Paradigm Reflections on Library and Information Science Research: A Case Study of Scientific Evaluation (Postprint)

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Abstract

[Purpose/Significance] The field of Library and Information Science (LIS) in China is currently undergoing a disciplinary functional transformation, with marked differences in research paradigms that have generated widespread discussion. This study aims to identify the logical discontinuities present in both the philosophical paradigm and the data paradigm within the discipline, enrich and refine the disciplinary theoretical system, and contribute to the flourishing development of LIS in the new era.

[Method/Process] From the perspective of disciplinary research paradigms, this study conducts a critical analysis and comparison of the two distinct research logics of philosophy-driven and data-driven approaches; and carries out a case study in the field of scientific evaluation.

[Results/Conclusion] Future research in Library and Information Science requires parallel pursuit of philosophy-driven and data-driven approaches, bridging key logical discontinuities, and avoiding both "fast-food research" and "ideal-type research."

Full Text

Preamble

Reflections on Research Paradigms in Library and Information Science: A Case Study of Scientific Evaluation

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Abstract:
[Purpose/Significance] China's library and information science (LIS) field is

currently undergoing a transformation in disciplinary functions, with marked differences in research paradigms sparking widespread discussion. This study aims to identify logical gaps inherent in both philosophical and data-driven paradigms, enrich and improve the discipline's theoretical system, and contribute to the vigorous development of LIS in the new era. [Method/Process] From the perspective of disciplinary research paradigms, this paper provides a critical analysis and comparison of two distinct research logics: philosophy-driven and data-driven approaches, using scientific evaluation as a case study. [Result/Conclusion] Future LIS research should be driven by both philosophy and data in parallel, bridging key logical gaps to avoid both "fast-food research" and "idealistic research."

Keywords: Discipline Construction; Research Paradigm; Research Logic; Philosophy-Driven; Data-Driven Paradigm; Library and Information Science; Scientific Evaluation
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Every stage of scientific development possesses a unique internal structure, and paradigms represent the manifestation of such structural models, governing and directing all scientific activities [1]. Scientists always conduct research under the dominion of a particular paradigm, which determines what they can observe, what questions they can pose, and how they can solve them [2].

Since the 21st century, developments in information technology and knowledge exchange have dramatically accelerated information production, transmission, dissemination, and utilization. Information's status in economic and social development has elevated it beyond tangible resources like land and petroleum to become the core resource of the third industrial revolution. This has propelled concepts such as the information society and information age, ushering in a crucial development opportunity for library and information science, which is oriented toward information and knowledge. During the 2018 and 2019 forums for young scholars in library, information, and archival management, researchers reached consensus on developmental contradictions within the discipline, including its overall low status as a first-level discipline and an identity crisis at that level [3]. Additionally, scholars such as Yu Liangzhi et al. [4] and Yang Jianlin [5] have conducted extensive discussions on disciplinary development issues in library science and information science respectively, directly confronting problems of functional transformation and chaotic knowledge systems in contemporary LIS.

Against this disciplinary backdrop, whether the issue is low disciplinary status or a chaotic knowledge system, the underlying scientific problem lies in the lack of systematic organization of research paradigms, absence of 归纳 in research thinking, and deficit of a unified disciplinary research paradigm. This has resulted in varying degrees of logical gaps within the philosophy→theory→method→data research system in LIS. Based on this context, this paper primarily addresses the following questions: What characteristics define current research paradigms in

China's LIS discipline? How should researchers adjust their research paradigms to adapt to contemporary disciplinary dilemmas? This study aims to optimize the paradigm 博弈 among LIS scholars when conducting research activities, enabling them to select appropriate research paradigms at different stages and conduct LIS research more scientifically.

2. The Research Logic Game in LIS: Philosophy-Driven vs. Data-Driven

LIS paradigms represent the collection of theoretical foundations, worldviews, value standards, research objectives, research techniques, cultural traditions, and psychological characteristics shared and followed by scholars engaged in library and information science research across different historical periods, countries, and institutions [5]. In the network environment, modern LIS theory has gradually evolved into a complex theoretical system characterized by the diversity of research objects, multiplicity of research subjects, dynamic complexity of research processes, and interdisciplinary integration of research content. The theoretical paradigm of LIS has consequently shifted, manifesting as a transition toward a complexity paradigm [6]. The complexity research paradigm in LIS represents a high-level 概括 of current research logic and thinking in the discipline. In this study, "research logic" refers to the collection of thinking, design, and methodology related to conducting research, while "research paradigm" encompasses research logic along with values, methodological systems, and ethics adhered to by the academic community.

During the initial stages of disciplinary development, conflicting research paradigms may coexist internally. When the discipline reaches a certain maturity, these conflicting paradigms mutually correct and integrate, forming more representative research paradigms and correspondingly more complete disciplinary knowledge systems [7]. The big data era is subverting traditional data analysis theories and methods, posing enormous challenges to conventional LIS theories and approaches [8]. Currently, both philosophy-driven and data-driven research paradigms coexist in LIS, both emphasizing practical value in scientific research. The former proceeds from relevant theories following the logic of theory→method→practice, while the latter explores data and data sources themselves in the big data era, focusing on big data mining methods and technological innovation, attempting to revise or construct new LIS theories.

2.1 Philosophy-Driven Research Logic

The philosophy-driven research paradigm begins with theoretical models and conceptual frameworks, employs rigorous logical argumentation, and then uses different research methods for empirical testing or theoretical interpretation. Its logic aligns with Western Deduction Research philosophy, with the chain: philosophy→theory→method→data. The philosophical foundations of LIS include Popper's "Three Worlds" theory, Kuhn's paradigm theory, Lakatos's "methodology of scientific research programmes," Shapere's information field theory as represented in philosophy of science, as well as critical realism and Marxist philosophy [9-10].

Kuhn's philosophical research has 演绎 the flourishing development of Chinese library science theories—including discourse analysis theory, sense-making theory, information freedom acquisition theory, and domain analysis. Representative theories derived from empirical approaches include scientific evaluation theory, library space design theory, literature growth/circulation laws, and vocabulary distribution laws [4], which similarly follow Kuhn's philosophical paradigm. Ma Feicheng, Chao Lemen, and others have summarized this paradigm as the "knowledge paradigm" [11-12].

The philosophy→theory upper-level logic has promoted the advancement of design science in LIS, fostering a generation of library science theorists in China from the 1980s to the end of the 20th century. To this day, theoretical research remains an important area. For instance, Chen Lihua argues that contemporary library science theory must be based on postmodernism's pluralistic value orientation, making value theory research the basic paradigm of library science as both a trend of the times and the discipline's own irrational appeal. This approach emphasizes the humanistic 情怀 of postmodern library science value theory research, focuses on the methodological guidance of humanistic values, and positions knowledge organization theory as the mainstream research paradigm of postmodern library science [13].

However, growing social demands in recent years have significantly impacted the philosophy-driven research paradigm. Recent hot topics such as reading promotion and public cultural services exhibit obvious practice-oriented characteristics. Strong practice orientation creates temporal and spatial contradictions with philosophy-driven approaches, as requirements for timeliness and efficiency are undoubtedly unfavorable for slow, meticulous philosophical theory construction. In the reading promotion field, Huang Danyu [14] points out that over-reliance on and emphasis on research under the interpretive scientific paradigm leads academic research to focus on analyzing problems rather than providing solutions. Over time, academic journals become filled with 高深 theories and models, falling into a "scholastic" maze that hinders reading promotion and knowledge exchange.

Similar issues have caused tremendous impact in the information science community, particularly against the backdrop of big data. The evolution of China's information science research paradigm follows the path: empirical paradigm→theoretical paradigm→computer simulation paradigm→fourth paradigm. This paradigm evolution has influenced the expansion of research content, innovation in research methods, and transformation of information exchange systems in information science [15]. Among these, the fourth paradigm of scientific research belongs to data-intensive science, emphasizing big data processing and application, advocating a mining model of "large-scale data + simple logic." In the big data era, information science theoretical systems require transformation from traditional research paradigms to data-driven paradigms to address the information crisis generated by big data [16]. Information science should center on data, with knowledge fusion as its content and core, vigorously strengthening information technology application capabilities, establishing data informatics to adapt to big data development needs [17-18]. This background has facilitated the emergence of data-driven research logic.

2.2 Data-Driven Research Logic

Data-driven research logic refers to empirical research conducted using existing data access conditions as the starting point, forming methodologies or theoretical frameworks through interpretation and analysis of results. The logical process belongs to Induction Research philosophy, with the chain: data/method→theory→philosophy, opposite to the philosophy paradigm. In the "data" component of data-driven logic, this includes not only quantitative data but also observational data. For example, grounded research typically starts from raw materials, continuously refines theory, and forms new theoretical frameworks, following the general process of inductive research and aligning with data-driven research logic.

The data-driven paradigm did not emerge from nowhere; its underlying philosophical principles are equally rigorous but somewhat more utilitarian. In fact, both logical positivism and falsificationism, the two major schools in philosophy of science, place the relationship between theory and data at the core of science. Logical positivism emphasizes the inductive process of science, where data serves as evidence; falsificationism emphasizes the demarcation criterion between science and non-science, where data serves as a criterion [19]. However, some natural science researchers have used data-based empirical research as the standard for judging "science" versus "pseudoscience," thus excluding social science research from science and labeling it "pseudoscience" due to its lack of data support. The rapid development of data science has revolutionized social science research, making quantitative research possible and transforming social science into an empirical science like natural science, bidding farewell to the "pseudoscience" label [20]. For example, the theory of knowledge unit discreteness and recombination proposed by Chinese scientometrician Zhao Hongzhou represents a typical data-driven paradigm: "Any scientific creation process first frees crystallized knowledge units and then recrystallizes them on a completely new thinking potential field. This process is not simple repetition but generates entirely new knowledge systems and units through recombination [21]."

The healthy development of LIS ultimately depends on a complete disciplinary theoretical system to ensure its unique status, and data-driven research logic must ultimately return to theoretical contributions. In time, information science may develop theoretical branches centered on big data, artificial intelligence, or national strategies, and its disciplinary system and theoretical foundation will face adjustment and reconstruction [5]. By comparison, library science has stronger practical significance and similarly needs to continuously enrich new concepts such as information literacy, public cultural governance, and smart libraries to supplement and strengthen the library theory system, enabling better social service.

3. Logical Gaps Between Philosophy-Driven and Data-Driven Paradigms: The Case of Scientific Evaluation

Evaluation plays increasingly important roles in modern human social activities, including judgment, prediction, selection, guidance, diagnosis, motivation, and rational resource allocation [26]. Evaluation of human scientific research activities has a long history, known as "second-generation evaluation" [27], which began in the 1930s and continued through the 1960s. During this stage, the term "evaluation" formally replaced "tests" used in the first generation. Second-generation evaluation, marked by the pursuit of scientific evaluation, is the source of peer review and bibliometric evaluation. Its core content—scientific research evaluation—also carries meanings of scientific assessment, technology evaluation, and academic review [28]. Early scientific evaluation focused mainly on qualitative discussion, but modern scientific evaluation research has evolved into quantitative studies, with literature data, patent data, and scientific census data as core resources, and scientific activity patterns and science-education strategy decisions as primary outcomes.

3.1 Dilemmas of the Philosophy-Driven Scientific Evaluation Paradigm

Since 2018, China has intensively issued a series of documents such as "Breaking the Four Onlys" and "Breaking the Five Onlys," along with academic rectification and evaluation reform, providing a favorable research environment for scientific evaluation activities and accelerating its development. However, risks have followed. Traditional policy-oriented research paradigms face significant controversy, while data-driven research based on science of science and scientometrics has quietly risen. The advent of the big data and big science era has subjected scientific evaluation to similar impacts as other social sciences. Two important reasons form this paradigm shift: First, a research attitude emphasizing 论证过程 has made quantitative research appear more scientific than qualitative research. Second, philosophy-driven scientific evaluation research at the macro level performs poorly in data feedback at the practical level, making it difficult to achieve ideal results, as illustrated in Figure 1 [Figure 1: see original paper].

As shown, research activities designed through philosophical speculation encounter obvious difficulties at the data stage due to lack of data channels, insufficient expected data volume, and low data quality. Different interpretations of policies through philosophical speculation lead to significant differences in research logic. Interpreting "Breaking the Four Onlys" with a focus on eliminating "paper-only (quantity)" transforms the past emphasis on paper quantity into emphasis on paper quality, forming current "representative work" practices. However, the academic community has many questions about representative work studies, particularly whether "representative work" reflects the evaluated subject's subjective cognition or objective selection based on evaluation indicators. Solving these research problems would complete the transformation from "Evaluation System 1.0" to "Evaluation System 1.1," with research difficulties shifting to statistical analysis of representative works at the data level.

Interpreting with a focus on "only" emphasizes diversification of evaluation methods, breaking the current single evaluation dimension based on citations. Required adjustments would include citation counts, average citations, journal impact factors, core database inclusion status, and SCI/SSCI inclusion. This represents a transformation from "Evaluation 1.0" to "Evaluation 2.0," with research difficulties lying in introducing new paper indicator data sources and evaluation methods to expand citation-based scientific evaluation activities.

Interpreting with a focus on "breaking" as overthrowing means negating existing paper-based indicators. Breaking traditional evaluation systems and indicators implies that reconstructed systems need more reference to webometrics and altmetrics rather than complete replacement. From another perspective, "breaking" means reforming evaluation indicator systems. Although rapid implementation is impossible in the short term, it will ultimately change evaluation connotations. New indicators such as webometric indicators quantitatively measure web impact, while altmetrics measure social impact or social media impact, representing significant changes in measurement connotation. Interpreting complex new data and migrating and quantifying relevant theories will become key research challenges.

Difficulties in data analysis and interpretation have sparked widespread discussion in practice. Yang Liying from the Documentation and Information Center of the Chinese Academy of Sciences notes that evaluation reflects problems at different levels and types in research evaluation, but current practice frequently exhibits "treating the foot for a headache" phenomena. The essence is that modifying evaluation indicators cannot comprehensively resolve evaluation controversies—available data does not align with policy orientation but must continue to be used due to practical constraints [29]. This practical problem can be summarized as four mismatches and one defect: mismatch between evaluation object and goal; mismatch between evaluation goal and method; mismatch between evaluation goal and data; mismatch between evaluation goal and indicators; and inherent defects in scientometric indicators themselves, as shown in Figure 2 [Figure 2: see original paper].

The top-down mapping reveals five philosophical issues in evaluation: deficiencies from evaluation philosophy to theory; insufficient scientific rigor from theory to method; fallacies from method to indicators; inappropriate selection from indicators to data; and lack of professional knowledge among evaluation practitioners. Issues 1, 2, and 5 stem from 固化 thinking patterns or insufficient knowledge capacity—metaphysical speculation differences that are difficult to resolve quickly. However, issues 3 and 4 (from method/indicators to data) arise because objective data does not meet evaluation logic and can potentially be solved once technical conditions improve.

3.2 Dilemmas of the Data-Driven Scientific Evaluation Paradigm

Data-driven research follows completely different evaluation paradigms and logic, driven by the need to screen and optimize massive heterogeneous data sources. Data is the core of metric evaluation, and high-quality data with low noise, easy accessibility, and broad coverage is the core of scientometrics. Much evaluation practice is driven by the process of deep mining and knowledge discovery of quality scientific data. Relatively speaking, data-driven evaluation practice suffers from weak research significance, often designing 多元 complex research methods to study limited social significance of partial data, generally giving the impression of "research for research's sake." Although results can be self-consistent, they are difficult to implement or influence policy formulation bottom-up. Against this background, researchers fall into dilemmas, most prominently in altmetrics research.

Against the Web 2.0 backdrop, altmetrics (proposed in 2010) [30] immediately received strong 追捧 from international academia and business. It is an emerging metric method for the Web 2.0 era. J. Priem defined it as "a metric concept and related indicators based on social networks aimed at comprehensively analyzing and measuring social impact [31]." Altmetrics emerged under special circumstances [32]: (1) the development of open access; (2) transformation of scientific communication patterns; (3) paradigm shift in metric research. Another important reason is that traditional metric methods showed deficiencies or limitations in new environments, urgently requiring innovative metric methods to supplement or replace traditional ones. Using the most famous altmetrics tool Altmetric.com as an example, researchers have fallen into frenzy over its colorful donut visualizations, but research using traditional paradigms has consistently low value, mostly remaining at the correlation level. J. Priem likened this behavior to "picking low-hanging fruit." Currently, these low-hanging fruits have been mostly exhausted, urgently requiring researchers to mine the "human" information behavior and data patterns behind different social media platforms. However, as research deepens, researchers gradually fall into 困境 lacking mining drivers.

Data-driven evaluation problems are not limited to scientific evaluation. Researchers in 上位 disciplines such as information science, computer science, management engineering, and artificial intelligence similarly face 意义匮乏 in data-driven research. Much research in LIS, especially information science, is problem-oriented, conducting empirical studies for the sake of data analysis, with interpretation and analysis of results remaining at the data analysis level. Such research has disconnections between research question formulation and research significance, neglecting deep analysis of results, with research 落脚点 failing to 回归 to theoretical contributions and disciplinary development.

4. Discussion and Implications

The commonality between philosophy-driven and data-driven research logic lies in their 解构性 exploration of frontier research topics; their differences lie in research foundations, priorities, and approaches to key research questions.

Data-driven research focuses on key issues during the research design phase, prioritizing practical feasibility as the core element to maximize research viability. Its disadvantage lies in overemphasizing data accessibility, leading to declining research drivers, plummeting research significance, insufficient relevance, and results lacking theoretical meaning as research deepens. Once social or technological environments change, such research cannot provide any reference. Philosophy-driven research is the opposite: because it deconstructs scientific problems behind topics from the outset, research significance—especially theoretical significance—is maximally guaranteed. However, overly ideal research designs easily lead to theory-practice disconnections during implementation. Over-reliance on and emphasis on philosophy-driven research leads academic studies to focus on analyzing problems rather than providing solutions. LIS is itself a highly practical discipline, with research questions generally possessing strong practical value. 高深 theories and models may trap LIS research in a "scholastic" maze [14], causing theoretical exploration to lose guiding significance. Moreover, these studies lacking practical feasibility often prove ephemeral and become sleeping literature, potentially wasting academic journal resources.

Based on this, facing the most urgent, important, and valuable frontier research topics requires careful research design to maximize both academic value and practical significance. Therefore, we propose:

Proposition 1: Emphasize philosophy-driven approaches in early research stages to avoid pseudo-research significance.
LIS topics are highly practical. Taking the scientometrics field as representative, topics are driven by clear scientific evaluation practice problems or methodological limitations, possessing inherent practical significance. However, practice is often limited by objective conditions, lacking reasonable research hypotheses, over-pursuing technical innovation, or using complex mathematics and statistics as the sole means, ultimately solving scientific problems lacking genuine research significance. Therefore, in early research stages, philosophical-level research significance must be emphasized, promoting theoretical 梳理 of practical problems and establishing key elements before subsequent research, avoiding "fast-food research."

Proposition 2: Emphasize objective practical activities to avoid theory-practice disconnection.
Some highly philosophical LIS research, such as in scientific evaluation, requires both rigorous logical 论证 and strict data collection, analysis, and verification. However, after forming research results, they cannot be applied to actual scientific evaluation activities, seriously disconnecting from practice. The fundamental reason is that research overemphasizes procedural scientific rigor

without close connection to industry evaluation activities, making it difficult to grasp real industry needs. Therefore, while conducting rigorous science, research must also incorporate objective development laws and fully reference actual industry conditions to avoid creating “idealistic research” in practice.

Proposition 3: Run philosophy-driven and data-driven approaches in parallel to bridge key logic gaps.
Neither philosophy-driven nor data-driven research has absolute superiority or absolute right/wrong. Especially in LIS, which emphasizes practice, the path to truth is not and should never be unique. Facing genuinely existing scientific problems, adopting philosophy-driven or data-driven approaches—aside from differing research efficiencies—both have potential for deep 挖掘 and constructing disciplinary 特色 topics. Philosophy-driven logic faces challenges at the data stage; data-driven logic falls into 困境 when 开拓 domain theory or reconstructing domain philosophy. Taking scientometrics and scientific evaluation as examples, recent research has generally focused on novelty in data collection methods, diversification of data dimensions, richness of results, and empirical verifiability, but results generally lack clear philosophical and theoretical contributions. At such times, research should not overemphasize 挖掘 of results but can instead interpret results from perspectives of cognitive philosophy or philosophy of science, better demonstrating theoretical value of research findings. When facing difficulties that cannot be overcome directly, consider parallel approaches from the other side, like victorious 会师 when digging tunnels, ultimately bridging the combination point of philosophical thinking and practice to form systematic disciplinary knowledge.

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Hou Jianhua: Paper concept and methodology guidance.

Reflections on the Research Paradigm in Library and Information Science—A Case Study of Scientific Evaluation

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Abstract: [Purpose/Significance] The field of library and information science in China is currently in a stage of disciplinary functional transformation, with obvious differences in research paradigms sparking extensive discussion. This study aims to identify logical gaps in both philosophical and data paradigms, enrich and improve the disciplinary theoretical system, and contribute to the vigorous development of LIS in the new era. [Method/Process] From the perspective of disciplinary research paradigms, this paper critically analyzes and compares two different research logics: philosophy-driven and data-driven approaches, with a case study in scientific evaluation. [Result/Conclusion] Future LIS research should be driven by both philosophy and data simultaneously, bridging key logical gaps to avoid "fast-food style research" and "idealistic research."

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