

## Postprint: Analysis of the Trajectory of Domestic Knowledge Services Research, 1992-2016

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### Abstract

[目的 / 意义] This study conducts a statistical analysis of 2,239 Chinese journal papers in the knowledge service research domain collected in the CNKI database, aiming to provide insights for future research.

[方法 / 过程] Employing bibliometric methods, this research performs a quantitative analysis of domestic knowledge service research, examining the distribution of publication volume, journal sources, core author distribution, highly cited literature, high-frequency keywords, as well as research scope and service objects.

[结果 / 结论] The analysis identifies shortcomings in existing research: knowledge service has not yet achieved a unified consensus, lacks systematic investigation, features more theory than practice with insufficient guidance, and lacks an effective evaluation mechanism. Future development trends of knowledge service are manifested in three aspects: acquisition of knowledge service content and technology, ubiquitousization of knowledge service, and team-based organization of knowledge service subjects.

### Full Text

#### Preamble

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**Analysis of Domestic Knowledge Service Research Trends from 1992 to 2016**

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## Abstract

**[Purpose/Significance]** This study conducts a statistical analysis of 2,239 Chinese journal papers on knowledge service research collected in the CNKI database to provide assistance for subsequent research. **[Method/Process]** Based on bibliometric methods, this paper performs a quantitative analysis of domestic knowledge service research, examining literature volume distribution, journal sources, core author distribution, highly cited papers, high-frequency keywords, and research scope and service objects. **[Result/Conclusion]** The analysis identifies existing research deficiencies: knowledge service has not yet formed a unified consensus, lacks systematic research, features more theory than practice with weak guidance, and lacks effective evaluation mechanisms. Future development trends in knowledge service are reflected in three aspects: acquisition of knowledge service content and technology, “ubiquitization” of knowledge service, and team-based organization of knowledge service providers.

**Keywords:** knowledge service; library; current status; development trends

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## Introduction

Knowledge service, as a new service concept, essentially integrates service with knowledge needs. In the 1990s, driven by the development of information technology and deepening research on the knowledge economy, the concept of knowledge service emerged. Knowledge service is a process that extracts services meeting various customer knowledge needs from massive, disordered information resources. In the knowledge economy era, knowledge service has become increasingly important for economic development.

Domestic scholars' research on knowledge service originated from Guo Jinnan et al.'s 1990 paper “Actively Exploring Correspondence Training and Proactively Providing Knowledge Service” [1]. Dai Guangqiang proposed new perspectives on knowledge service in his paper “Medicine Expanding from Technical Service to Knowledge Service—A New Era of Medical Development” [2]. In 1998, Wang Changwen [3] mentioned in his paper “Calling for ‘Knowledge Service’ ” that several major shopping malls in Jinan were conducting knowledge lectures to attract customers, introducing knowledge service and awakening domestic awareness of this concept. Knowledge service first appeared in the library and information science field in Ren Junwei's 1999 paper “Knowledge Economy and Library Knowledge Service” published in *Library and Information Science Knowledge* [4], thus opening the prelude to knowledge service research in the library and information community. Zhang Xiaolin's 2000 paper “Towards Knowledge Service: Seeking Growth Points for Library and Information Work in the New

Century” [5] analyzed the operational models of knowledge service, sparking a research boom in the library and information field. Chen Jingzeng argued that libraries must follow four established principles to develop knowledge services: proactivity, timeliness, continuity, and profitability [6]. Wang Mingliang et al. [7] proposed that to achieve a transformation in knowledge service models, a new model should be constructed on the basis of existing information services, namely “knowledge warehouse + knowledge service platform,” providing new ideas for the transition from information service to knowledge service. As domestic scholars’ research on knowledge service deepened, Wang Qingyao offered new insights into personalized knowledge service in his paper “Personalized Knowledge Service: A Deeper Approach to Researching Knowledge Services in Domestic Research University Libraries” [8]. Wang Weijun et al. conducted systematic analysis and research on Wiki-based knowledge service [9]. With deepening research and technological development, new knowledge service approaches based on ontology, semantic web, and Web 2.0 gradually became research directions for scholars. Li Jing et al. applied ontology technology to knowledge service practice, proposing ontology-based retrieval system models and user models to innovate knowledge service methods [10].

Currently, knowledge service research is mainly concentrated in the library and information field, and domestic scholars focus more on theoretical and macro-level studies. This paper conducts a bibliometric analysis of domestic journal papers in the knowledge service field, summarizes the current development status and existing problems, analyzes development trends, and provides references for subsequent research.

## 1 Data Sources

This study uses the China Academic Journal Network Publishing Database as its data source. Advanced search was selected with “subject” as the search term, “knowledge service” as the keyword, and core journals as the source category. The search period was 1992-2016, and the search date was August 11, 2016, yielding 2,239 results.

### 2.1 Literature Distribution by Year

Research output in a discipline field varies across different periods. As the primary carrier of research achievements, literature demonstrates the periodicity and development trends of a field through these temporal variations. Therefore, statistics on literature volume for a specific topic from a specific information source help understand the development status and trends of that field from this external characteristic [11]. Based on sample data statistics, the publication output of domestic knowledge service research is shown in .

As seen in [Figure 1: see original paper], the overall development trend of domestic knowledge service research literature shows an upward trajectory. Based on publication volume, China’s knowledge service research can be roughly divided

into three stages. The first stage is the discipline emergence period (1992-2000), when domestic knowledge service research was in its infancy, related research began to sprout, and the number of research papers was relatively small. The second stage is the discipline development period (2001-2010), when knowledge service research attracted academic attention, and the number of research papers gradually increased, reaching its first peak in 2010. The third stage is the maturation trend period (2011-2016; 2016 data is incomplete), characterized by fluctuating yet linear growth in literature volume, indicating that domestic knowledge service research is gradually moving toward maturity.

## 2.2 Journal Source Analysis

Core journals are the primary information sources for a research field. British bibliometrician Bradford proposed a regional analysis method for analyzing literature distribution data, dividing journal literature distribution in a research field into three different regions to identify core journals in that field. By statistically analyzing the sources of sample literature, the 2,239 papers surveyed were published in 248 different academic journals. lists 11 journals with more than 60 published papers. As shown, current knowledge service research is mainly concentrated in the library and information field. The primary reason is that university libraries possess rich collection resources and subject librarian talent advantages. With increasing demand for knowledge services, libraries have intensified research on personalized knowledge services for different users to enhance their core competitiveness. The 11 journals listed in published a total of 1,177 papers, accounting for 52.6% of the surveyed literature, indicating both the concentration of knowledge service research papers and that the journals listed in are important information sources for knowledge service research.

## 2.3 Author Analysis

The status of author groups is closely linked to the development of a field. Statistical analysis of authors in the knowledge service research field can not only reflect the relationship between authors and literature volume but also predict, estimate, and reveal the research capabilities of scholars in that field [12]. Analyzing the core author group in the knowledge service field is of important guiding significance for understanding the current development status and predicting its development prospects. According to statistical results, there are 1,903 authors in the knowledge service field, with the most productive author, Wang Daoping, having published 21 related papers. According to Lotka's law, when authors who publish one paper in a field account for about 60%, a core author group is formed [13]. In this survey, authors who published one paper in the knowledge service field accounted for 94% of the total, indicating that a core author group has not yet formed in this field. According to Price's law, the formula for calculating core author productivity is  $m = 0.749 \times \sqrt{N_{\max}}$ , where  $N_{\max}$  is the maximum number of papers published by an author, and  $m$  is the minimum number of papers for core authors [14]. Substituting the data from

into the formula yields  $m = 0.749 \times \sqrt{21} \approx 3.5$ . The calculation shows that authors who published four or more papers in the knowledge service field are core authors, totaling 250 papers and accounting for 11.2% of the total papers—far below the 50% indicator in Price's law.

These data show that the author base for domestic knowledge service research is large and dispersed, with no highly influential core author group formed. This also indicates that the knowledge service field lacks representative researchers, with most scholars only conducting superficial theoretical exploration and lacking continuity and depth in their research.

## 2.4 Highly Cited Literature Analysis

Citation frequency is an important indicator of paper quality and academic level [15]. The higher the citation frequency, the greater the recognition and academic influence. lists the ten most frequently cited papers in knowledge service research. As shown, all ten papers are from core journals in the library and information field, indicating that domestic knowledge service research development is not yet comprehensive. Scholars should consider how to conduct in-depth knowledge service research from multi-angle and interdisciplinary perspectives beyond the library and information field.

## 2.5 Keyword Frequency Analysis

Keywords in scientific papers can reflect research themes and concerns, and analysis of high-frequency terms in papers on a specific research topic can effectively reveal the focus and development trends of that field [16]. lists changes in keywords and their occurrence frequencies in three different stages of knowledge service research. From 1992-2000, knowledge service was still in its infancy, and domestic research only addressed basic concepts. During this period, knowledge service did not receive high attention, and research mainly involved knowledge economy, libraries, services, and universities. From 2001-2010, knowledge service received widespread attention from scholars and society, and theoretical development was rapid. Domestic scholars considered knowledge service an important branch of knowledge management and a refinement of traditional information services into targeted, valuable knowledge services. Therefore, in theoretical research on knowledge service, domestic scholars studied knowledge service more from the perspectives of information processing, knowledge service models, knowledge management innovation, and target user needs. Zhang Xiaolin believed that knowledge service is based on searching, organizing, and analyzing information and knowledge in network environments, grounded in sufficient knowledge and capabilities, and integrated into users' problem-solving processes according to their problem contexts to propose services that effectively support knowledge application and innovation [5]. From 2011-2016, domestic scholars began researching knowledge service from technical and methodological perspectives. Data mining technology was applied to the knowledge service field, and knowledge service systems and innovative service platforms were constructed

using cloud computing and knowledge grid methods. Due to the complexity of knowledge transfer, technologies such as ontology, semantic grid, knowledge mining, and semantic web were introduced to the knowledge service research field to address semantic issues among different types of knowledge. Simultaneously, greater attention was paid to research on knowledge service models, evaluation systems, personalized services, and user needs.

## 2.6 Research Scope and Service Objects

As seen in , which lists the top ten disciplines researching knowledge service, the disciplinary scope of knowledge service research is relatively broad, but related research is mainly concentrated in library and information science and digital libraries. Beyond libraries, knowledge service applications have penetrated enterprise economics, news media, internet technology, trade, finance, and other fields. The fundamental purpose of knowledge service development is to meet user needs. However, current research on knowledge service targets is overly abstract, with most scholars focusing on library resources rather than users' actual knowledge demands. As Liu Xianghong pointed out, knowledge service should establish a user-centered rather than library-centered information description framework [17]. In the agricultural economy field, Zhao Ruixue et al. constructed a multi-dimensional knowledge service system oriented toward agricultural science and technology innovation to meet the multi-level knowledge service needs of agricultural researchers [18]. Yuan Hongmei conducted in-depth analysis of knowledge service industry alliances [19], while Liao Kaiji utilized user models to filter business process knowledge and provide personalized knowledge services based on business roles and tasks [20]. In the knowledge economy era, knowledge is crucial for development across all industries. Knowledge service research should expand beyond libraries to various disciplinary fields to identify more valuable research objects—a direction that should attract widespread researcher attention.

## 3.1 Deficiencies in Knowledge Service Research

Although domestic knowledge service research has achieved certain accomplishments, it remains in a developmental stage, particularly in combining theory with practice. Based on articles such as Mao Gang et al.'s "Research on University Library Knowledge Service System Based on Dissipative Structure Theory" [21], "Research on Knowledge Service Model Oriented to Major Science and Technology Projects" [22], and Wan Min's "Analysis of Problem-Solving Agricultural Science and Technology Knowledge Service Demand" [23], the following deficiencies can be summarized: (1) No unified consensus on knowledge service has been formed. Although many scholars have researched knowledge service theory, specific definitions remain fragmented, and a complete theoretical system has not yet been established. (2) Lack of systematic research. Research on knowledge service content is not deep enough, mostly limited to superficial elaboration without forming a knowledge service system framework. (3) The-

ory outweighs practice with weak guidance. The ultimate goal of knowledge service is to return to user needs, improve service levels and quality, and better achieve knowledge sharing. However, most current research results are general countermeasures and suggestions that cannot be effectively transformed into practical action strategies. Related research focuses more on theoretical discussion, with fewer knowledge service research results actually applied in practice—this is a weak link in current knowledge service research that requires attention from scholars in related fields. (4) Lack of effective evaluation mechanisms. Knowledge service is a very abstract concept. For service recipients, whether knowledge service is effective and how to evaluate its impact are crucial aspects. However, few existing research results address this issue. Without accurately understanding the performance brought by knowledge service, the value of knowledge service research results will be greatly diminished. Therefore, research on evaluation mechanisms should be strengthened within the knowledge service system.

## 3.2 Future Development Trends of Knowledge Service

The rapid development of computer technology provides broader space for knowledge service development. Knowledge service will innovate along with users' evolving needs in the future. Based on existing relevant academic research results, the focus of knowledge service research has shifted from early library knowledge service functions to specific knowledge practices across various industries.

### 3.2.1 Knowledge Acquisition and Knowledge Mining

With improvements in network environments and knowledge service awareness, the breadth and depth of people's knowledge needs are showing diversified and semantic trends in terms of types. Traditional processing, handling, and display of external features of structured data resources and various literature resources—such as titles, authors, keywords, abstracts, and sources—can no longer meet user knowledge needs in the current internet context [24]. Therefore, future knowledge service development will rely on data mining, artificial intelligence technology, semantic technology, and ontology-based concepts to study knowledge hidden in information, conduct semantic associations of various resource types, utilize database technology for knowledge mining, and provide effective knowledge services for users.

### 3.2.2 “Ubiquitization” of Knowledge Service

Ubiquitous means ever-present. The “ubiquitization” of knowledge service is mainly manifested in the scope, content, and environment of service provision. To accelerate the trend of knowledge service ubiquitization and solve users' knowledge acquisition problems, knowledge and capabilities that create value for users must be developed [25]. Ubiquitization is the core concept of future

knowledge service [26]. Research on knowledge service ubiquitization will make provided knowledge services more aligned with user needs, enabling users to obtain any required knowledge at any time through any available means, giving knowledge service boundless development space.

### 3.2.3 Team-based Organization of Knowledge Service Providers

Research subjects in knowledge service are mostly subject librarians, university teachers, and disciplinary experts. However, knowledge service is a systematic project that provides services not just for a single field. Particularly in the knowledge economy era, the demand for knowledge across all industries is enormous. Therefore, to meet users' growing knowledge needs and maximize the value of knowledge, knowledge service providers must shift from individual research to team-based research. Team members form professional complementarity, promoting improvements in knowledge service levels and quality while enhancing user satisfaction.

## 4 Conclusion

Knowledge service methods and content exhibit diverse characteristics against the backdrop of networking, digitalization, and sharing. To improve the current development status of knowledge service and leverage its role in the knowledge economy era, considerations can be made from aspects such as enhancing service awareness among knowledge service providers, optimizing knowledge service infrastructure, and constructing integrated knowledge service platforms [27]. Simultaneously, knowledge service research should be combined with markets, introducing market resources to jointly develop market demand and transforming knowledge service research results into productive forces.

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**Author Contributions:**

Wang Hai: Wrote the paper;

Wang Shihua: Collected and analyzed data.

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