

Problems and Countermeasures in Using Domestic Social Media for Altmetrics Evaluation of Scholarly Outputs (Postprint)

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Abstract

[Purpose/Significance] This study analyzes the problems and countermeasures associated with utilizing domestic social media for Altmetrics evaluation of academic outputs, with the aim of advancing research in this area. [Method/Process] A literature review methodology is adopted to examine the current research status of applying social media to Altmetrics evaluation of academic outputs both domestically and internationally. [Results/Conclusion] Six major issues are identified in the use of domestic social media for Altmetrics evaluation of academic outputs: insufficient data infrastructure; inadequate exploration of data sources and metrics; lack of validation concerning relationships among metrics and influencing factors; insufficient investigation into the underlying implications of metrics; underdevelopment of Altmetrics analysis tools; and lack of theoretical underpinning.

Full Text

Existing Problems and Countermeasures of Domestic Social Media for Altmetrics Evaluation of Academic Achievements

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Abstract

[Purpose/Significance] This paper aims to analyze the problems and countermeasures of using domestic social media for Altmetrics evaluation of academic achievements, in order to promote research on Altmetrics evaluation of domestic academic outputs. **[Method/Process]** Through literature review, this study examines the current state of research on social media for Altmetrics evaluation of academic achievements both domestically and internationally. **[Result/Conclusion]** The application of domestic social media for Altmetrics evaluation of academic achievements faces six major issues: lack of data infrastructure, insufficient exploration of data sources and indicators, absence of validation for inter-indicator relationships and influencing factors, inadequate research on the deeper meanings of indicators, shortage of Altmetrics analysis tool development, and lack of theoretical support.

Classification Number: G250

Keywords: Altmetrics, domestic social media, Chinese academic achievements, impact evaluation, Altmetrics data sources

Currently, China's academic impact evaluation methods primarily rely on peer review, citation analysis, and webometrics. However, in the Web 3.0 era, the research environment has undergone significant changes: diversification of academic output types, networking of academic communication methods, maturation of open access, institutional repositories, and preprint platforms, and expansion of academic impact scope to broader audiences beyond the research community, including the general public, thereby generating social impact. These transformations, combined with the limitations of traditional evaluation methods, render existing approaches inadequate for current needs, necessitating exploration of new evaluation methods. The timely introduction of Altmetrics holds strong practical significance: (1) It can evaluate more types of academic outputs, including not only papers but also code, videos, courseware, etc.; (2) It enables rapid and timely evaluation of academic impact, overcoming the time-lag deficiency of traditional methods; (3) It provides multi-angle reflection of academic impact, such as scholarly, educational, and social influence, offering a more comprehensive assessment of academic value based on diverse metrics like downloads, views, and shares.

Proposed by J. Priem in 2010, the concept of Altmetrics has attracted widespread attention and discussion in the academic evaluation community. As a method for evaluating the impact of academic achievements on social media, Altmetrics features broader evaluation objects, data sources, and indicators compared to traditional methods, with impact coverage extending further. Evaluation objects include institutions, authors, journals, and research outputs (papers, code, courseware, videos, etc.), with data primarily sourced from various social media platforms using metrics such as views, bookmarks, downloads, shares, likes, and comment counts. This demonstrates Altmetrics' strong dependence on social media platforms that carry evaluation data, with

the development status of social media profoundly influencing Altmetrics research progress.

Existing literature shows that current Altmetrics research primarily focuses on foreign-language academic achievements, relying on foreign social media platforms, with limited studies on Chinese academic achievements or domestic social media. However, due to differences in social media usage habits and academic communication practices across countries, foreign social media platforms tend to favor foreign-language literature when used for evaluation, creating biases against Chinese literature. Therefore, foreign Altmetrics research findings cannot be directly applied to Chinese academic evaluation, leaving domestic Altmetrics evaluation in a lagging position. To introduce Altmetrics into China's academic evaluation system, it is necessary to start from domestic language contexts and existing social media platforms. Consequently, there is an urgent need to understand the development status of social media for Altmetrics evaluation both domestically and internationally, explore problems and challenges in using domestic social media for academic evaluation, and propose effective countermeasures to provide references for theoretical and practical research on domestic Altmetrics evaluation.

2. Development Status of Foreign Social Media for Altmetrics Evaluation of Academic Achievements

As informal academic communication through social media becomes increasingly prominent, the visibility of academic achievements on these platforms has gradually increased, generating certain social impacts and giving rise to Altmetrics evaluation methods. Scholars have examined Altmetrics data sources and indicators, explored their deeper meanings, and developed Altmetrics analysis tools using foreign social media platforms.

2.1 Data Sources and Indicators

2.1.1 Exploration of Applicable Data Sources and Indicators First, scholars have used questionnaire surveys to understand researchers' online academic communication patterns. Nature magazine conducted extensive surveys showing Google Scholar as the most known and frequently visited website among researchers, followed by ResearchGate and LinkedIn [?]. S. Haustein et al. [?] surveyed participants and their research outputs at the STI conference, finding Mendeley to have the highest coverage among reference management tools, making it a potential data source for evaluating academic literature impact, while Facebook, LinkedIn, Twitter, and Google+ were the most popular social platforms.

Second, data mining methods have been employed to explore potential data sources and indicators. Scholars have evaluated platform applicability by analyzing coverage, timeliness, and stability. From a coverage perspective, Mendeley achieves the highest rate at approximately 60%-80% [?]. Twitter ranks second

at about 10%-20% [?, ?], while Facebook' s coverage ranges only from 1%-10% [?, ?, ?], and Wikipedia' s mention and citation rates for papers are merely around 1% [?]. In terms of timeliness, mass social media platforms like Twitter, Facebook, and blogs perform best, whereas Mendeley shows poorer timeliness but better sustainability [?].

2.1.2 Classification of Data Sources and Indicators Classifying different data sources and indicators helps more clearly reflect the impact dimensions of evaluation objects. Altmetric.com categorizes data sources into social media data, online management data, mainstream news media, science magazines, and policy documents [?]. C.R. Sugimoto et al. [?] divided data sources into nine categories: social networks, social bookmarking and reference management tools, social data sharing, video, blogs, microblogs, Wikipedia, social recommendations, and rating and review services. Wang Rui et al. [?] classified different data sources into three layers according to their functions: perception layer, social media layer, and application layer. Yang Liu and Chen Ming [?] categorized data sources into six types: social media platforms, reference management tools, academic service platforms, mainstream news media, government documents, and user data. Other scholars have divided social media platforms into seven categories: social networks, social bookmarking, blogs, microblogs, wikis, media, and data sharing [?]. These classifications are primarily based on social media functions, though minor differences exist due to the complex and overlapping functionalities of social network platforms.

Regarding indicator classification, ImpactStory divides metrics into saves, citations, recommendations, and discussion counts. Plum Analytics categorizes them into usage, captures, mentions, social media, and citations. PLoS ALMs classifies indicators into views, citations, saves, discussions, and recommendations [?].

2.1.3 Relationships Between Indicators Scholars have studied correlations between Altmetrics and citations, among Altmetrics themselves, and between Altmetrics and peer review data. As is well known, citation metrics represent academic impact. Researchers typically conduct correlation analysis between Altmetrics and citation metrics to demonstrate the substitutability of Altmetrics indicators. High correlation suggests these metrics can partially reflect academic impact, while low correlation indicates they supplement rather than replace citation metrics, instead reflecting social impact, visibility, or attention levels. Extensive empirical studies show strong correlation between Mendeley and citation metrics, making Mendeley an effective early-impact indicator for papers, with similar academic network platforms (like CiteULike) capable of reflecting academic impact [?]. Data from Twitter and blogs, by contrast, cannot reflect academic impact but rather social impact and attention levels [?].

Beyond studying correlations with citations, scholars have examined relation-

ships among Altmetrics indicators themselves to explore the intersectionality of impact dimensions [?, ?]. Research finds correlations among similar indicators and weak correlations among dissimilar ones, suggesting certain redundancy in impact dimensions reflected by different indicators. Therefore, constructing evaluation systems requires careful consideration of multi-dimensional indicators to avoid simply stacking multiple metrics.

Peer review results represent research quality. Scholars have studied correlations between Altmetrics and peer review results, and whether Altmetrics can predict peer review outcomes. The Research Excellence Framework (REF) assesses research quality in UK higher education institutions. P. Wouters et al. [?] and J. Ravenscroft et al. [?] analyzed correlations between Altmetrics indicators and REF scores, finding very low or negative correlation coefficients. L. Bornmann and R. Haunschild [?] conducted regression analysis using citation counts and Altmetrics indicators against F1000Prime post-publication peer review, showing only Mendeley readership and citation counts significantly correlated with paper quality. The Italian National Scientific Qualification, a peer-committee assessment process, was studied by A.G. Nuzzolese, P. Ciancarini, and A. Gangemi [?], who used candidate research data and corresponding Altmetrics to predict qualification results, finding Mendeley readership could serve as a potential data source and predictor for obtaining national scientific qualification.

2.1.4 Influencing Factors of Altmetrics Indicators Research indicates that influencing factors include academic policies, country, discipline, language, user age, publication time, account type, gender, and access type. For example, on Facebook, biomedical and health science articles are more popular with richer mention and comment data [?]. Mendeley coverage varies by publication source [?], discipline [?], data aggregator [?], and gender [?]. On Twitter, academic outputs from Brazil and Latin America have lower representation [?], open access papers show higher coverage [?], and papers in social sciences, biomedicine, and health sciences receive more attention than those in mathematics, computer science, natural sciences, and engineering [?, ?]. On Twitter, publication timing and account type affect attention levels [?]. Access type (open vs. restricted) is not a relevant factor for citation or mention counts [?]. Papers with preprints receive more Altmetrics scores and citations than those without [?].

2.1.5 Construction of Evaluation Systems You Qingbin, Wei Bo, and Tang Shanhong [?] used correlation strength between 11 indicators and citations to select 7 indicators, applied principal component analysis to obtain 3 components, and constructed an evaluation model proving capable of identifying highly cited papers. Cheng Fei [?] proposed that paper dissemination includes acquisition, evaluation, and citation, constructing a three-dimensional model of perception, attention, and academic impact to measure influence during dissemination. Cheng Aijuan [?] similarly built a three-dimensional model of perception, social impact, and academic impact. Wang Xianwen, Fang Zhichao, and Wang Hongyin [?] used citation metrics and various social media indica-

tors to construct a system reflecting short-term and long-term impact as well as social and academic influence.

2.2 Research on the Deeper Meanings of Altmetrics Indicators

The aforementioned studies rely on quantitative indicator values, but pure numbers poorly reflect true value and deeper meanings behind data (such as motivation for data generation), directly affecting indicator validity. Therefore, qualitative analysis through questionnaires, content analysis, and interviews is needed to explore data value. M. Thelwall et al. [?] conducted content analysis of tweets related to academic literature, finding few discussions about content, with most tweets simply repeating titles and abstracts without in-depth discussion. E. Mohammadi et al. [?] studied bookmarking motivations in Mendeley, demonstrating that using Mendeley bookmarks as readership indicators is reasonable, with bookmark counts reflecting academic impact. They later surveyed Twitter users (including non-academics) who mentioned academic papers, examining their identities, genders, access methods, and motivations, finding most academic information came from social sciences or humanities. K. Qing et al. [?] proposed a method to identify scientists and non-scientists on Twitter without relying on external bibliographic systems, investigating demographics, sharing behaviors, and interconnections to provide foundational information for social media-based evaluation systems. P.Y. Chen et al. [?] used large-scale questionnaires to study Mendeley and Zotero users, finding Mendeley users are younger, more gender-balanced, and prefer discovery and networking functions, while Zotero users are more enthusiastic about social media, more from social sciences and humanities, and prefer search and literature management functions. K. Holmberg and J. Vainio [?] used email questionnaires to survey Finnish researchers about why their work received significant attention on Twitter and Mendeley, revealing that high attention results from multiple factors, primarily high-quality publication channels, timeliness, and research topic types.

2.3 Research on Altmetrics Analysis Tools

Over ten Altmetrics analysis tools have been developed abroad, most commonly Altmetric.com, ImpactStory, Plum Analytics, and PLoS Impact Explorer. These tools facilitate empirical Altmetrics research. Studies on analysis tools mainly cover: (1) functional descriptions, including data sources, evaluation object types, tracking methods, evaluation strategies, indicators and classification methods, target users, visualization, and output formats [?, ?]; (2) comparative analyses of differences between tools, covering functional features, data tracking methods, counting differences, and coverage comparisons [?, ?]; and (3) development challenges [?], including inability to identify paper mentions in audio/video, mapping between multiple identifiers for the same article, lack of relevant measurement standards, and anomaly detection.

3. Development Status of Domestic Social Media for Altmetrics Evaluation of Academic Achievements

To introduce Altmetrics into China's research evaluation system, scholars have explored applicable domestic data sources and indicators while analyzing their deeper meanings.

3.1 Data Sources and Indicators

3.1.1 Exploration of Applicable Data Sources and Indicators Currently, there is no recognized and reliable Altmetrics data source or indicator system in China, though some sources have been involved in empirical research. At the paper level, Yu Houqiang et al. [?] used Altmetric.com to analyze Sina Weibo indicator characteristics, finding coverage below 1%. Wang Luona et al. [?] selected 10 domestic social media platforms, extracting available indicators to evaluate highly cited papers. At the book level, Zhang Yu et al. [?] selected social sites like Dangdang and ScienceNet, extracting online book review indicators to evaluate academic works. Lin Xiaohua [?] introduced book usage indicators (including borrowing frequency, edition counts, institutional collection volume) for book evaluation. At the scholar level, Guo Ying and Xiao Xiantao [?] used WeChat mentions, ScienceNet mentions, and total views to evaluate scholars.

3.1.2 Classification of Altmetrics Indicators Qiu Junping and Yu Houqiang [?] divided social media indicators into three layers: perception, social media, and application. Yu Houqiang and Qiu Junping [?] categorized indicators into dissemination, acquisition, and utilization layers based on an academic impact generation model. Li Ming and Chen Ming [?] classified academic book impact indicators into four layers: pre-reading query, reading intention, reading usage, and evaluation feedback.

3.1.3 Influencing Factors of Altmetrics Indicators Yu Houqiang et al. [?] analyzed Sina Weibo mentions of academic papers, finding that mentioned journals were mainly comprehensive journals, preprint platforms, and open access journals. Weibo users showed higher interest in life/health-related, life-relevant, and interesting papers, and paid more attention to newly published literature. These studies demonstrate that Weibo indicators are influenced by journal type, discipline, and time factors.

3.1.4 Construction of Evaluation Systems Wang Luona et al. [?] used data mining to capture indicators from representative domestic online media platforms for dynamic evaluation of Chinese academic papers. Li Yong et al. [?] used text mining, statistics, and bibliometrics to analyze data from the XiaoMuChong academic exchange platform, establishing an influence evaluation model for multi-dimensional journal impact assessment. Qiu Junping et al. [?] summarized Altmetrics indicator systems for institutional repositories and validated

them using domestic repositories. Liu Dan and Liu Yuzhen [?] selected domestic social sites and constructed a journal evaluation indicator framework without empirical validation. He Jun and Cai Ronghua [?] established a comprehensive book evaluation system from content quality (including borrowing frequency, download frequency) and editorial quality perspectives. Guo Ying and Xiao Xiantao [?] used two-dimensional evaluation to measure scholar impact.

3.2 Research on the Deeper Meanings of Altmetrics Indicators

Liu Yuzhen and Chen Jing [?] conducted content analysis of microblog comments on academic papers, using manual reading to categorize and analyze comments, finding most blog posts served to paraphrase, report, and link to papers, with bloggers expressing various attitudes (agreement, disagreement, etc.), though most posts contained no comments, making sentiment judgment impossible.

4. Problems and Challenges of Domestic Social Media for Altmetrics Evaluation of Academic Achievements

The research status reveals that scholars have conducted preliminary validation of domestic social media applicability for evaluation, but compared with international research, domestic studies lag behind in both breadth and depth. This study identifies six issues hindering the application of domestic social media in Altmetrics evaluation of academic achievements.

4.1 Lack of Data Infrastructure

Altmetrics evaluation relies on academic paper-related data from social media, naturally generated through evolving academic communication methods. Traditionally, researchers disseminated academic information through formal channels (journals, publishers, professional databases) and informal means (conferences, email). In the information technology era, traditional methods clearly have significant limitations: narrow dissemination channels, slow speed, limited audiences, and one-way communication. The prevalence and advantages of social media have attracted researchers to use these platforms for exchange, accumulating academic achievement-related data. However, unlike international practices, China's academic communication still relies on traditional methods with low social media usage [?], resulting in extremely low academic output visibility and insufficient data infrastructure. The main reasons include: (1) Domestic social media itself faces problems: late start, immature technology, incomplete functionality, and complex network environments that fail to meet academic exchange needs. For instance, Zhang Yaokun et al. [?] investigated registration, continuous usage, visibility, and disciplinary differences across four academic social networks, finding domestic academic circles lack visibility features (paper counts, readership, etc.) and continuous usage data compared with foreign software. Domestic reference management software lacks Mendeley's

Group function that enables uploading, sharing, and commenting on literature within groups, greatly enhancing interactive efficiency. Complex user identities, difficulty verifying information authenticity, and digital copyright protection issues in social media environments create concerns about online communication, making researchers reluctant to self-disclose on social media and resulting in low usage for academic exchange. (2) Problems in China's academic communication methods: Researchers still depend on traditional journal and professional database dissemination, lacking proficiency in information-era retrieval, publishing, and sharing technologies. Academic information sharing and feedback remain within small research circles without full awareness of social media's positive impacts or utilization of its advantages, resulting in low levels of open sharing.

4.2 Lack of Exploration of Data Sources and Indicators

Current research shows domestic Altmetrics data sources and indicators remain in the preliminary exploration stage. Unlike international research, domestic social media classification, usage patterns, and researcher preferences have not been extensively investigated, with inadequate research on coverage, timeliness, and stability. Although scholars have involved domestic social media and indicators in empirical studies, these efforts are fragmented, unsystematic, and lack extensive experimental validation for general acceptance.

4.3 Lack of Validation of Inter-Indicator Relationships and Influencing Factors

Evaluation indicator systems should follow the principle of independence—clear connotation without overlap, reflecting impact from different perspectives. However, indicators are not entirely unrelated, as they have complementary and interrelated functions [?], making the study of inter-indicator relationships important. Existing domestic research has constructed Altmetrics evaluation systems using multiple indicators but rarely validates indicator effectiveness or interrelationships. Additionally, domestic research lacks analysis of influencing factors for social media indicators, leading to questions about their validity and applicability.

4.4 Lack of Research on the Deeper Meanings of Indicators

When academic achievements appear on social media and generate impact, what types of achievements and platforms are involved? How does dissemination differ from traditional methods? Who generates the Altmetrics data—what are their identities, motivations, and purposes for using social media for academic exchange? Can this data evaluate research impact, and if so, which dimensions? These questions address deeper meanings behind social media data and constitute essential issues for Altmetrics. Currently, domestic research lacks investigation into these fundamental questions.

4.5 Lack of Altmetrics Analysis Tools

Currently, no analysis tools based on domestic social media platforms are available. Social media data features rapid changes, multiple types, and complex sources, requiring professional tools for collection and processing. To intelligently collect, process, and display data from various online platforms, China needs to develop Altmetrics analysis tools based on domestic social media and indicators.

4.6 Lack of Theoretical Support

International experience shows that social media data lacks clear connotation and scientific theoretical foundation when used for academic evaluation, with social media indicators being biased indices suffering from indicator heterogeneity. These same problems exist in domestic research on Altmetrics evaluation using social media.

5. Countermeasure Analysis for Domestic Social Media in Altmetrics Evaluation Research

5.1 Fully Utilize Social Media for Academic Exchange

The prevalence of social media provides new channels for academic exchange, compensating for traditional methods' deficiencies while offering convenience to researchers and data infrastructure for Altmetrics evaluation. First, domestic social media must provide comprehensive, reliable platforms meeting users' needs for acquiring, managing, sharing, commenting, saving, and securing academic information; purify the communication environment; enhance regulatory capabilities to filter false information and combat piracy; prevent data manipulation; standardize academic information publication, management, dissemination, and usage; and provide data access interfaces. Second, improve user information literacy, cultivate habits of networked academic communication, emphasize all stages of academic output dissemination (pre-publication, publication, promotion, commentary), and encourage more effective academic sharing and exchange through social media. Third, accelerate the development of policies on scientific data openness, sharing, and protection to provide legal and policy support for academic exchange.

5.2 Explore Domestic Potential Data Sources and Indicators

This study's investigation of domestic social media platforms reveals many professional platforms (e.g., Aguo Petroleum Network, Bioon, Boyan Forum) offering literature sharing, mutual assistance, and upload functions that have accumulated rich impact data on papers and books, serving as data sources for discipline-specific academic evaluation. This study categorizes social sites into seven types: library, blog, news, community, Q&A, wiki, and social, each further divided into academic, professional, and comprehensive types (see Table 1).

Academic-type platforms theoretically have the highest coverage of papers and books, followed by professional types. However, comprehensive and professional platforms feature more diverse academic output types (including courseware, images, etc.) with the broadest audience coverage and most extensive impact. Future research should explore usage, coverage, timeliness, and stability starting from these platforms.

Table 1. Classification and Examples of Domestic Altmetrics Data Sources

Category	Academic Type	Professional Type	Comprehensive Type
Library	Academic search engines: Baidu Scholar, Duxiu Academic; Open access journals: Sciencepaper Online; Institutional repositories; Academic online libraries: Lingdian Garden, Boyan Library	Professional libraries: Aguo Petroleum Library (petroleum), IT168 Library (IT), MBA Think Tank (economics)	Baidu Library, Docin, Doc88
Blog News	ScienceNet Blog ScienceNet, China Social Science Network, Boyan News, Bioon	CSDN Blog (IT) Huxiu (business/tech), Bioon (biomedicine)	Sina Blog Guokr, Xinhua, People' s Daily, Tencent News
Community	Boyan Forum, Lingdian Garden Forum, XiaoMuChong Forum	Douban, Tieba, Renren	-
Q&A	CSDN Q&A (computer science), Guokr Q&A (science)	Zhihu, Baidu Knows, Soso Ask, 360 Q&A, iAsk	-
Wiki	MBA Encyclopedia (economics)	Baidu Baike, Hudong Baike, Sogou Baike	-
Social	QQ, WeChat	-	-

5.3 Conduct Empirical Research on Inter-Indicator Relationships and Influencing Factors

Empirical research is essential to validate the applicability of domestic social media indicators in Altmetrics impact evaluation. Future studies require extensive empirical validation of each indicator. When selecting platforms, key considerations include: (1) Platform usage rate—higher researcher usage increases mention counts and coverage; (2) User groups and characteristics—disciplinary background, age, education, and content types, prioritizing academic social sites; (3) Data accessibility—whether platforms offer free, simple, and efficient data access methods; (4) Data integrity—whether all evaluation indicators (likes, comments, shares, bookmarks) are obtainable, as some platforms have incomplete data (e.g., XiaoMuChong only provides 1000 comments) or deleted data preventing reproducibility; (5) Data update timeliness—frequency varies across platforms; (6) Data credibility—presence of false data from improper dissemination or mass manipulation, and complex user identities with varying knowledge levels affecting understanding and objective evaluation of professional information; (7) Data security—whether platforms have security safeguards and anomaly detection.

5.4 Research the Deeper Meanings and Potential Application Value of Altmetrics Indicators

Common methods for studying Altmetrics data essence include text mining, content analysis, questionnaires, and interviews to investigate user preferences, information behaviors, and motivations. While computer technology facilitates easy data acquisition from online sources, helping understand underlying meanings (e.g., sentiment analysis of comments to determine positive/negative impact), mined data alone cannot reflect deeper meanings like audience identity, preferences, and motivations, requiring in-depth user surveys that must include non-researchers mentioning academic information. The diversity and anonymity of online users pose enormous challenges for such investigations. E. Mohammadi and M. Thelwall [?] developed a method to identify users sharing academic information by using Twitter monitors and Altmetric.com to obtain Twitter accounts, then extracting email addresses from Twitter profiles with web links. As network platforms have different management mechanisms and user information transparency levels, scholars should attempt different platforms.

5.5 Develop Chinese Altmetrics Analysis Tools

Developing Chinese Altmetrics analysis tools requires comprehensive support from network platforms, developers, academia, and publishers. Network platforms need transparent, authentic, secure data with detection mechanisms, standardized digital resource dissemination, and data access interfaces. Developers must provide mature computer technology for tracking, mining, computing, integrating, and visualizing multi-source data. Academia should recognize new online communication and evaluation mechanisms in the internet era, improve information literacy, and maximize academic impact. Publishers must strengthen

digital knowledge resource construction and provide standards for digital resource publishing.

5.6 Validate Altmetrics Applicability and Establish Theoretical Frameworks

Like peer review and citation evaluation, Altmetrics is not a perfect method, facing 质疑 and challenges in its early development with inherent defects such as indicator heterogeneity. However, Altmetrics' value far outweighs its defects and challenges. The validity of social media for evaluation requires continued verification. P. Sud and M. Thelwall [?] proposed that Altmetrics validation should proceed through four steps: quantitative analysis (especially correlation and sign tests), content analysis, interviews, and semantic analysis. Currently, most validation remains at the quantitative stage without universal patterns, while deeper qualitative analyses require greater research investment. Through extensive validation, Altmetrics connotation will become clearer and theoretical frameworks will gradually emerge. When Altmetrics alone cannot meet evaluation needs in specific contexts, it can be combined with other methods to compensate for its deficiencies.

6. Summary and Outlook

Currently, many Chinese scholars have introduced Altmetrics concepts, main ideas, and methods, opening new avenues and injecting fresh blood into scientific evaluation. However, implementing Altmetrics in China faces enormous challenges. In the internet environment, China's academic communication methods and dissemination mechanisms are in transition, with low usage of domestic social media in academic exchange, immature related technologies, and institutionalized dissemination mechanisms not yet established. Nevertheless, scholars have conducted 挖掘 and empirical studies on domestic social media and indicators, proving the feasibility of Altmetrics evaluation for Chinese academic achievements. However, as analyzed above, China's Altmetrics evaluation faces problems including lack of data infrastructure, theoretical support, in-depth research on indicator essence, reliable data sources, systematic indicator frameworks, and supporting analysis tools.

Despite these shortcomings, researchers generally recognize traditional communication limitations, largely agree on developing online academic exchange, and are willing to disseminate formal academic achievements and comments through online channels [?]. Meanwhile, China's academic communication technology continues improving, and dissemination mechanisms are maturing, leading to continuous accumulation of academic achievement data across social media platforms and emergence of more quality data sources and indicators. Additionally, gradual improvements in data sharing mechanisms, data property rights protection, and digital resource standardization will lay solid foundations for tracking academic achievements and developing Altmetrics analysis tools. Through improving academic communication methods, extensively exploring and validating

data sources and indicators, deeply 挖掘 indicator meanings and application values, developing Chinese Altmetrics analysis tools, and validating Altmetrics to establish theoretical frameworks, China's academic achievement evaluation will become more comprehensive and complete.

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