Volume Analysis

The number of publications in domestic core journals was statistically analyzed in chronological order. The results show that the research on green consumption in China has gone through three stages. From 1994 to 2000, it was the initial stage of green consumption research in China, with scholars beginning to explore this field in 1994. From 2001 to 2011, the research entered a rapid development stage, with a burst-like increase in the number of publications, experiencing three fluctuations and an upward trend during this period. After 2012, the number of publications gradually stabilized. As shown in Figure 1.

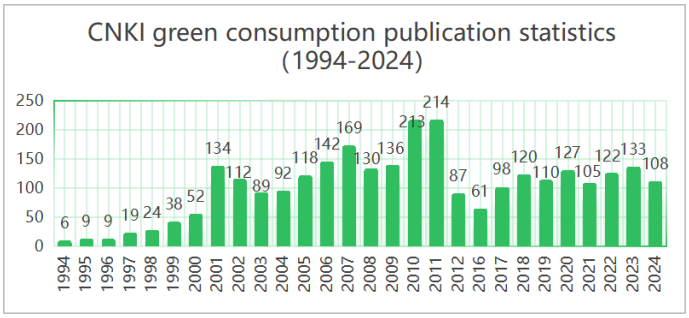


Figure 1. CNKI green consumption publication statistics.

2.2.2 Analysis of Major Study Authors and Institutions in China

Co-occurrence Analysis of Authors in Green Consumption Research in China Using CiteSpace software, a visual analysis of the authors of core journal literature in the field of green consumption retrieved from CNKI was conducted. The 2,793 records retrieved from the CNKI database were exported and converted into CiteSpace data format for analysis. In CiteSpace, the time was set from 1994 to 2024, the time slice was set to "1," and the node type was selected as "Author," resulting in the author network map shown in Figure 2. In the map generated by CiteSpace, the size of the node indicates the frequency of occurrence of the object represented by the node, with larger nodes indicating higher frequency. The diameter of the line between nodes represents the strength of the connection between two nodes, with stronger connections indicated by thicker lines. The author network map in Figure 2 has 685 nodes and 87 lines, with a network density of 0.0004, intuitively showing that there are many researchers

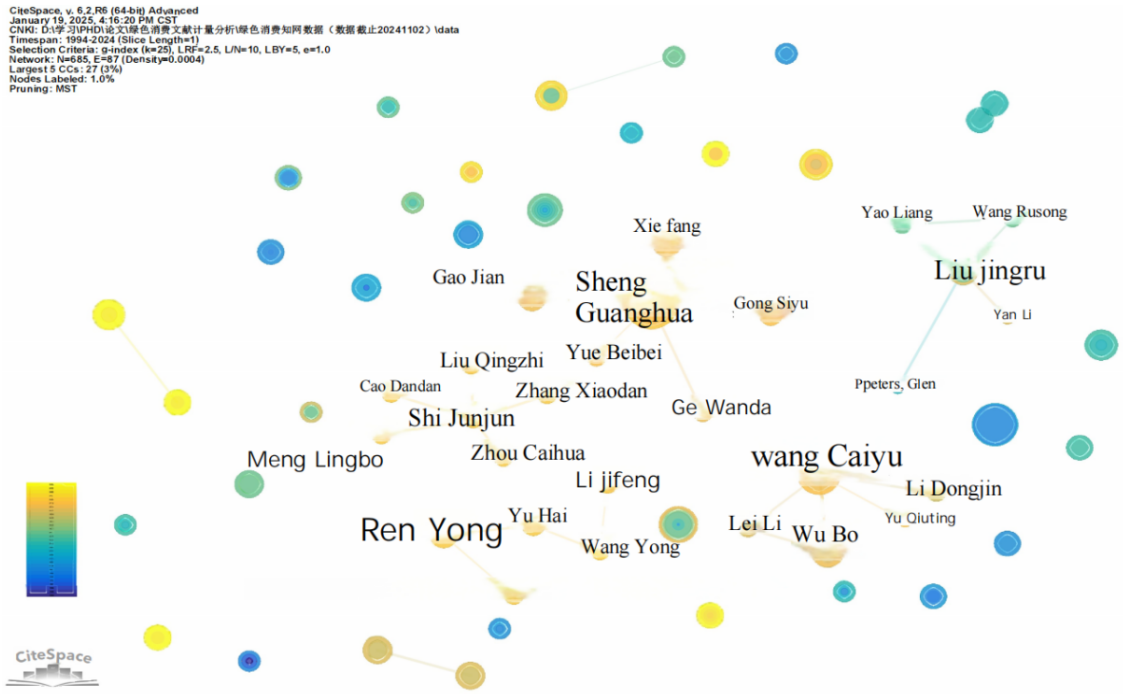


Figure 2. Author network diagram.

in the field of green consumption in China, but the cooperation network is relatively dispersed.

From the author publication frequency statistics, the top ten authors in terms of publication volume in the field of green consumption are: Sheng Guanghua, Xie Fang, Liu Jingru, Wang Caiyu, Ren Yong, Gao Jian and Wu Bo. As can be seen from Figure 2, the lines between authors are relatively sparse, indicating that the author cooperation network is relatively dispersed. Most literature authors are independent authors or co-authored by two people, with local cooperation networks as the main form, and no centralized cooperation network has been formed. According to the author publication frequency statistics, there are 685 authors who have published core journal papers in the field of green consumption, with 496 authors publishing only once, accounting for 72.41%, 144 authors publishing twice, accounting for 21.02%, and 45 authors publishing three or more times, accounting for 6.57%. Therefore, there are few high-yield authors in the field of green consumption. In addition, some larger nodes do not form lines with other nodes, indicating that some high-yield authors publish independently.

Co-occurrence Analysis of Institutions in Green Consumption Research in China To further analyze the publishing institutions and their cooperation networks in the field of green consumption, the node type in CiteSpace was set to "institution," with other settings unchanged, resulting in the institutional network map shown in Figure 3, with 642 nodes and 94 lines, and a network density of 0.0005. According to the institutional frequency statistics, the top ten institutions in terms of publication volume in the field of green consumption are: School of Business, Jilin University; School of Management, China University of Mining and Technology; School of Economics and Finance, Xi'an Jiaotong University; School of Business, Zhejiang University of Finance and Economics; Department of Psychology, Xinyang Normal University; School of Business, Central South University; School of Economics and Management, Beijing Forestry University; School of Management, Wuhan University of Technology; School of Business, Hunan University; Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, all with more than 8 publications.

As can be seen from Figure 3, in addition to the five institutions, including the School of Business, Jilin University, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, School of Business, Zhejiang University of Finance and Economics, Department of Psychology, Xinyang Normal University, and Institute of Sociology, Chinese Academy of Social Sciences, which have formed local cooperation networks in the field of green consumption, the remaining nodes have few lines, mostly distributed separately or in a two-point line, reflecting that the cooperation between institutions

in the field of green consumption in China is not yet close enough, and the existing cooperation nodes have thin lines, indicating that the strength of cooperation between institutions is weak. At the same time, some larger nodes do not form lines with other nodes, indicating that some high-yield institutions have not yet conducted cooperative research with other research institutions.

The sparse collaboration networks observed in this study (density = 0.0004) are attributable to structural constraints within China's academic evaluation system, which disproportionately incentivizes first-author publications while marginalizing interdisciplinary collaboration [20]. Compounding this issue are persistent institutional silos—evident in the disciplinary segregation between business schools and environmental science departments—that impede cross-domain knowledge synthesis. Empirical data reveal that only 12% of publications in the analyzed corpus (n = 2,793) involved cross-disciplinary co-authorship, a stark contrast to the 34% reported in European Union research consortia during the same period [20].

2.3 Analysis of Research Hotspots in Green Consumption in China

2.3.1 *Analysis of Hotspot Keywords in Green Consumption Research in China*

Since keywords are a high-level summary of the core content of literature, the research hotspots in a certain field can be determined by analyzing the keywords with higher frequency in the scientific and technological literature of that field, and the association between high-frequency keywords can reveal the internal connections of knowledge in that field to a certain extent. Therefore, a co-occurrence analysis of high-frequency keywords for domestic sustainable consumption research literature data can intuitively reveal the research hotspots in that field.

To further analyze the research hotspot keywords in the field of green consumption, the node type in CiteSpace was set to "keyword," with other settings unchanged, resulting in the keyword co-occurrence map shown in Figure 4. As can be seen from Figure 4, there are 711 nodes and 1,338 lines, with a network density of 0.0053. The warmer the node color, the more recent the publication time; the colder the node color, the more distant the publication time.

The largest node in Figure 4 is "green consumption," followed by: green marketing, circular economy, low-carbon economy, low-carbon consumption, ecological civilization, green development, green finance, influencing factors, consumption, etc. The practice of green marketing is highly related to the theory of consumer behavior [13]. The circular economy model has been proven to be a key path to resource efficiency improvement [3].

In addition, according to the keyword frequency statistics, a keyword frequency was obtained. There are 51 keywords in the field of green consumption research in China with a frequency of more than 10, among which the top 20 keywords and their frequencies are shown in Table 1. According to the centrality ranking, there are 75 keywords in the field of green consumption with a centrality of more than 0.01, and the top 20 high-centrality keyword information is shown in Table 1. Unlike the frequency of keywords, the centrality of keywords reflects their importance in the entire keyword co-occurrence network. Nodes with high centrality are more closely connected with other nodes, representing core research themes within a certain period and are also key nodes connecting different research themes. A systematic comparison of research frameworks across green finance, digital economy, and circular economy highlights fundamental divergences between China's state-driven paradigm and the market-oriented approaches predominant in international scholarship, particularly in governance models and innovation pathways (see Table 2).

2.3.2 *Cluster Analysis of Research Hotspots in Green Consumption in China*

To further explore and present the knowledge structure of research hotspots in this field, a cluster analysis of high-frequency keywords was conducted using the Log-likelihood ratio (LLR) algorithm in the CiteSpace clustering analysis module, resulting in the cluster map of research hotspots in green consumption shown in Figure 5. This map further analyzes the hotspots and knowledge structure in the field of green consumption.

The clustering generated a total of 711 nodes and 1,338 lines, with a modularity value Q of 0.5611 (an indicator used to mark whether clustering is suitable, generally between 0.4 and 0.8 is better) and an average silhouette value S of 0.8586 (an indicator used to mark internal similarity, with values between 0 and 1, the higher the value, the higher the similarity), indicating that the clustering effect is good, the threshold selection is reasonable, and the internal similarity is high, and the results are convincing.

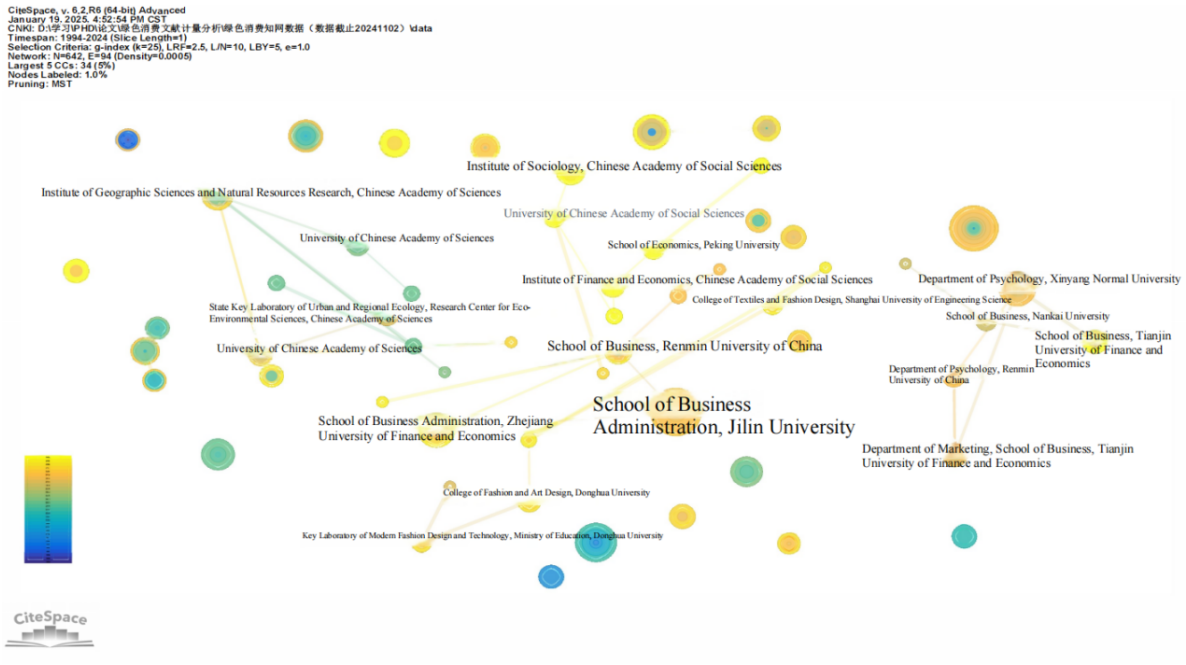


Figure 3. Institutions network diagram.

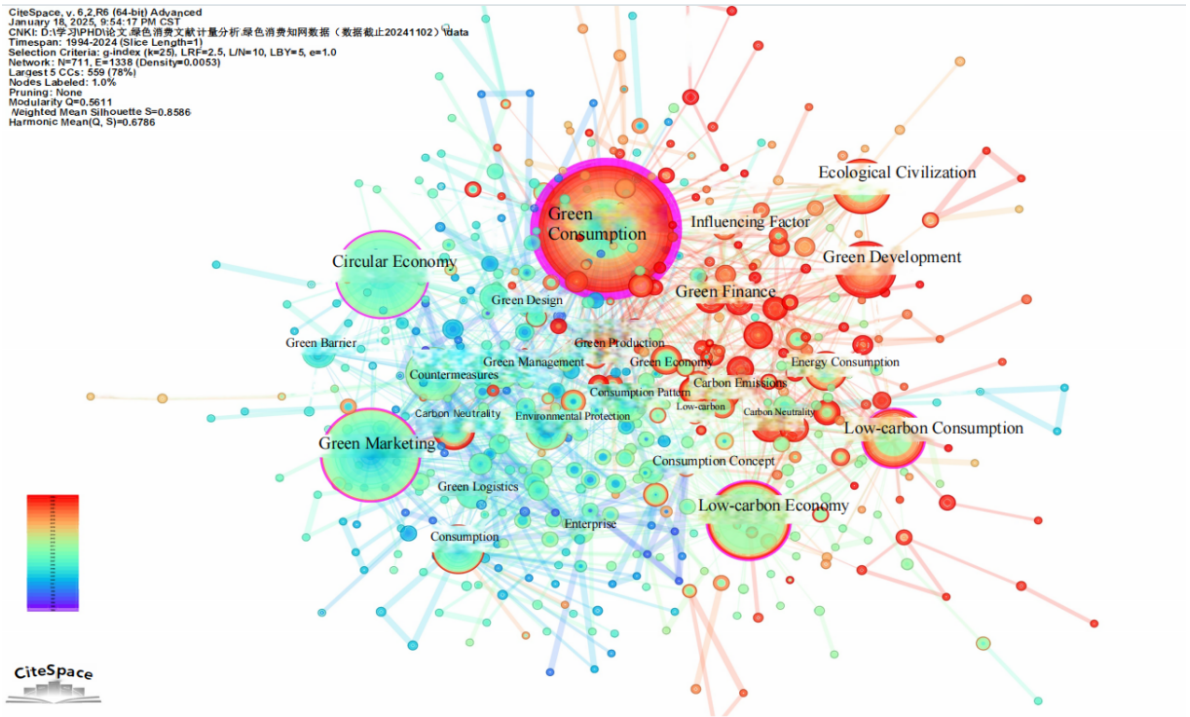


Figure 4. Keyword co-occurrence map.

As can be seen from Figure 5, the top seven research hotspot clusters in the field of green consumption are: green marketing, low-carbon economy, green marketing, circular economy, green development, ecological civilization, consumption, reflecting the seven major research themes in the field of green consumption.

2.4 Development Trends and Frontier Exploration of Green Consumption Research in China

This study uses the burst word map of green consumption research from 1994 to 2024 (Figure 6) to clearly see the research hotspots and development trends in the field of green consumption in China. The burst word analysis from 1994 to 2024 reveal the dynamic evolution path of green consumption research, providing a basis for further exploration of

Table 1. Top 20 hotspot keywords in green consumption research in China.

Rank	Frequency	Centrality	First Appearance Year	Keyword
1	406	0.62	1997	Green Consumption
2	190	0.18	1998	Green Marketing
3	150	0.15	2002	Circular Economy
4	117	0.18	2009	Low-Carbon Economy
5	85	0.1	2009	Low-Carbon Consumption
6	64	0.07	1998	Countermeasures
7	64	0.06	2012	Green Development
8	62	0.06	2008	Ecological Civilization
9	56	0.09	1999	Consumption
10	43	0.03	1998	Green Products
11	38	0.02	2010	Energy Consumption
12	36	0.03	1999	Consumption Patterns
13	35	0.02	1998	Environmental Protection
14	30	0.01	2010	Carbon Emissions
15	24	0.02	2001	Green Management
16	24	0.01	2021	Carbon Neutrality
17	23	0.03	1999	Enterprises
18	23	0.03	2017	Green Finance
19	22	0.02	2001	Green Barriers
20	20	0.03	2010	Influencing Factors

Table 2. Comparative analyses of research paradigms in China and internationally.

Research Theme	China's Focus	Global Focus (e.g., EU/US)
Green Finance	State-backed green bonds, policy tools	Market-driven carbon trading, ESG metrics
Digital Economy	Government-led e-platforms (e.g., Alipay's Ant Forest)	Corporate-led AI for supply chain optimization
Circular Economy	Industrial symbiosis in eco-parks	Consumer-facing product lifecycle management

its frontier areas.

2.4.1 Evolution of Research Hotspots

From the temporal distribution of burst words, the focus of green consumption research in China has gone through several development stages. From the early focus on "environmental protection" (1998-2002) and "consumption" (1999-2008), it gradually shifted to "green marketing" (2006-2007), "low-carbon economy" (2010-2012), and "ecological civilization" (2008-2020). In recent years, "carbon neutrality" (2021-2024), "carbon peak" (2021-2024), and "digital economy" (2022-2024) have become research frontiers, reflecting the profound impact of national policies and technological development.

The map shows multiple clusters, such as "low-carbon economy" and "green development," indicating that researchers are exploring the connection between green consumption and macroeconomic development and industrial transformation. In particular, the clusters of "circular economy" and "green finance" reflect the trend of research towards systemic and practical directions.

2.4.2 Focus and Expansion of Research Themes

Through timeline analysis, it can be found that the research on green consumption in China has gradually expanded from a single field to

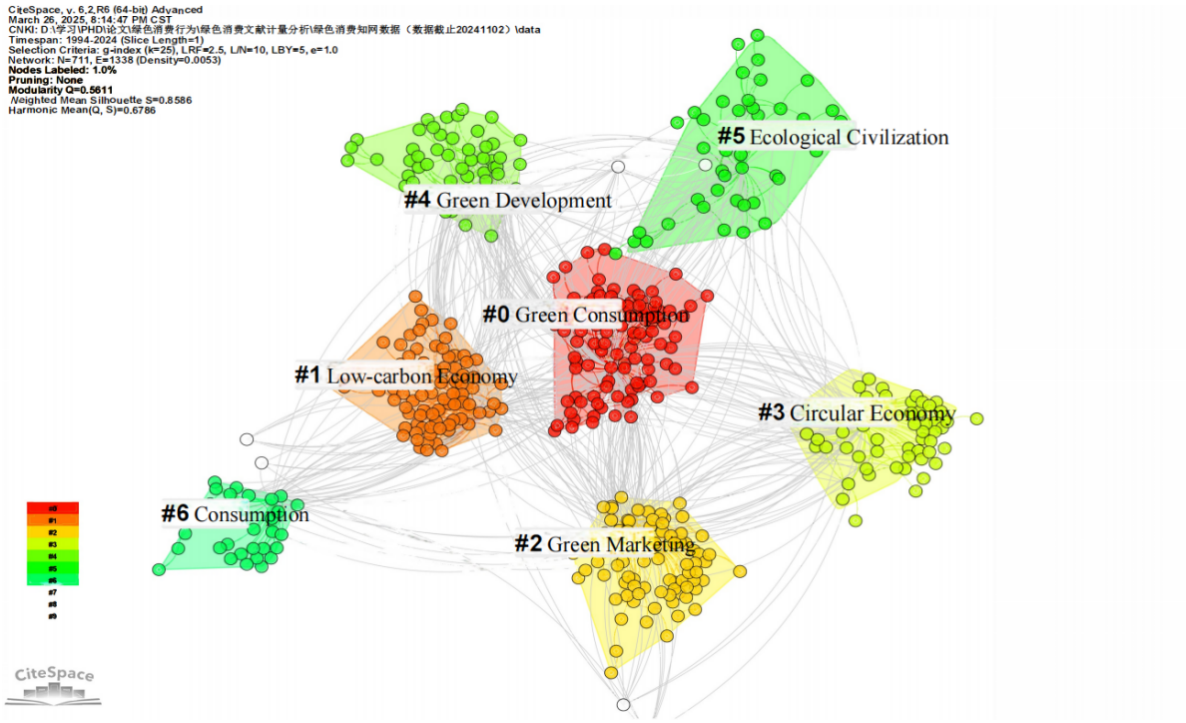


Figure 5. Clustering diagram of domestic hot spots of green consumption research.

interdisciplinary. Traditional environmental protection and consumption behavior research have gradually integrated perspectives from sociology, economics, and management. For example, the long-term activity of the word "influencing factors" (2010-2024) in the map indicates that researchers have continuously paid attention to the driving mechanisms, policy impacts, and cultural factors of green consumption. At the same time, "green finance" has become an important direction for research, showing that green consumption research has begun to expand from consumer behavior research to financial support and policy tools.

2.4.3 Frontier Exploration and Future Outlook

From the burst strength of keywords, "low-carbon consumption" (2009-2018) and "carbon neutrality" (2021-2024) have significant burst strength, indicating that low-carbon policies and global climate governance issues have played an important role in promoting green consumption research. The 'dual carbon' goals (announced in 2020) catalyzed a surge in research on 'carbon neutrality' (burst strength: 12.78) and 'peak carbon' (burst strength: 7.99) post-2021. For instance, A thematic analysis indicates that post-2021 publications frequently cite the *14th Five-Year Plan for Green Development* [12], this alignment between research agendas and state mandates reflects China's policy-driven research paradigm, wherein national strategies exert a direct influence on academic priorities [18, 19]. This aligns with global climate governance frameworks [7] but diverges in implementation mechanisms. In addition, the emergence of "digital economy" (2022-2024) reflects the potential of digital technology in promoting the transformation of green consumption, which may become a new research focus in the future.

3 Discussion of Results

The findings of this study provide a comprehensive overview of the research landscape in the field of green consumption in China. The analysis reveals several key insights that contribute to the understanding of the current state and future directions of green consumption research.

3.1 Evolution of Research Focus

The study shows that the focus of green consumption research in China has evolved over time, reflecting changes in societal priorities and policy directions. Initially, the research was centered on broad concepts such as "environmental protection" and "consumption," indicating a foundational stage where the basic principles and implications of green consumption were being explored. This period laid the groundwork for subsequent developments.

As the research progressed, the focus shifted towards more specific and actionable areas such as "green marketing," "low-carbon economy," and "ecological civilization." This shift suggests a growing recognition

Top 25 Keywords with the Strongest Citation Bursts

Keywords	Year	Strength	Begin	End	1994 - 2024
Environmental Protection	1998	7.19	1998	2002	
Consumption	1999	7.43	2000	2008	
Green Barrier	2001	9.16	2001	2005	
Countermeasure	1998	7.22	2004	2009	
Circular Economy	2002	41.36	2005	2009	
Harmonious Society	2005	6.62	2005	2008	
Green Marketing	1998	8.81	2006	2007	
Ecological Civilization	2008	8.29	2008	2020	
Low-carbon Economy	2009	45.96	2010	2012	
Low-carbon Consumption	2009	22.59	2010	2018	
Energy Consumption	2010	10.7	2010	2018	
Carbon Emission	2010	5.68	2010	2024	
Impact Factor	2010	5.15	2011	2020	
Green Development	2012	21.64	2016	2024	
Green Finance	2017	8.78	2017	2024	
Evolutionary Game	2017	5.09	2017	2022	
Better Life	2018	5.42	2018	2021	
New Era	2018	4.65	2018	2020	
Green Transition	2020	8.3	2020	2024	
Resident Consumption	2020	5.36	2020	2024	
Consumption Upgrade	2017	4.94	2020	2024	
Carbon Neutrality	2021	12.78	2021	2024	
Peak Carbon	2021	7.99	2021	2024	
Mediating Effect	2017	6.03	2021	2024	
Digital Economy	2022	5.12	2022	2024	

Figure 6. Keywords with the Strongest Citation Bursts of domestic green consumption research.

of the need for practical strategies and policies to promote green consumption. The emergence of these themes coincides with increasing global awareness of climate change and the urgent need for sustainable practices.

In recent years, the research has further expanded to include emerging topics such as "carbon neutrality," "carbon peak," and "digital economy." These topics reflect the influence of national policies aimed at addressing climate change and the potential of digital technologies to facilitate sustainable consumption. The inclusion of these themes indicates a maturation of the field, where research is now addressing more complex and integrated issues. China's 'dual carbon' targets have reoriented green consumption research from theoretical exploration to applied policy implementation. For example, studies on 'green finance' (centrality: 0.03) now emphasize fiscal mechanisms to subsidize low-carbon technologies, mirroring the State Council's 2021 guidelines on green bond issuance. This contrasts with the EU's market-driven carbon trading focus, underscoring China's state-centric approach.

3.2 Interdisciplinary Nature of Green Consumption Research

The study highlights the interdisciplinary nature of green consumption research, with contributions from fields such as sociology, economics, management, and environmental science. This interdisciplinary approach is essential for addressing the multifaceted challenges associated with green consumption. For instance, understanding consumer behavior requires insights from psychology and sociology, while developing effective policies and strategies necessitates expertise in economics and management.

The integration of these disciplines allows for a more holistic understanding of green consumption, encompassing both the behavioral and systemic aspects. This comprehensive approach is crucial for developing effective interventions and policies that can drive the transition towards sustainable consumption patterns.

3.3 Role of Policy and Technological Innovation

There are significant synergies between the policy path of China's 'dual carbon' target and international practices such as the EU Green New Deal [4]. The research underscores the significant role of policy and technological innovation in shaping green consumption. The formulation of China's 'dual carbon' targets (i.e., carbon peak and carbon neutrality) has generated significant catalytic momentum in both scholarly and practical domains [12]. These policy imperatives establish a strategic framework that aligns interdisciplinary research priorities with technological innovation pathways, thereby fostering the advancement of decarbonization technologies and

systemic transition strategies to operationalize these climate governance commitments.

The dominance of themes like 'ecological civilization' and 'green finance' underscores the alignment of research with state priorities, reflecting a top-down knowledge production model. This contrasts with Western studies, where grassroots movements and corporate sustainability often drive research agendas. Such divergence highlights the necessity of analyzing China's green consumption research as a unique case study of policy-scholarship symbiosis.

While Western studies prioritize consumer autonomy (e.g., nudge theory; [16]), Chinese research emphasizes institutional frameworks, reflecting Confucian collectivist values. For instance, 'ecological civilization' (centrality: 0.06) integrates Marxist ecological theory, a concept absent in Euro-American literature [5]. The circular economy model in China focuses on industrial symbiosis in eco-parks [3], contrasting with the EU's consumer-facing product lifecycle management. Moreover, the rise of digital technologies presents new opportunities for promoting green consumption [10]. The use of big data, artificial intelligence, and other digital tools can enhance consumer awareness and facilitate more sustainable consumption behaviors. This technological dimension is likely to become increasingly important as the field continues to evolve.

3.4 Collaboration and Knowledge Sharing

The analysis also reveals the importance of collaboration and knowledge sharing in advancing green consumption research. While the study identifies a number of high-yielding authors and institutions, it also highlights the relatively dispersed nature of the research network. This suggests that there is room for greater collaboration and exchange between researchers and institutions. China's academic evaluation system, which prioritizes quantitative publication metrics (e.g., SCI-indexed papers), has entrenched a 'publish-or-perish' culture [14]. Coupled with funding allocation mechanisms that disproportionately favor established institutions such as the Chinese Academy of Sciences [15], this ecosystem discourages risk-taking in collaborative research, particularly in exploratory or interdisciplinary domains [9].

Enhanced collaboration can facilitate the sharing of ideas, resources, and methodologies, leading to more robust and impactful research. Furthermore, fostering international cooperation can provide access to global perspectives and best practices, enriching the research landscape in China.

4 Conclusions and Future Research

4.1 Conclusions

This study systematically analyzed the relevant literature in the field of green consumption in China using the CiteSpace tool, revealing the research hotspots, development trends, and main literature in green consumption. The results show that the research on green consumption in China has gone through three stages: the initial stage from 1994 to 2000, the rapid development stage from 2001 to 2011, and the stage of gradual stabilization after 2012. This trend is closely related to the domestic attention to environmental issues and policy support.

The research hotspots in the field of green consumption are mainly focused on green marketing, circular economy, low-carbon economy, ecological civilization, green development, etc. These hotspots reflect the close connection between green consumption and macroeconomic, industrial transformation, environmental protection, and other aspects. In particular, the proposal of concepts such as "carbon neutrality" and "carbon peak" has further promoted the deepening of green consumption research.

In addition, this study also found that although there are many researchers in the field of green consumption, the cooperation network is relatively dispersed, the number of prolific authors is limited, and the cooperation between institutions is not yet close enough. This indicates that in the future, it is necessary to strengthen the cooperation between scholars, promote the exchange and cooperation between different institutions, and promote the further development of green consumption research.

4.2 Future Research

Based on the above research conclusions, future green consumption research can be further explored in the following aspects:

4.2.1 Consumer Behavior Transformation under the Carbon Neutrality Goal

With the proposal of the carbon neutrality goal, the behavior patterns and consumption preferences of consumers will undergo significant changes. Future research can further explore the characteristics, influencing factors, and changing trends of consumers'

green consumption behavior under the carbon neutrality goal, providing a scientific basis for policy-making and corporate marketing.

4.2.2 *Green Consumption Models Driven by Digital Technology*

The rapid development of digital technology has brought new opportunities and challenges to green consumption. Future research can focus on how digital technology promotes the innovation of green consumption models, such as improving consumers' green consumption awareness and behavior participation through big data, artificial intelligence, and other technological means.

4.2.3 *Optimization Design of Green Financial Support Systems*

As an important means to promote green consumption, the optimization design of the green financial support system is crucial. Future research can explore how to promote the further development of the green consumption market and improve the economic feasibility and social acceptance of green consumption through green financial instruments and policy support.

4.2.4 *Deepening of Interdisciplinary Research*

Green consumption research involves multiple disciplines. In the future, it is necessary to further strengthen interdisciplinary research and integrate theories and methods from sociology, economics, management, environmental science, and other disciplines to provide a more comprehensive and in-depth perspective for green consumption research. Future studies can learn from the "nudge theory" in behavioral economics [16] to design more effective green consumption intervention strategies.

4.2.5 *International Cooperation and Exchange*

Green consumption is a global issue that requires cooperation and exchange between countries. Future research can strengthen international cooperation, learn from international advanced experience and research results, and promote the international development of domestic green consumption research.

In summary, the research on green consumption in China has gradually formed a trend of shifting from basic theoretical research to applied practice, and the integration of cross-fields has become an important driving force for the deepening of research. In the future, researchers can further focus on the transformation of consumer behavior under the carbon neutrality goal, the green consumption model driven by digital technology, and the optimization design of the green financial support system, to provide theoretical support and practical guidance for the green economy and sustainable development.

Data Availability Statement

Not applicable.

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Conflicts of Interest

Chunsheng Wang served as an Associate Editor of the *Journal of Social Systems and Policy Analysis* at the time of manuscript submission. To ensure the integrity of the peer-review process, Chunsheng Wang was not involved in the editorial handling, peer review, or decision-making process for this manuscript, which was handled independently by another editor. The remaining authors declare no conflicts of interest.

Ethical Approval and Consent to Participate

Not applicable.

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