

From Discourse Analysis to the Construction of Discourse Identity: A Bibliometric Study of China's Science and Technology Discourse

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Abstract: In the context of increasingly fierce global technological competition, the study of technological discourse has become an important perspective for examining a country's soft power and building cultural identity. Using 1,051 journal articles retrieved from the CNKI database spanning 2000–2025 as the sample, this paper adopts bibliometric methods and employs VOSviewer for visual analysis to systematically map the knowledge landscape and developmental trajectory of research on China's science and technology discourse. The research results show that this field has gone through three stages - initial emergence, slow development and rapid growth, and has formed a cross-disciplinary research model centered on journalism and communication studies, linguistics, etc. The research themes cluster around four areas: discourse strategies in science and technology communication, sci-tech journals and international discourse power, sci-tech translation and discourse reconstruction, and science and technology discourse in ideological and political education. The research perspective is undergoing a paradigm shift from “communication effects” to “identification mechanisms” with keywords such as “cultural identity” and “cultural self-confidence” gradually emerging. This study employed the method of bibliometrics to trace the development trend of China's technological discourse research, from discourse analysis to identity construction. It provides a reference for future related research.

Keywords: Science and Technology Discourse; Bibliometric Analysis; VOSviewer; Knowledge Map; Research Hotspots; Cultural Identity

1. Introduction

As “the systematic expression of scientific knowledge, technological principles, and their social applications by the scientific community” [1], science and technology discourse serves not only as a vital vehicle for conveying scientific and technological information but also as a key force in constructing national image and shaping cultural identity. From the perspective of cultural identity theory, identity is not a pre-existing essence but a practical process actively constructed through discourse [2]. Hence, as crucial discursive practices and carriers of discourse contestation, science and technology narratives [3] profoundly influence the public's, especially young people's, cultural identification and sense of belonging. Nevertheless, China has achieved historic accomplishments in science and technology.

The uniquely distinctive Chinese science and technology discourse system has been shaped by major breakthroughs in manned spaceflight, the BeiDou Navigation System, 5G communications, artificial intelligence, and quantum information. This discourse system still lacks a systematic review of its disciplinary structure, evolutionary logic, and core themes. Addressing these issues not only helps grasp the developmental patterns of this field but also provides literature support and theoretical positioning for in-depth empirical research on the relationship between science and technology discourse and cultural identity.

However, despite the remarkable technological achievements, the academic community still lacks a systematic literature analysis of the overall knowledge structure, evolution trajectory, and core issues of the specialized field of “Chinese technological discourse”. Therefore, this article attempts to answer the following questions: What are the periodic characteristics and overall trends in China's research on technological discourse since the beginning of

this century? Which authors and institutions constitute the core forces in this field? What kind of cooperation networks have they formed? How have the research hotspots emerged and what is their internal structure like? How has the research frontier developed and in what position does the “cultural identity” perspective stand?

To systematically answer the above questions, traditional qualitative reviews are inadequate. However, bibliometric methods can objectively reveal the disciplinary structure, collaboration networks, and topic evolution based on large-scale literature data. Therefore, this study uses the CNKI database as the data source and employs the VOSviewer tool for visual analysis, aiming to fill the knowledge gap. Theoretically, this paper is the first to systematically apply bibliometric methods to review the developmental process of China’s science and technology discourse research from 2000 to 2025. This paper systematically sorts out the field’s knowledge architecture, summarizing its core research groups, popular research themes and evolutionary trends. The holistic field cognition constructed herein offers references for subsequent academic research. It takes research frontiers as its starting point. It adopts cultural identity as an analytical lens throughout the analysis. The empirical findings of this study can help refine science communication strategies and boost the constructive influence of scientific discourse. We retrieved relevant papers about scientific discourse from CNKI spanning 2000 to 2025 to form our research sample. On this basis, bibliometric approaches and VOSviewer 1.6.20 visualization software are applied to generate knowledge maps and carry out systematic analysis. We first calculated the annual publication quantity of all retrieved literature. Then, we performed a series of analyses covering author collaboration networks, institutional co-occurrence, keyword clustering and time overlay graphs, which clarify the

developmental status, core hotspots and frontier trends within this field.

2. Data Sources and Research Methods

We extracted data from the CNKI journal database via subject retrieval. The search terms included “scientific discourse”, “technological discourse”, and “science communication”. We limited the publication years to 2000–2025. A total of 3036 documents were retrieved in the initial search in March 2026.

We manually filtered the retrieved literature. Items like meeting notices, book reviews, call-for-paper notices, opening speeches and news reports were excluded, as these were not formal research papers. We also deleted repeated papers and entries with missing information. The screening yielded 1051 valid studies in total. We then exported all records in RefWorks. The dataset included titles, authors, affiliations, keywords, abstracts and publication years for follow-up quantitative analysis.

This article uses the VOSviewer software developed by Leiden University in the Netherlands to generate a knowledge graph. The specific analysis methods include: dividing the research stage based on the annual publication volume statistics; identifying the core authors and their collaboration relationships through the analysis of the author collaboration network; revealing the distribution of the main research forces through the analysis of institutional co-occurrence; using keyword co-occurrence networks and clustering analysis to identify the research hotspots and their internal structures; and combining with time view overlay analysis, using the average publication year of keywords to reveal the development trends of the research frontiers.

3. Annual Publication Volume Distribution and Research Stage Division

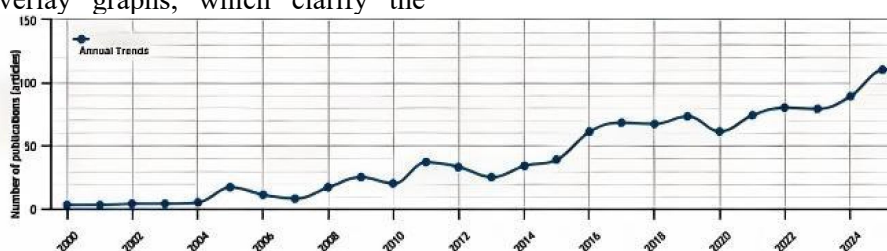


Figure 1. Annual Publication Volume Distribution of China’s Science and Technology Discourse Research (2000–2025)

The annual publication volume of the 1,051 articles is presented in Figure 1. Based on the

trend in publication volume, the development of China’s science and technology discourse

research from 2000 to 2025 can be divided into three stages.

Emergent Stage (2000–2008): The average annual publication volume was fewer than 20 articles, with research being sporadic and exploratory. Early studies primarily focused on the linguistic feature analysis of scientific texts, such as genre analysis of scientific paper abstracts and the grammatical features of English for science and technology. Researchers in this stage were predominantly scholars from the fields of foreign language teaching and linguistics.

Slow Growth Stage (2009–2018): The publication volume rose steadily, averaging approximately 30 to 60 articles per year. Major technological advances in high-speed rail and aerospace took place in China around 2009, drawing academic attention to science communication. In addition, the popularity of international discourse analysis expanded the scope of domestic research. Several sporadic studies focused on journal internationalization and scientific translation during this phase.

Rapid Development Stage (2019–2025): Publication output in this field saw exponential

growth year by year. The annual paper count rose above 60 in 2019, then climbed past 80 in 2023. If this upward trend continues, the total number will reach more than 100 in 2025. This explosive growth is associated with multiple factors: intensifying Sino-US technological competition made “science and technology discourse power” a policy and academic hotspot; the rapid iteration of emerging technologies such as artificial intelligence and 5G stimulated extensive research on technological discourse construction; and the national strategic deployment of “accelerating the construction of a philosophical and social sciences discourse system with Chinese characteristics” injected strong momentum into the field.

The stepwise increase in the number of publications reflects the external popularity of this field. However, to understand the underlying driving forces, it is necessary to investigate from two dimensions: author collaboration and institutional distribution.

4. Core Authors and Institution Analysis

4.1 Author Collaboration Network

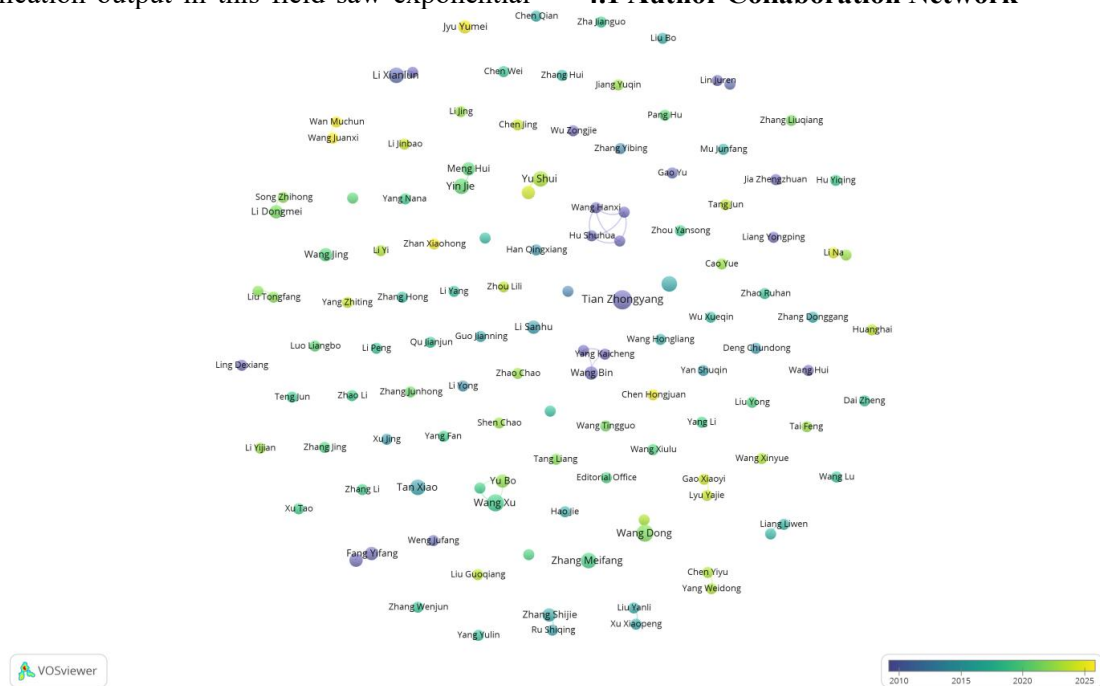


Figure 2. Distribution Map of Author Collaboration Network for Chinese Science and Technology Discourse Studies (2000-2025)

As shown in Figure 2, based on the co-occurrence analysis of authors, several relatively stable core author groups have emerged in research on China’s science and technology discourse. In the field of journalism and communication, scholars at Tsinghua

University have conducted sustained research on “science and technology communication and national image”. In linguistics, scholars at Qilu University of Technology have produced prominent research on the emotional discourse and rhetorical construction of science and

technology news [4]. Many researchers from various universities are focusing on the topic of “digital intelligence technology” and “ideological and political education discourse”. Overall, the density of the author collaboration network is low, and cross-institutional and cross-disciplinary cooperation remains insufficient. Most studies are conducted individually or in small teams, and a large-scale, normalized academic community has yet to form. This indicates that the field is still in a phase of “individual-based” research, thus necessitating strengthened organized scientific collaboration in the future.

4.2 Core Research Institutions

Regarding institutional distribution, China’s science and technology discourse research has formed a multi-point distribution with key concentrations. The main research institutions can be categorized into three types: first, the journalism and communication schools of comprehensive universities (e.g., the School of Journalism and Communication at Renmin University of China, the School of Journalism at Fudan University, the School of Journalism and Communication at Tsinghua University, and the Communication University of China), which primarily focus on issues such as strategic narratives in science and technology communication, the construction of international discourse power, and science and technology discourse in the context of new media; second, foreign language institutions and the foreign language schools of comprehensive universities (e.g., Beijing Foreign Studies University, Shanghai International Studies University, and Guangdong University of Foreign Studies), which focus on linguistically oriented research on sci-tech translation, academic discourse analysis, and the textual features of scientific papers; third, colleges focusing on ideological and theoretical studies (e.g., the relevant research departments at Xi’an Jiaotong University, Southwest University, and East China Normal University), which concentrate on issues such as digital-intelligent technology empowerment of ideological and political education discourse and the ideology of science and technology. Additionally, the history and philosophy of science and technology programs at science and engineering institutions such as the University of Chinese Academy of Sciences and the University of Science and Technology of

China also occupy an important position in science and technology discourse research, reflecting the interdisciplinary academic origins of this field.

5. Thematic Clustering Analysis of Research Hotspots

Based on the standardized processing of keywords from the 1,051 articles (merging synonyms, removing overly generic terms), keywords with a frequency of ≥ 5 were extracted to construct a co-occurrence matrix, and clustering analysis was performed using VOSviewer. The results demonstrate that the research hotspots can be classified into four major thematic clusters. In this way, we can condense the scattered topics into several meaningful clusters, thereby identifying the core issue groups in this field. As shown in Figure 3. With respect to clustering strength, “discourse strategies and strategic narratives in science and technology communication” ranks first. The core keywords of this cluster include “science and technology communication”, “science communication”, “discourse strategy”, “narrative strategy”, “national image”, and “international communication”. Research primarily explores: how science and technology news constructs national image through discourse [5]; how science documentaries employ multimodal discourse to achieve science communication and identity construction [6]; the construction of an affinity-oriented discourse in new media science communication [7]; and the agenda-setting and empathic communication of major scientific and technological events (such as manned spaceflight and anti-pandemic technology) [8]. Keywords such as strategic narrative and geopolitics have recently gained popularity in this field. This shows researchers now analyze sci-tech communication against the backdrop of great-power rivalry. Zheng et al. [3] studied global disputes over DeepSeek, while Jing and Hu [9] investigated overseas discourse used by Chinese tech firms. Their work well illustrates this change of research perspective. In addition to the communication patterns summarized in previous studies, large-scale live technological events also exhibit significant changes in their discourse. The 2024 Chang’e-6 lunar sample return mission serves as a typical illustration. Domestic mainstream media abandoned the conventional style of simply releasing technical breakthroughs, and built a

two-layer narrative that balances shared human destiny and cultural rejuvenation. They highlighted cross-border collaborative equipment and open data sharing, while weaving timeless poetic motifs of moon exploration alongside contemporary aerospace visuals. This approach of framing rigorous technical progress with warm, accessible storytelling sparked

extensive spontaneous commentary and derivative works from young online users, outperforming rigid conventional tech news frameworks in outreach. This real-life case demonstrates that the logic of identity construction in technological discourse is not only a theoretical topic but is also tested and applied in actual communication practices.

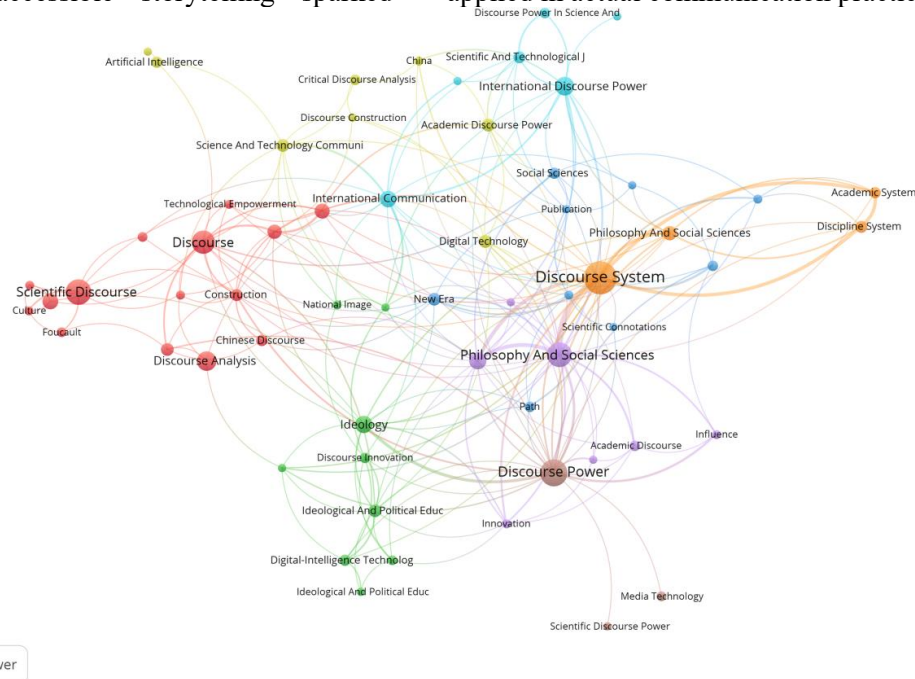


Figure 3. Clustering Analysis Map of China's Science and Technology Discourse Research

The second cluster reflects obvious Chinese features and policy trends. Its central theme revolves around sci-tech journals and the building of international discourse power. Key terms include Chinese sci-tech journals, English-language academic journals, international discourse power, academic influence and international standards. Research in this cluster falls into four main strands. First, many studies discuss how domestic journals can boost global influence and gain greater discourse initiative [10,11]. Second, scholars examine digital platform building and the reshaping of communication discourse [12]. Third, joint activities between journals and academic conferences help raise their global profile [13]. Fourth, taking part in drafting international standards enables researchers to secure technological discourse power [14,15]. These publications lead to a clear conclusion. Sci-tech journals are far more than places to release academic findings. They have become critical platforms to control academic evaluation and set research agendas. Turning China from a major producer of academic papers into a nation with

leading academic discourse has become a key strategic priority for national innovation. Most contributors to the third cluster come from linguistics and translation studies. Their research centers on sci-tech translation and the reconstruction of discourse. High-frequency terms in this cluster include sci-tech translation, discourse reconstruction, term translation, corpus, and discourse analysis. Existing studies fall into several themes: researchers explore English translation strategies and cross-cultural discourse transformation for ancient Chinese scientific works including Tiangong Kaiwu [16]; some papers examine the pragmatic functions of first-person pronouns within research abstracts [17]; other works make comparisons between the academic writing styles of Chinese and Western scholars; still others analyze how AI translation reshapes the global international communication discourse system [18]. The theoretical contribution of this cluster lies in revealing that sci-tech translation is not merely a conversion of linguistic symbols but a cross-linguistic practice of knowledge systems, modes of thinking, and discourse power. The

study by Shan and Liao [19] on translators' national consciousness in the sci-tech translation activities of the late Qing and early Republican periods offers valuable insight into the historical connection between science and technology discourse and cultural identity.

As a distinctly Chinese research cluster, the fourth cluster focuses on "science and technology discourse in ideological and political education".

This cluster features core keywords: ideological and political education, digital intelligent technology, algorithm recommendation, discourse innovation, and ideological discourse power. Three major research themes dominate relevant literature: how big data, artificial intelligence and algorithms empower the discourse system of ideological and political education [20,21]; what discourse risks emerge alongside digital intelligent technology and its governance, including information cocoons and value alienation [22]; and how researchers can strengthen public recognition of mainstream ideology by constructing sci-tech narratives [23]. This research strand reveals the special ideological role of sci-tech discourse in China's academic landscape. We can draw clear insights into embedding sci-tech discourse within ideological education from the C919 passenger jet's commercial rollout over the last two years.

Stiff official policy talks lack the pull of the C919's development milestones, supply chain self-reliance wins, and live footage of its first commercial flight. These weave a stirring narrative of persistent innovation. Surveys of us reveal their conversations rarely center on technical specifications. Instead, they gravitate toward the collective identity and national pride tied to the label "Made in China". Technology counts as more than just a productive force; it also acts as a key vehicle to spread values and shape collective identity. Researchers in this field mainly concentrate on one central question: how to turn scientific breakthroughs into materials for patriotic education and public communication.

The cluster map clearly reveals the general pattern of research hotspots in this field. However, research interests do not remain constant, and their temporal evolution is also worthy of attention.

6. Discussion

Using the overlay time view function of

VOSviewer and coloring by the average publication year of keywords, the evolutionary trends of the research frontiers can be identified. Through bibliometric analysis and knowledge mapping, this study has systematically reviewed the knowledge landscape and developmental trajectory of China's science and technology discourse research from 2000 to 2025, leading to the following conclusions.

First, China's science and technology discourse research has entered a rapid development stage. Since 2019, the volume of publications has grown exponentially, with research enthusiasm highly correlated with the rise in national scientific and technological strength and strategic demands. This subject once remained on the fringes of academic inquiry, yet it has since grown into a major research priority. Drawing on journalism, communication studies and linguistics, scholars have built a solid interdisciplinary analytical framework.

Additionally, we can sort existing studies into four distinct themes. They cover strategic discourse in science communication, global discourse power built through academic journals, reshaped discourse generated in sci-tech translation, and the application of scientific discourse in ideological education. These four themes, while each having their own emphases, are interconnected and together constitute the overall knowledge structure of China's science and technology discourse research.

This field has witnessed a clear shift in research paradigms. Early scholars concentrated on linguistic traits within scientific writings, before turning their attention to communication strategies and outcomes. More recent work centers on global discourse competition and the formation of cultural identity. Such progressive changes demonstrate that Chinese researchers keep their studies closely tied to national strategic priorities.

Although cultural identity has become an increasingly prevalent research angle, relevant literature still lacks cohesion. As shown in Figure 4, most studies regard cultural identity only as a side effect of science communication. Few scholars set sci-tech discourse as an independent variable to conduct thorough research on identity construction. On the whole, the field still faces obvious limitations: theoretical frameworks remain underdeveloped, empirical approaches lack diversity, and well-designed case studies are far from sufficient.

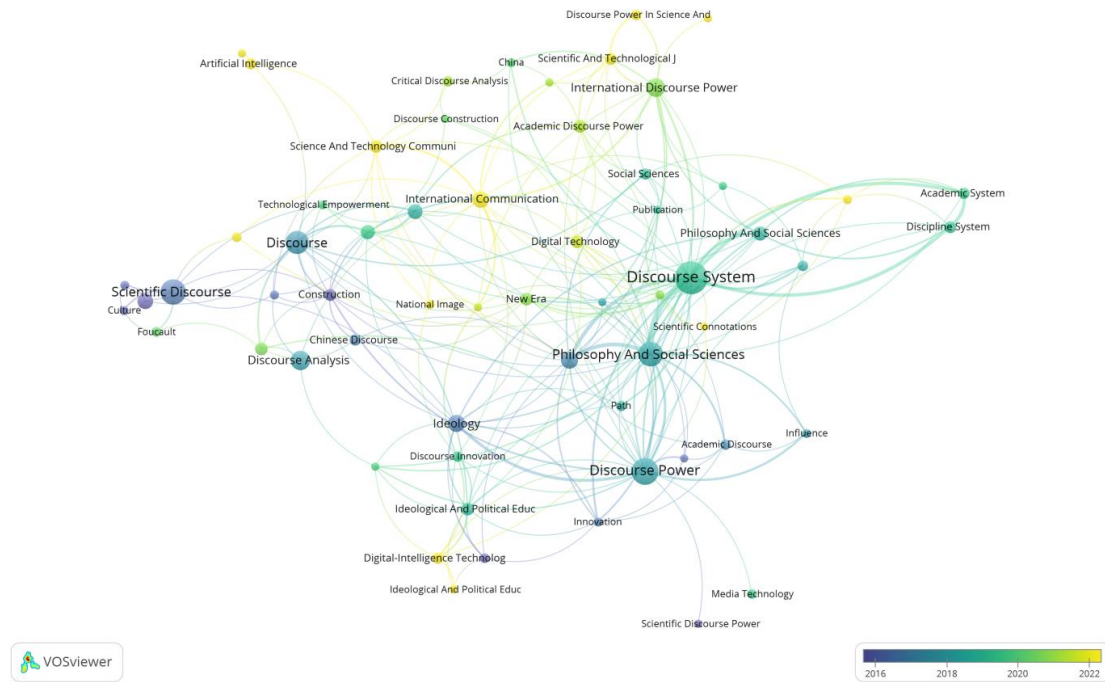


Figure 4. Temporal Clustering Analysis Map of China's Science and Technology Discourse Research

Future studies can move forward along three avenues. Scholars may draw on discourse-historical analysis to uncover how scientific narratives evolve into patriotic discourse. Using sentiment analysis and online ethnography, researchers can investigate how these narratives stir emotional resonance and build collective identities. Cross-group comparative work can also unpack audience discrepancies in reception, alongside the mechanisms behind identity formation. For example, we could compare how Generation Z and older adults respond emotionally to the same major scientific or technological news, and how their identities are shaped through that process. Our preliminary observations suggest that the younger group tends to see technological achievements as cultural resources they can participate in and co-create, whereas the older group is more likely to treat such achievements as authoritative proof of value. Exploration along these directions will help propel China's science and technology discourse research from functional analysis toward constructive interpretation.

7. Conclusion

Based on bibliometric and knowledge mapping methods, this study conducted a systematic analysis of the research literature on China's science and technology discourse from 2000 to 2025, comprehensively presenting the field's

development process, research forces, thematic clusters, and frontier trends. The research results indicate that the study of Chinese technological discourse is generally showing a rapid upward trend, and has formed a cross-disciplinary model centered on fields such as news communication and linguistics. The research themes are concentrated in four major areas: science and technology communication strategies, sci-tech journals and international discourse power, sci-tech translation and discourse reconstruction, and science and technology discourse in ideological and political education. The field is undergoing a paradigm transformation from discourse analysis to identity construction, with topics such as cultural identity and cultural self-confidence gradually becoming frontier directions, though related research remains relatively weak. Future research urgently needs to strengthen the theoretical construction and practical application of deepening cultural identity and cultural self-confidence, thereby providing solid academic support for the paradigm leap of China's science and technology discourse system from "descriptive interpretation" to "guiding construction".

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