DSI DATA SCIENCE AND INFORMETRICS
VOL.3, NO.2, MAY. 2023

RESEARCH ARTICLE

Academic use of social media in China: A Review of the Literature

Chunli Liu[a], Fei Shu[b, c]*

a. Library, China Medical University, Shenyang, China
b. Hangzhou Dianzi University, Hangzhou, China
c. Université de Montréal, Montréal, Québec, Canada

ABSTRACT
Altmetric indicators are largely affected by countries or regions, especially for non-English speaking countries such as China, Japan, Russia, etc. Although China is the largest county in terms of the number of social media users, we still know little on the academic use of local social media tools and local altmetric indicators in China. The purpose of this paper is to present the landscape of local altmetrics in China, including the local social media platform for academic use, local altmetric data sources and indicators, as well as the local altmetric studies conducted by Chinese scholars.

KEYWORDS
Social media; Altmetrics; China; Literature

1 Introduction

The concept of *altmetrics*, created by Priem et al. (2010), is proposed as an alternative to more traditional citation-based metrics. Altmetrics is a new approach to measure scholarly impact on the basis of activities in social media platforms (Haustein et al., 2014; Priem, 2014; Thelwall et al., 2013). It is a new approach to evaluate the impact of scientific outputs mainly based on the academic use on social media (Thelwall et al., 2013). It targets various types of scientific outputs using a wide variety of data sources and indicators (Kwok, 2013) comparing to traditional research evaluation using the number of publications and citations.

Although altmetrics is regarded as a democratizer of science and its reward system, as it potentially overcome the *Matthew Effect* reflected in traditional citation-based metrics (Haustein et al., 2015), previous studies indicate that existing altmetric indicators are biased against non-English speaking countries such as China, Japan, Russia, Iran and Latin America (Alperin, 2014, 2015b; Maleki, 2014; Park & Park, 2018; Wang et al., 2016) due to their low visibility in English social media (e.g., Twitter, Facebook, Mendenley, etc.). Scholars from non-English speaking countries having different scientific communication behavior on social media may use their local social media platforms (Alperin, 2013, 2015a; Ortega, 2020; Sugimoto et al., 2017; Yu et al., 2017; Zahedi, 2017), which are not fully covered by current altmetric studies focusing on international social media platforms in English (Zahedi, 2016).

* Corresponding Author: fei.shu@mail.mcgill.ca

China is the largest social media market with the most social media users (Zahedi, 2016) who use their local Chinese social media (e.g., Wechat, Weibo, etc.) instead of international ones. Due to the data availability and the language barrier, few altmetric studies pay attention to the local altmetrics in China and analyze the academic use of social media among Chinese scholars (Yu et al., 2017). Thus, it is necessary to have an in-depth understanding of the characteristics of social media commonly used in China for conducting the altmetric studies regarding China, which has its unique social media culture and administration regulations. The purpose of this paper is to explore the Chinese local social media platforms, discover the academic use of Chinese social media as well as related altmetric indicators, and review the local altmetric literature.

2 Local Social media platforms for academic use in China

According to iMedia Research (2020), there are around 800 million social media users in China; WeChat, QQ, and Sina Weibo are the top three social media platforms in terms of the number of users, accounting for 73.7%, 43.3%, and 17.0% of the China's population respectively. These *Big Three* are also included in the top 10 global social media platforms with 1151, 731, and 497 million global users respectively (We are Social & Hootsuite, 2020). In addition to these well-known three, there are various local social media tools or platforms that are used by Chinese scholars (shown in Figure 1), which have been divided them into seven categories as shown in Table 1.

Figure 1 List of Chinese social media tools or platforms used by Chinese scholars

Table 1 Local social media platforms for academic use in China

Category	Major Platforms (Chinese Name)	Created in	URL	Data (Open Access)
Document– Sharing	Baidu Library	2009	wenku.baidu.com	No
	Docin	2006	www.docin.com	No
	Doc88	2008	www.doc88.com	No
	Taodocs	2011	www.taodocs.com	No
Blog	ScienceNet	2007	www.sciencenet.cn	No
	CSDN Blog	1999	blog.csdn.net	No
	Sina Blog	1998	blog.sina.com.cn	API
News	Guokr.com	2010	www.guokr.com	No
	Tencent News	2003	news.qq.com	No
	Bioon.com	2001	www.bioon.com	No
	China Social Science Net	2011	www.cssn.cn	No
Community	DXY	2002	www.dxy.cn	API
	Douban	2005	www.douban.com	API
	Xiaomuchong	2001	muchong.com	No
Q&A	CSDN Q&A	1999	ask.csdn.net	No
	Zhihu	2011	www.zhihu.com	API
	Baidu Zhidao	2005	zhidao.baidu.com	API
	iask	2004	www.iask.com	No
	Sousou wenwen	2013	wenwen.soso.com	No
General	Wechat	2011	weixin.qq.com	API
	Sina Weibo	2009	www.weibo.com	API

2.1 Document–sharing

Document-sharing social media is an online platform offering storage for users to share their documents. Users are encouraged to upload their course materials, research articles, business proposals, industry standards, notes as well as other professional documents; they can generate income when these documents are downloaded by other users. Normally, readers could freely access the abstract or some free pages but need to pay for downloading the full document. The platforms profit from the commission, price difference and VIP membership that allows readers to download documents at a discount price. Although users are required not to upload documents of which they are not authors or copyright holders, some copyright infringements are still claimed regarding document-sharing in these platforms (Guo, 2011).

These document-sharing social media platforms vary by their coverage, copyright policy, document format, and marketing strategy. Yi (2019) reports that Doc88 is the largest one in terms of the coverage while Baidu has the largest group of users. According to Baidu (2021), there are over 50 million users and around 800 million documents contributed by more than 180 thousand authors in Baidu Library.

Although billions of documents are shared in these document-sharing platform, few are downloaded or acknowledged by users. The impact of such documents could be assessed by their online usage, including the number of clicks, views, and downloads. The document-sharing platforms also allow users to leave comments, ratings, and recommendations for these documents, which could also be used to evaluate their quality or impact.

2.2 Blog

The blog platform is a discussion or informational diary that is published online and managed by individuals. The bloggers could create their personal blogs on a blog site and post their personal articles from time to time. Some Chinese scholars would like to share their research and opinions through such academic blogs as ScienceNet and CSDN blog, and other general blogs like Sina blog.

ScienceNet is an academic blog, with more than one million users; most users are scientists or researchers. They use ScienceNet blogs to discuss scientific research with their peers, establish friendship with other researchers. In addition to the individual bloggers, some research institutions also set up their official blog at ScienceNet to disseminate knowledge and research. CSDN Blog is dedicated to creating a communication platform for IT developers, providing technical people with comprehensive information and knowledge exchange and interaction. Most CSDN bloggers are technical persons working in computer science or information science. Although Sina Blog is a general blog covering various topics, some Chinese scholars also use it to promote their research and carry out academic exchanges.

Although each blog is free to read and share, they are ranked by the number of readers, recommendations, and comments. Only those high ranking blogs could be displayed in the homepage while the rest need to be browsed and searched. Thus, these indicators (i.e., the number of readers, recommendations, and comments) could be used to evaluation the impact of the blogs.

2.3 News

The news-type social media contain massive information representing the timely scientific news and stories. In addition to sharing scientific news and updates regarding research and development, Chinese scholars also disseminate their recent research via some local

news-type social media including Guokr.com, Tencent News, Bioon.com, and China social science net.

Guokr.com is an open and diverse community in science and technology, consisting of three sections: scientists, interest groups and Q&A. These three sections allow users to follow their interested people or groups, read recommended articles, and share their own articles. Tencent news is a mobile application based on iOS and Android platform. It features a combination of news, videos, and microblogs, providing mobile users news and updates at the very first time. There are 15 news channels in Tencent news, of which science and technology is one. Bioon.com is a news platform for the biotech industry, providing news, consulting service and industry analysis. Most Bioon members have master's or doctoral degrees in the field of medicine or biology. China Social Science Network is a national social science academic research network sponsored by the Chinese Academy of Social. It has 54 channels and more than 1,300 columns for social scientists from different disciplines.

2.4 Community

In China, the social media is also used as an interactive community platform for scientific communication, with members mainly from universities, research institutes, and enterprises for R&D. Users use the community forum to exchange academic resources, share research stories, and help each other. The popular social media communities in China include DXY, Douban, and Xiaomuchong.

DXY is a leading online healthcare community in China, connecting health practioners, health researchers, patients, pharmaceuticals, and insurance companies. It has served over one hundred million public users and six million professional users. Indeed, 71% of the health practioners in China are DXY users. Xiaomuchong is an academic platform sharing academic resources for scientific researchers. It covers academic content such as fund application, patent standards, studying abroad, graduate admission, paper submission, and academic assistance. Most members come from universities, research institutions, and enterprises for R&D.

Douban is a reading community for educated youth. In addition to the collection of books, movies, music and other products, Douban offers a review and recommendation platform that users could express their comments and recommendations for all contents.

2.5 Q & A

Compared with social media community, Q&A social media only focus on the interaction between questions and answers. Online Q&A platforms connect users with different backgrounds. Scholars with special expertise in their disciplines obviously become the active users in Q&A platforms. In addition to answering questions as requested, some users also share their knowledge, experience, and insights to others. The most popular Q&A platforms in China are Baidu Zhidao and Zhihu.

Baidu Zhidao, developed by Baidu, is a leading search-based interactive knowledge question and answer sharing platform. Everyone could provide the answer for a given question, as the answers are ranked and returned as the search result. Compared with search-based Q&A platforms, Zhihu focuses on providing comprehensive answers on the basis of a group of experts in different disciplines. Similar to Quora, Zhihu Users can actively participate in the Q&A process by editing questions and commenting on answers that have been submitted by other users, which helps Zhihu surpass other competitors and become the largest Q&A platform in China. According to Yiguan (2020), there were over 220 million users in Zhihu in which more than 40% are 24 years and under.

2.6 General

Scholars also use general social media platforms such as WeChat, Sina Weibo for academic use. Scholars could create an official WeChat account to disseminate their research and promote related business; they also could use Sina Weibo to post their message like "tweets". Many scholars would like to disseminate their research via general social media platforms to gain higher impact considering the large number of users in WeChat and Sina Weibo.

The number of active WeChat users have been over 1.2 billion over 200 countries and regions as of the first quarter of 2020 (The China Academy of Information and Communication and Technology, 2020). Although WeChat is a social networking tool with the function of instant messaging. People could share information including academic content via two approaches: personal friend group and public account. Sina weibo looks like the Chinese version of Twitter; users post texts less than 140 Chinese characters with photos, music or videos. Similar to Twitter, Sina Weibo is also used to disseminate knowledge and promote research.

3 Local altmetric indicators in China

With the academic use of social media, some altmetric indicators have been developed by different social media platforms to measure the social impact of papers, books, journals, and individual scholars.

3.1 Paper

The local altmetric indicators at the paper level in China generally come from three categories of social media platforms: document-sharing (Baidu Library, Doc88.com, Docin.com, and Taodocs.com), blog (Sina blog, CDSN blog, and Sciencenet blog), and general (Sina weibo and WeChat). These social media platforms provide various altmetric indicators to measure the social impact of research papers as shown in Table 2, which are retrieved and summarized in this study.

Table 2 Altmetric Indicators for research papers in China

Category	Platform	Altmetric Indicator
Document Sharing	Baidu Library	Number of "likes" given by users Number of comments left by users Number of collections by users Number of sharing by users Number of readings by users Number of downloading by users Star ratings given by users
	Doc88	Number of views by users Number of downloading by users
	Docin	Number of "likes" given by users Number of "dislikes" given by users Number of comments left by users Number of views by users
	Taodocs	Star ratings given by users

Category	Platform	Altmetric Indicator
Document Sharing	Sina Blog	Number of "likes" given by users Number of comments left by users Number of recommendations by users Number of bookmarking by users Number of readings by users Number of sharing by users Number of replies to comments by users
Blog	CDSN Blog	Number of "likes" given by users Number of comments left by users Number of recommendations by users Number of bookmarking by users Number of readings by users Number of sharing by users Number of replies to comments by users
	Sciencenet Blog	Number of "likes" given by users Number of comments left by users Number of collections by users Number of sharing by users Number of readings by users Number of discussions by users Number of searches by users
	Sina Weibo	
General	WeChat	Number of "likes" given by users Number of views by users Number of sharing by users Number of readings by users

The social impact of a paper is measured on the basis of the readership, and quantified by the number of readings, comments, "likes" and other indicators. Most indicators are objective as counting the number of actions by the readers, while some indicators (e.g, "likes", "dislikes", star ratings) are subjective as representing readers' personal opinions.

3.2 Books

Altmetric indicators for books are developed in some reading community platforms to recommend books. These indicators could be grouped into two categories: library collection indicators and network utilization indicators (Jiang & Wei, 2018; Li et al., 2019) . The library collection indicators measure the quantity of the reading including number of readings, number of collecting libraries, number of downloads, number of recommendations, number of collections, and number of comments. The network utilization indicators measure the quality of reading including numbers of book reviews, academic community discussions, news reports, reader reviews and mentions.

Among various reading community platforms, Douban is the most famous one for book recommendation (Jiang & Wei, 2018). In order to allow readers to rate and recommend books, the following 14 indicators are included in Douban, which has been copied by other reading community platforms:

- Douban score (The overall rating of the book)
- Number of reviewers
- Number of tags
- Number of short reviews

- Number of book reviews
- Number of reading notes
- Number of topics
- Number of collecting libraries
- Number of versions
- Number of recommendations
- Number of readers who are reading
- Number of people who have read
- Number of people who want to read
- Number of used books for sale.

3.3 Journals

Although the journal impact factor (JIF) is the most popular indicator for assessing academic impact of journals, some altmetric indicators are also constructed to evaluate social impact of journals in some community platform. For example, Xiaomuchong, one of the popular platforms for scientific communication (Li et al., 2017), includes the Chinese periodical evaluation section in its platform. The evaluation criteria include number of forum replies, number of posts viewed, number of posts reviewed, number of the "helpful" labelled by users, review speed, publishing speed, review cost, publishing cost, and editorial communication.

Wang (2019) selected 420 journals reviewed in Xiaomuchong and constructed a journal impact evaluation model measuring both the academic impact and the social impact of journals. The academic impact is based on the traditional citation impact while the social impact is measured by four dimensions (Li et al., 2017) as below:

- Social attention: number of journals viewed, number of comments, number of webpage views
- Comprehensive editorial communication: editorial communication, review quality
- Time cost: publication speed, review speed
- Economic cost: publication fee, acceptance rate, review fee

In addition, Liu and Liu (2018) constructed a framework for evaluating the impact of Chinese academic journals. Their framework consists of citation indicators, online usage indicators and social media impact indicators. In addition to the traditional citation indicators, online usage indicators include total online usage, journal usage factor, usage annual index, and usage half-life while social media impact indicators include total number of blog posts and average number of blog posts.

3.4 Scholars

ScienceNet is a comprehensive website promoting science to build an influential Chinese scientific community. In addition to news reports, it also provides blogs for scholarly communication. Zhao (2015) established some indicators to evaluate the scholarly impact of these ScienceNet blogs, including blog status (time created, number of activities, number of points and number of readers), post status (total posting volume, average annual posting volume, number of featured papers) and evaluation status (total reading, average reading per article, number of evaluations and average number of evaluations).

Another study regarding the ScienceNet blog also contributed three evaluation indicators: blogger enthusiasm, communication coverage, and blog post quality (Cao, 2017). The enthusiasm of bloggers includes the number of blog posts, the number of activities, the number of

points and gold coins, and the number of topics; the spread coverage includes the number of friends, the number of visits, and the number of visits per article; and the quality of the blog is measured by the number of blogs recommended by the website.

In addition to the general platform measuring social impact of individual scholars, some altmetric indicators assessing health physicians are also provided by some health websites including "Good Doctor" (https://www.haodf.com/), Sohu Health (https://health.sohu.com/), Zhihu (https://www.zhihu.com), "Yimaitong" (http://www.medlive.cn/), " and Xunyiwenyao (http://www.xywy.com/). Such altmetric indicators are developed to measure the scholarly impact, the social media impact, and online diagnosis impact of a health physician.

4 Local altmetric studies in China

The concept of altmetrics has been paid attention by Chinese scholars as it was coined by Priem et al. (2010). We conducted the keyword search using "Altmetrics" (keywords or abstracts) and "China" (author address) to retrieve the literature from the core collection of Web of Science; in addition, we also searched keywords "Altmetric*" as well as other variants from Chinese CNKI database and local Chinese literature. After manual validation, 52 English and 327 Chinese papers regarding altmetric studies were identified as shown in Figure 2. The number of altmetric studies in China have been increasing since 2012 until 2019 when the number of altmetric research declined. Since altmetrics is a new imported concept, it was translated into different Chinese names (Yu et al., 2019). The first paper introducing altmetrics in China was published by Liu (2012) who named altmetrics as "Xuan zhe ji liang xue". On the other hand, altmetrics was also named as "Bu chong ji liang xue" (You & Tang, 2013) and "Ti dai ji liang xue" (Qiu & Yu, 2013). Although the last translation (Ti dai ji liang xue) has been accepted by most Chinese scholars, some scholars still prefer to use the "altmetrics" other than any Chinese translation in their publications.

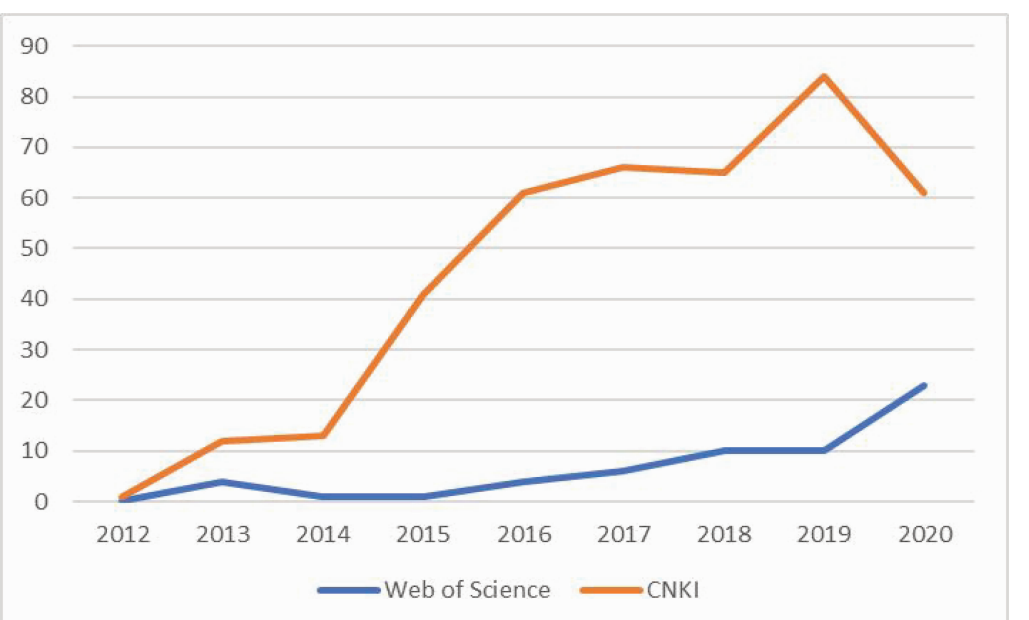

Figure 2 Number of altmetric studies in China (2012-2020)

Altmetric research in China mainly focused on theoretical discussion and literature review regarding the production, development and research tools of altmetrics (Liu, 2012, 2016; Qiu & Yu, 2015; Yu et al., 2019). Some studies discussed the needs of altmetrics stakeholders (Shen et al., 2018), content of altmetric data (Meng & Xiang, 2016), user motivation (Liu & Wang, 2020), context analysis (Wang & Liu, 2017), and data quality (Liu et al., 2019; Yu & Cao, 2019).

Chinese scholars also conducted some empirical research as investigating the comprehensive evaluation model integrating altmetrics and citation indicators (H. Li et al., 2020; Li & Ren, 2020; Peng et al., 2018; Zhai et al., 2020), the factors associated with altmetric indicators (Li & Hao, 2019), and design and develop of altmetric indicator on Sina Weibo (Yu et al., 2017), news report (Yu, Cao, & Wang, 2020), policy documents (Yu Cao, Xiao, & Yang, 2020), social impact of individuals (Guo & Xiao, 2019), books (Jiang et al., 2020; Wang et al., 2019; Xiao & Yang, 2020), journals (Zhao & Wang, 2019), datasets (L. Li et al., 2020) and papers (Zhao et al., 2019).

Due to the limited availability of Chinese social media data, many empirical studies conducted by Chinese researchers used international data such as Altmetric.com, PlumX, PLOS ALMs or directly from Twitter and Mendeley (Fang & Wang, 2019; Jin et al., 2015; Shu et al., 2017; Tian et al., 2019; Zhao & Yu, 2020); few researches used local Chinese altmetric data in their altmetric studies (Yu et al., 2016; Yu et al., 2017; Zhao & Wei, 2017). Indeed, the plug-in of PlumX or altmetric.com has been embedded in the institutional repositories of some Chinese universities.

In addition to the impact of academic use on social media, some Chinese scholars also explored and compared the characteristics of the local social media platform. Xiong (2020) found that Xiaomuchong users were highly active while ScienceNet blogs were most influential. Fan (2016) compared Zhihu, Douban and Guokr. com using Alexa ranking of third-party statistical data, and ranked them from high to low in terms of access traffic. Yan (2016) found that DXY community is highly professional; questions and requests were answered and replied to quickly.

In summary, although Chinese scholars publish a lot of papers introducing the altmetrics and reviewing their literature, few studies have tried to measure the dissemination of research via local Chinese social media. Although Chinese scholars conduct many altmetric studies investigating the influence of scholarly activities on various socia media tools, local Chinese social media such as WeChat, Weibo have rarely been studied.

5 Discussion and Conclusion

Although social media has been frequently used to promote research, and some altmetric indicators have been developed in China, China's altmetric studies still face the challenges due to the limited availability of data source. Most local Chinese social media don't provide or limit the use of APIs. Alternatively, researchers have to use the web crawlers or other programming to obtain the data, which hinders the development of China's altmetric studies.

In addition, various scholarly identifiers such as DOI, PubMed ID, ISBN and so on are used in altmetric studies linking the publications with their social media activities. However, document identifiers are not assigned to some Chinese local publications so that we could not establish the relationship between academic activity in social media and the mentioned publications, which is one of the main obstacles to the acquisition of Chinese altmetric data.

As a result, few altmetric studies investigate the academic use of local social media and test the local altmetric indicators. As this study presents, although various altmetric indicators have been developed and applied, the validity and reliability of these indicators have never been validated, which needs to be explored in future research.

As the largest source country of international scientific literature with the largest social media user population, China's local altmetrics is inevitable to be a popular research topic, within or outside the scope of bibliometrics. The local social media platforms, altmetric indicators, as well as local altmetric studies reviewed by this paper could build a foundation for future studies focusing on local altmetrics in China.

Acknowledgments

The study was fully supported by grant from 2020 Scientific Research Fund Project of Education Department of Liaoning Province in China (No. QNRW2020004).

References

Alperin, J. P. (2013). Ask not what altmetrics can do for you, but what altmetrics can do for developing countries. *Bulletin of the American Society for Information Science and Technology, 39* (4), 18–21.

Alperin, J. P. (2014). South America: Citation databases omit local journals. *Nature, 511* (7508), 155–155.

Alperin, J. P. (2015a). Geographic variation in social media metrics: An analysis of Latin American journal articles. *Aslib Journal of Information Management, 67* (3), 19.

Alperin, J. P. (2015b). *The public impact of Latin America´s approach to open access*. Stanford University,

Baidu. (2021). Project Chengfeng 2021 [Press release]. Retrieved from http://cn.chinadaily.com.cn/a/202101/08/WS5ff7f34ba3101e7ce9739cec.html

Cao, C. (2017). *Research on the academic influence of LIS bloggers in sciencenet* [Master´s thesis, Zhengzhou University). , CNKI.

Fan, W., & Zhang, Z. (2016). A comparison of the relevant data with Alexa ranking of Douban, Zhihu and Guokr Website. *Journal of Hefei University, 33* (6), 90–95.

Fang, Z., & Wang, X. (2019). Study on the accumulation speed and user type of scientific publications' first tweets. *Documentation, Information & Knowledge, 2019* (2), 28–38.

Guo, Y. (2011). Online Library and Copyright Protection. *Journal of Digital Research + Publishing*, *2011*, 73–80.

Guo, Y., & Xiao, X. (2019). The evaluation of Chinese scholars' influence by altmetrics index. *Information Studies: Theory & Application, 42* (4), 64–70.

Haustein, S., Larivière, V., Thelwall, M., Amyot, D., & Peters, I. (2014). Tweets vs. Mendeley readers: How do these two social media metrics differ?. *IT–Information Technology, 56* (5), 207–215.

Haustein, S., Sugimoto, C., & Larivière, V. (2015). Guest editorial: Social media in scholarly communication. *Aslib Journal of Information Management, 67* (3), null. doi:10.1108/AJIM–03–2015–0047

iMedia Research. (2020). *China mobile social report – 2019*. Retrieved from https://report.iimedia.cn/repo13–0/38891.html

Jiang, C., Guo, Q., & Zhang, G. (2020). Bookmetrix–based discipline characteristics analysis of the academic book assessment indexes. *Journal of Intelligence, 39* (08), 193–202.

Jiang, C., & Wei, Q. (2018). Construction of influence evaluation indicators system embodied altmetrics of academic monographs in humanities and social sciences. *Journal of Intelligence, 37 (2)* 65–71+77.

Jin, W., Zhao, R., & Yin, G. (2015). An analysis of the accumulation state and the validity of user readership data in online reference managers take the indicators of altmetrics as an example. *New technology of library and information service*, *2015* (11), 75–81.

Kwok, R. (2013). Research impact: Altmetrics make their mark. *Nature, 500* (7463), 491–493.

Li, H., Zhang, L., & Jiang, C. (2020). Research on influence evaluation of humanities and social science academic monographs from the perspective of altmetrics: Comparative analysis based on BKCI, Amazon, and Goodreads. *Journal of the China Society for Scientific and Technical Information, 39* (09), 896–905.

Li, L., Yu, H., Yin, Z., & Chang, M. (2020). Quantitative measure of the value of scientific datasets from perspective of altmetrics. *Information Studies: Theory & Application, 43* (09), 47–52+71.

Li, M., Li, J., Chen, M., & Shi, J. (2019). Exploratory analysis of citation counts and altmetrics indicators of Chinese academic books and the implications. *Journal of the China Society for Scientific and Technical Information, 38* (06), 557–567.

Li, X., & Hao, D. (2019). Analysis and interpretation on altmetrics of Chinese scientific journals. *Journal of Intelligence, 38* (11), 158–166.

Li, X., & Ren, J. (2020). Research on comprehensive evaluation of journal influence based on citation index and altmetrics index: Taking international journal of library and information science as an example. *Journal of Intelligence, 39* (01), 146–153.

Li, Y., Shao, Z., & Zhao, X. (2017). The multidimensional altmetrics measures for academic journals. *Journal of the China Society for Scientific and Technical Information, 36* (02), 190–196.

Liu, C. (2012). Scientometrics in the Web 2.0 environment: Altmetrics. *Library and Information Service, 56* (14), 52–56+92.

Liu, C. (2016). Development, current situation, and related issues of altmetric tools. *Library and Information Service, 60* (05), 87–92+117.

Liu, D., & Liu, X. (2018). Construction of indicators framework of digital journals usage statistics from the perspective of altmetrics. *Journal of Modern Information, 38* (03), 138–144.

Liu, X., & Wang, C. (2020). Research on altmetrics indicators from the perspective of users' motivation. *Documentation, Information & Knowledge, 2020* (03), 63–70+96.

Liu, X., Zhao, Z., & Wei, Y. (2019). Research on Altmetrics data quality from the perspective of life cycle. *Documentation, Information & Knowledge, 2019* (02), 12–18.

Maleki, A. (2014). *Twitter users in science tweets linking to articles: The case of Web of Science articles with Iranian authors.*

Meng, W., & Xiang, F. (2016). Altmetrics academic quality evaluation method based on sentiment analysis. *Library and Information Service, 60* (11), 107–112.

Ortega, J. L. (2020). Blogs and news sources coverage in altmetrics data providers: A comparative analysis by country, language, and subject. *Scientometrics, 122* (1), 555–572.

Park, H., & Park, H. W. (2018). Research evaluation of Asian countries using altmetrics: Comparing South Korea, Japan, Taiwan, Singapore, and China. *Scientometrics, 117* (2), 771–788.

Peng, Q., Yan, S., Yang, B., & Huang, S. (2018). Research on compound evaluation of newspaper articles influence integrating citation and altmetrics. *Library and Information, 2018* (5), 11–21+28.

Priem, J. (2014). Altmetrics. In B. Cronin & C. R. Sugimoto (Eds.), *Beyond bibliometrics: Harnessing multidimensional indicators of performance*. Cambridge, MA: MIT Press.

Priem, J., Taraborelli, D., Groth, P., & Neylon, C. (2010). *Altmetrics: a manifesto.* Retrieved from http://altmetrics.org/manifesto/

Qiu, J., & Yu, H. (2013). The putting forward process and research progress of altmetrics. *Library and Information Service, 57* (19), 5–12.

Qiu, J., & Yu, H. (2015). Some basic problems in advancing the development of altmetrics. *The Journal of the Library Science in China, 41* (01), 4–15.

Shen, L., Liu, Y., Ding, W., Bi, Y., & Han, Y. (2018). Stakeholder identification in Altmetrics evaluation under the context of informal communication recurrence. *Library and Information Service , 2018* (05), 22–28.

Shu, F., Haustein, S., & Quan, W. (2017). Can Twitter increase the visibility of Chinese international publications. *Library Tribune, 2017* (6), 9.

Sugimoto, C. R., Work, S., Larivière, V., & Haustein, S. (2017). Scholarly use of social media and altmetrics: A review of the literature. *Journal of the Association for Information Science and Technology, 68* (9), 2037–2062.

The China Academy of Information and Communication and Technology. (2020). *WeChat employment impact report – 2019–2020*. Retrieved from http://www.caict.ac.cn/kxyj/qwfb/ztbg/202005/t20200514_281774.htm

Thelwall, M., Haustein, S., Larivière, V., & Sugimoto, C. R. (2013). Do Altmetrics Work? Twitter and Ten Other Social Web Services. *Plos One, 8* (5), e64841.

Tian, Y., He, P., Tai, Y., Wu, S., Zhang, K., & Yu, Q. (2019). Analysis of the attention degree of scientific papers on social network – taking biomedical papers from PLOS as example. *Digital library forum, 2019* (04), 54–61.

Wang, K., Liu, X., & Han, Y. (2019). Exploring Goodreads reviews for book impact assessment. *Journal of informetrics, 13* (3) , 874–886.

Wang, L. (2019) . Evaluation of domestic academic journals impact based on Altmetrics. *Journal of Academic Library, 37* (03), 74–83.

Wang, P., & Liu, X. (2017). Research on altmetrics' essence based on content analysis. *Library and Information Service, 61* (02), 114–120.

Wang, X., Fang, Z., Li, Q., & Guo, X.(2016). The poor Altmetric performance of publications authored by researchers in the mainland of China. *Frontiers in Research Metrics and Analytics, 1* (8). doi:10.3389/frma.2016.00008

We are Social, & Hootsuite. (2020). *Digital 2020: Global Digital Overview.* Retrieved from https://wearesocial.com/digital–2020

Xiao, A., & Yang, S. (2020). The application of bookmetrix in the evaluation of academic book impact. *Library Tribune, 40* (09), 79–85.

Xiong, H., Li, J.L., & Li, X.M. (2020). A comparative study of online academic social networking sites in China. *Digital Library Forum*, *2020* (6), 47–55.

Yan, W., Liu,Q., Zhou, Z., & Lin, X. (2016). Performance analysis of scientific collaboration behavior in academic health community––taking ding xiang yuan as example. *Journal of Information Resources Management*, *2016* (4), 12–18, 56.

Yi, S., & Yu,B. (2019). A correlation research of altmetrics and bibliometric indicators based on domestic literature management platform. *Journal of Intelligence, 38* (7), 193–198.

Yiguan. (2020). *Analysis of Chinese digital users behavior 2019.* Retrieved from https://www.analysys.cn/article/detail/20019539

You, Q., & Tang, S. (2013). Altmetric & its application prospect. *Information Studies: Theory & Application, 36* (12), 6–10.

Yu, H., & Cao, X. (2019). Study on the construction of evaluation system of altmetrics data quality. *Documentation, Information & Knowledge, 2019* (02), 19–27+50.

Yu, H., Cao, X., & Wang, Y. (2020). Distribution features of news altmetrics. *Journal of the China Society for Scientific and Technical Information, 39* (10), 1081–1092.

Yu, H., Cao, X., Xiao, T., & Yang, Z. (2020). How accurate are policy document mentions? A first look at the role of altmetrics database. *Scientometrics,* 1–24.

Yu, H., Hemminger, B., Xiao, T., & Qiu, J. (2016). Feature of sina weibo altmetrics indicator. *The journal of the library science in China, 42* (04), 20–36.

Yu, H., Ren, Q., Zhang, Y., & Liu, C. (2019). Divergence in Chinese translation of the term altmetrics: confusion, influence, and discrimination. *The journal of the library science in China, 45* (01), 47–59.

Yu, H., Xu, S., Xiao, T., Hemminger, B. M., & Yang, S. (2017). Global science discussed in local altmetrics: Weibo and its comparison with Twitter. *Journal of Informetrics, 11* (2), 466–482.

Zahedi, Z. (2016). *Could we start to talk about an 'altmetric divide' ? On the imbalance in the access and use of social media platforms across countries.*

Zahedi, Z. (2017). *What explains the imbalance use of social media across different countries? A cross country analysis of presence of Twitter users tweeting scholarly publications.* Retrieved from https://www.narcis.nl/publication/RecordID/oai:openaccess.leidenuniv.nl:1887%2F54803

Zhai, S., Ye, D., Hu, P., & Xu, X. (2020). Evaluation of the academic impact of data papers fused with altmetrics and citation analysis. *Journal of the China Society for Scientific and Technical Information, 39* (07), 710–718.

Zhao, C. (2015). Evaluation and research on academic influence of library science scholars based on Sciencenet. *Library and Information Service, 59* (S1), 158–160+123.

Zhao, R., Wang, J., Feng, X., & Qi, Y. (2019). Evaluation of open access papers' impact based on altmetrics. *Information Studies: Theory & Application, 42* (01), 81–86.

Zhao, R., & Wang, X. (2019). Evaluation and comparison of the influence of sino–US international OA journals. *Information and documentation services, 40* (02), 5–13.

Zhao, R., & Wei, M. (2017). Academic impact evaluation of Wechat in view of social media perspective. *Scientometrics, 112* (3), 1777–1791.

Zhao, R., & Yu, B. (2020). Cooperation model of altmetrics top 100 papers and analysis of its influencing factors. *Information Science, 38* (04), 3–8.