Exploring the Relationship Between Bibliometric and Altmetrics Indices: A Study of Iranian JCR Journals

Ismael Mostafavi*[1], Zahra Namvar [2], Yeganeh Dastar [3]

Abstract
Purpose: This study investigates the correlation between bibliometric and altmetrics indices of Iranian JCR (Journal Citation Reports) journals, with a focus on their presence on social media platforms.
Methodology: The research utilized a scientometric approach to examine all Iranian JCR journals indexed in the Web of Science database in 2022. Initial data retrieval identified 156 Iranian journal titles, with 94 of them being shared at least once on social media, yielding variable scores. Data collection was carried out using the Altmetric.com database, and data analysis was conducted using Pearson's correlation test in the SPSS (v.23) software.
Findings: The results indicate that Twitter is the primary platform for sharing scientific research among Iranian JCR journals on social media, with Pinterest and LinkedIn being underutilized. Interestingly, there was no significant relationship found between highly cited Iranian JCR journals and their presence on social media platforms, suggesting that some highly cited journals are not being shared on these platforms.
Conclusion: Although Iranian journals exhibit promise in certain indicators, there is a need for increased utilization in scientific circles. Notably, a positive correlation was observed between journal citations and mentions on virtual social networks, emphasizing the importance of further exploration of this relationship.
Value: This study emphasizes the potential for comparing bibliometric and altmetrics indicators to monitor scientific outputs in both traditional and virtual environments.

Keywords: *Altmetrics, Social Media, Iranian JCR Journals, Bibliometrics, Web of Science.*

1. Assistant Professor, Department of Knowledge and Information Science, Faculty of Psychology and Educational Sciences, Yazd University, Yazd, Iran (Corresponding Author) mostafavi@yazd.ac.ir
2. Ph.D. in Knowledge and Information Science, Scientific Resources Development Department, Islamic World Science and Technology Citation and Monitoring Institute, ISC, Shiraz, Iran
3. Master Student in Information Management, Yazd University, Faculty of Psychology and Educational Sciences, Yazd, Iran

Extended Abstract

Introduction: Unlike approximately 60 years ago when the common practice was to rely on extensive databases to document publications and references, new technologies, tools, and methodologies such as altmetrics have been proposed for monitoring references and evaluating the impact of publications. The main advantage of these approaches and tools is their ability to reflect and assess various research impacts within society and beyond the academic realm.

Purpose: The aim of this study is to explore the relationship between bibliometric and altmetrics indices of Iranian JCR journals. This investigation was conducted by assessing the visibility of Iranian JCR journals indexed in the Web of Science through social media platforms.

Methodology: This study was conducted with a practical purpose and utilized a scientometric approach, employing the altmetrics method. The population for this research includes all Iranian JCR journals from the year 2022. As traditional citation indices for 2023 are calculated based on data from the previous two years and published as usable citation indices in 2022, the research population consists of Iranian JCR journals from 2022. The study examines the subscription status and presence of Iranian JCR journals in 2022 across various social media platforms. Initially, 156 Iranian journal titles indexed in the Web of Science database were retrieved, with 94 journals found to have been shared at least once on social media and possessing altmetrics scores. The Altmetrics Institute evaluates the presence of scholarly content on different social media platforms. A general Altmetrics score is assigned based on the total points given by the institute for discussions, references, studies, and bookmarking, indicating the level of sharing and usage of a document on social media, reflecting the attention it has received on social networks. Data collection was facilitated through the Bookmarklet tool, available for free download from Altmetric.com and installed on a browser. All journals were manually searched using this tool, and relevant information and data regarding social media engagement were extracted from the articles. As the analyzed data are of interval type, Pearson's correlation test was carried out using SPSS software version 23 to examine the correlation of the data.

Findings: The research findings reveal that out of the 156 Iranian journal titles indexed in the Web of Science database in 2022, 94 journals have been shared on social media at least once and have received varying evaluation scores. These journals have accumulated a total of 64,327 mentions on different social media platforms. Twitter was the primary social media platform used for sharing Iranian journals, representing 70% of the attention, followed by news outlets with 12%, and Facebook with 7%, ranking first to third, respectively. Other platforms such as Google Plus, video platforms, policy documents, Wikipedia, blogs, inventions, post-publication peer review platforms, Darit, F1000, Q&A platforms, Weibo, Pinterest, and LinkedIn followed in ranking. LinkedIn and Pinterest had the lowest levels of usage.
Table 1 shows that the International Journal of Health Policy and Management performed the best in terms of attention on social media, with a score of 6149, followed by the International Journal of Preventive Medicine and the Journal of Research in Medical Sciences with scores of 5530 and 4354, respectively. On the other hand, the Iranian Journal of Allergy, Asthma & Immunology had the lowest differential score at 1095. Table 2 displays the citation metrics, with the International Journal of Environmental Science and Technology leading with 12,412 citations. The top three journals belonged to the categories of Environmental Sciences, Chemistry (Multidisciplinary), and Engineering (Multidisciplinary).

Table 3: Correlation Test of Bibliometric and Altmetric Indices of Iranian Journals in the JCR Database

		Immediacy Index	Eigen factor	Normalized Eigenfactor	Influence Score	Total Articles	Citable Items
Mention out	Correlation coefficient pvalue Number	0/28 0/07 40	0/63** 0/000 94	0/68** 0/000 94	0/53** 0/000 89	0/30 0/003 94	0/35** 0/000 94
Mentions	Correlation coefficient pvalue Number	0/34* 0/02 40	0/48** 0/000 94	0/54** 0/000 94	0/56** 0/000 86	0/15 0/15 94	0/19 0/05 94
News	Correlation coefficient pvalue Number	0/69 0/67 40	0/35** 0/001 94	0/41** 0/000 94	0/33** 0/002 89	0/09 0/37 94	0/14 0/17 94
Blog	Correlation coefficient pvalue Number	0/20 0/20 40	0/62** 0/000 94	0/67** 0/000 94	0/37** 0/000 89	0/43** 0/000 94	0/47** 0/000 94
Policy Documents	Correlation coefficient pvalue Number	0/52** 0/000 40	0/57** 0/000 94	0/61** 0/000 94	0/60** 0/000 89	0/29** 0/005 94	0/32** 0/001 94
Patent	Correlation coefficient pvalue Number	0/05 0/74 40	0/43** 0/000 94	0/45** 0/000 94	0/17 0/09 89	0/43** 0/000 94	0/44** 0/000 94
Twitter	Correlation coefficient pvalue Number	0/42** 0/007 40	0/48** 0/000 94	0/54** 0/000 94	0/62** 0/000 89	0/13 0/18 94	0/18 0/07 94
Peer review	Correlation coefficient pvalue Number	-0/17 027 40	0/05 0/60 94	0/01 0/85 94	-0/08 0/43 89	0/02 0/81 94	0/02 0/82 94
Weibo	Correlation coefficient pvalue Number	0/13 0/39 40	0/63** 0/000 94	0/64** 0/000 94	0/04 0/67 89	0/74** 0/000 94	0/76** 0/000 94
Facebook	Correlation coefficient pvalue Number	0/08 0/59 40	0/20** 0/04 94	0/24** 0/01 94	0/23** 0/02 89	0/03 0/71 94	0/06 0/53 94
Wikipedia	Correlation coefficient pvalue Number	-0/004 /98 40	0/50** 0/000 94	0/55 0/000 94	0/39** 0/000 89	0/20* 0/05 94	0/25* 0/01 94
Google+	Correlation coefficient pvalue Number	-0/06 0/71 40	0/22 0/03 94	0/26** 0/009 94	0/13 0/21 89	0/07 0/47 94	0/11 0/25 94
LinkedIn	Correlation coefficient pvalue Number	0c 0 40	0c 0 94	0c 0 94	0c 0 89	0c 0 94	0c 0 94
Reddit	Correlation coefficient pvalue Number	-0/05 0/75 40	0/17 0/09 94	0/19 0/06 94	0/14 0/18 89	0/005 0/96 94	0/03 0/73 94
Pinterest	Correlation coefficient pvalue Number	-0/13 0/39 40	-0/003 0/97 94	-0/04 0/70 94	-0/07 0/51 89	-0/01 0/86 94	-0/01 0/85 94
F1000	Correlation coefficient pvalue Number	0/05 0/73 40	0/14 0/16 94	0/16 0/11 94	0/13 0/22 89	0/003 0/97 94	0/01 0/85 94
Q&A	Correlation coefficient pvalue Number	-0/02 0/86 40	0/26** 0/01 94	0/32 0/002 94	0/13 0/21 89	0/14 0/17 94	0/16 0/11 94
Video	Correlation coefficient pvalue Number	0/24 0/13 40	0/37** 0/000 94	0/44** 0/000 94	0/42** 0/000 89	0/07 0/48 94	0/11 0/26 94
Syllabi	Correlation coefficient pvalue Number	0c 0 40	0c 0 94	0c 0 94	0c 0 89	0c 0 94	0c 0 94

To further explore the relationship between bibliometric and altmetric metrics, 40 Iranian journals were examined using SPSS software and Pearson tests. The findings in Table 3 show a positive and significant association only between the urgency index and policy documents. Additionally, there is a significant correlation between the journal penetration coefficient and average scores of indicators. The results demonstrate further relationships between different metrics and external sources.

Conclusion: The study suggests that Iranian journals show positive performance in certain indicators but there is room for improvement in utilizing variables within scientific environments. There is a significant correlation between journal citation counts and indicators of mentions on social networks, highlighting the importance of further attention in this area.

Value: Comparing bibliometric and altmetric indicators provides valuable insights into monitoring scientific outputs across traditional academic environments and virtual scientific social networks.

References
Abramo, G., Cicero, T., & D'Angelo, C. A. (2012). A sensitivity analysis of researchers' productivity rankings to the time of citation observation. *Journal of Informetrics*, *6*(2), 192-201. https://doi.org/10.1016/j.joi.2011.12.003

Altmetric, L. L. P. (2019). When did Altmetric start tracking attention to each attention source?. *https://help. altmetric. com/support/solutions/articles/6000136884-whendid-altmetric-start-tracking-atten-tion-to-each-attention-source*.

Altmetric.com.(2020). How is the Altmetric Attention Score calculated.

Bornmann, L. (2014). Do altmetrics point to the broader impact of research? An overview of benefits and disadvantages of altmetrics. *Journal of informetrics*, *8*(4), 895-903. https://doi.org/10.1016/j.joi.2014.09.005

Bornmann, L., Haunschild, R., & Adams, J. (2019). Do altmetrics assess societal impact in a comparable way to case studies? An empirical test of the convergent validity of altmetrics based on data from the UK research excellence framework (REF). *Journal of informetrics*, *13*(1), 325-340. https://doi.org/10.48550/arXiv.1807.03977

Buschman, M., & Michalek, A. (2013). Are alternative metrics still alternative?. *Bulletin of the American Society for Information Science and Technology*, *39*(4), 35-39. https://doi.org/10.1002/bult.2013.1720390411

Chen, M., & Wang, L. (2022). An Altmetrics and citation analysis of selected predatory journals in library and information science field. *The Journal of Academic Librarianship*, *48*(6), 102618. https://doi.org/10.1016/j.acalib.2022.102618

Cooper, I. D. (2015). Bibliometrics basics. *Journal of the Medical Library Association: JMLA*, *103*(4), 217. https://doi.org/10.3163/1536-5050.103.4.013

Coyne, M., & Regan, J. (2022). Measuring the social impact of contemporary dysphagia research: an altmetric analysis. *Speech, Language and Hearing*, *25*(1), 46-58. https://doi.org/10.1080/2050571X.2021.1926626

Díaz-Faes, A. A., Bowman, T. D., & Costas, R. (2019). Towards a second generation of 'social media metrics': Characterizing Twitter communities of attention around science. *PloS one*, *14*(5), e0216408 .https://doi.org/10.1371/journal.pone.0216408

Engwall, L., Blockmans, W., & Weaire, D. (2014). Bibliometrics: Use and Abuse in the Review of Research Performance. *Wenner - Gren International Series. Vol.87*.

Erfanmanesh, M.A. (2018). The Relationship between Altmetric Activity and Quality Indicators of the Library and Information Science Journals in Scopus. *Library studies and information organization, 29*(2), 7-26. doi: 10.30484/nastinfo.2018.2220. [In Persian].

Evans, P., & Krauthammer, M. (2011). Exploring the use of social media to measure journal article impact. *AMIA ... Annual Symposium proceedings. AMIA Symposium*, *2011*, 374–381.

Fekete, E., & Haffner, M. (2019). Twitter and academic geography through the lens of# AAG2018. *The Professional Geographer*, *71*(4), 751-761. https://doi.org/10.1080/00330124.2019.1622428

Fenner, M. (2013). What can article-level metrics do for you?. *PLoS biology*, *11*(10), e1001687. https://doi.org/10.1371/journal.pbio.1001687

Gordon, G., Lin, J., Cave, R., & Dandrea, R. (2015). The question of data integrity in article-level metrics. *PLoS Biology*, *13*(8), e1002161. https://doi.org/10.1371/journal.pbio.1002161

Hammarfelt, B. (2014). Using altmetrics for assessing research impact in the humanities. *Scientometrics*, *101*(2), 1419-1430. https://doi.org/10.1007/s11192-014-1261-3.

Haustein, S., Peters, I., Bar-Ilan, J., Priem, J., Shema, H., & Terliesner, J. (2014). Coverage and adoption of altmetrics sources in the bibliometric community. *Scientometrics*, *101*, 1145-1163. https://doi.org/10.1007/s11192-013-1221-3

Howard, J. (2012). Scholars Seek Better Ways to Track Impact Online. *Chronicle of Higher Education*. https://cacmb4.acm.org/news/145756-scholars-seek-better-ways-to-track-impact-online/fulltext

HTOO, T. H. H. (2015). NA, Jin-Cheon. Comparison of Altmetrics across Multiple Disciplines: Psychology, History, and Linguistics.(2015). In *International Conference of Asian Special Libraries 4th ICoASL* (pp. 22-24).

Jaring, P., & Bäck, A. (2017). How Researchers Use Social Media to Promote their Research and Network with Industry. *Technology Innovation Management Review*, *7*(8), 32-39. https://doi.org/10.22215/timreview/1098.

Kietzmann, J. H., Hermkens, K., McCarthy, I. P., & Silvestre, B. S. (2011). Social media? Get serious! Understanding the functional building blocks of social media. *Business horizons*, *54*(3), 241-251. http://dx.doi.org/10.1016/j.bushor.2011.01.005

Koprubasi, S., Bulut, E., & Celebi, A. R. C. (2022). The relationship between citation-based metrics and Twitter in the area of age related macular degeneration research: Altmetric and bibliometric study. *Journal of Clinical Medicine of Kazakhstan*, *19*(5), 12-22. https://doi.org/10.23950/jcmk/12502

Lin, J., & Fenner, M. (2013). Altmetrics in Evolution: Defining and Redefining the Ontology of Article-Level Metrics. Information Standards Quarterly 25: 20–26. *Online verfügbar unter http://www. niso. org/apps/group_public/download. php/11273/lP_Lin_Fenner_PLOS_altmetrics_isqv25no2. pdf, zuletzt geprüft am*, *4*, 2016.

Melicherová, M., Ondrišová, M., & Šušol, J. (2021). Bibliometrics versus altmetrics: Researchers' attitudes in Slovakia. *Iberoamerican Journal of Science Measurement and Communication*, *1*(1) .https://doi.org/10.47909/ijsmc.11

Moed, H.F. (2008). Citation Analysis in Research Evaluation. (A. Mirzaei, H. Mokhtari, Trans). Chapar. [In Persian].

Nip, I., & Feng, H. (2022). Examining correlation of altmetric score and citation number in dermatology journal articles. *Journal of Dermatological Treatment*, *33*(1), 297-299. https://doi.org/10.1080/09546634.2020.1750555

Noroozi Chakoli, A. (2011). *Introduction to Scientometric.* Organization for Researching and Composing University Textbooks in the Islamic Sciences and the Humanities (SAMT). [In Persian].

Priem, J., & Hemminger, B. H. (2010). Scientometrics 2.0: New metrics of scholarly impact on the social Web. *First Monday*, *15*(7). https://doi.org/10.5210/fm.v15i7.2874

Priem, J., Taraborelli, D., Groth, P., & Neylon, C. (2010). *Alt-metrics: A Manifesto.* Available: http://altmetrics. org/manifesto.

Rathemacher, A.J. (2014). *Rathemacher, Andrée J. "Article-Level Metrics and Altmetrics: New Ways to Measure the Impact of Your Research."* URI AAUP News XXXVIII, no. 4 (April 2014): 2,4. Available: https://docs.google.com/file/d/0BLbmAB0uzHGTDJKbnlUOWhzaUk

Robinson-García, N., Torres-Salinas, D., Zahedi, Z., & Costas, R. (2014). New data, new possibilities: Exploring the insides of Altmetric. *com. Profesional de la información/Information Professional,* *23*(4), 359-366. https://doi.org/10.48550/arXiv.1408.0135

Robinson-Garcia, N., van Leeuwen, T. N., & Rafols, I. (2018). Using altmetrics for contextualised mapping of societal impact: From hits to networks. *Science and public policy*, *45*(6), 815-826. https://doi.org/10.1093/scipol/scy024

Sedighi, M. (2019). The Role of Social Media in Assessing the Impact of Research (Case Study: The Field of Scientometrics). *Iranian Journal of Information Processing and Management*, *34*(2), 765-792. doi: 10.35050/JIPM010.2019.056 [In persian]

Serati Shirazi, M. (2019). An Altmetric Study on Scientific Iranian Articles Indexed in Social Science index. *Sciences and Techniques of Information Management*, *5*(4), 162-190. doi: 10.22091/stim.2020.4982.1356 [In persian]

Shenavar, N., Atapour, H., & Shenavar, A. (2022). A Bibliometric and altmetrics analysis of highly cited articles in the field of Infectious Diseases. *Payavard Salamat*, *15*(5), 419-431.[In persian]

Sinha, P. K., Sahoo, S. B., Gajbe, S. B., Chakrabory, K., & Mahato, S. S. (2020). Altmetrics Research Progress: A Bibliometric Analysis and Visualization. *Journal of Scientometric Research*, *9*(3), 300-309. https://doi.org/10.5530/jscires.9.3.37

Sud, P., & Thelwall, M. (2014). Evaluating altmetrics. *Scientometrics*, *2*(98), 1131-1143. https://doi.org/10.1007/s11192-013-1117-2

Talebian, A., Okhovati, M., Arshadi, H., Hayati, R., Tabrizi, R., & Karimimoghadam, Z. (2023). Investigating and comparing citation indicators and altmetrics of articles in the field of addiction to opioids by using the PlumX tool. *Journal of Health Administration*, *26*(2),33-50. Doi: http://dx.doi.org/10.22034/26.2.33 [In persian]

Torres-Salinas, D., Cabezas-Clavijo, Á., & Jiménez-Contreras, E. (2013). Altmetrics: New Indicators for Scientific Communication in Web 2.0. *Comunicar*, *21*(41), 53-60. https://doi.org/10.48550/arXiv.1306.6595

Waltman, L. (2016). A review of the literature on citation impact indicators. *Journal of informetrics*, *10*(2), 365-391. https://doi.org/10.1016/j.joi.2016.02.007

Williams, A. E. (2017). Altmetrics: an overview and evaluation. *Online information review*, *41*(3), 311-317. http://dx.doi.org/10.1108/OIR-10-2016-0294

Wouters, P., & Costas, R. (2012). *Users, narcissism and control: tracking the impact of scholarly publications in the 21st century.* Utrecht: SURF foundation.

Zou, X., Yue, W. L., & Le Vu, H. (2018). Visualization and analysis of mapping knowledge domain of road safety studies. *Accident Analysis & Prevention*, *118*(9),131-145.https://doi.org/10.1016/j.aap.2018.06.010

Zungu, N. (2021). Correlating Altmetrics and h5-Index Using Google Scholar Metrics for Journals in Library and Information Science. *Library Philosophy and Practice (e-journal).* https://digitalcommons.unl.edu/libphilprac/6435/