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Sapna Verma Ms.

sapnaverma.du@gmail.com

Madhusudhan Margam Dr.

University of Delhi, madhumargam@gmail.com

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Altmetric Analysis of Highly Cited Publications on Digital Library in Brazil and India: A Comparative Study

*Sapna Verma **Margam Madhusudhan

*Research Scholar ** Associate Professor

Department of Library and Information Science, University of Delhi, Delhi-110007.

Email:*sapnaverma.du@gmail.com; **mmadhusudhan@libinfosci.du.ac.in

Abstract

In Library and Information Science, Altmetrics is one of the emerging metrics to capture the online attention of scholarly literature. The present paper is an attempt to do a correlation study of an altmetric score and citations received by the highly cited publications of Digital library in Brazil and India country during 1989-2017. The study reveals that India is the county which received altmetric attention as compared to Brazil. While doing Altmetric analysis, it was found that discipline wise, Librarians followed by PhD scholar are the maximum readers whereas subject-wise, Computer science professionals contribute the maximum readership followed by social science disciplines in India in the field of a digital library. So, it is the need of time to explore the area more so that altmetric would become one of the standard indicators to measure the research impact in a professional.

Keywords: Altmetrics, Highly-cited Publications, Digital Library, India, Brazil.

1. Introduction

Research assessment is a principal component of research studies, as it is an attempt to evaluate the research output and to measure the impact of research. “In scholarly communication, citations are playing a significant role to evaluate the research evaluation. But as time passes, new metric studies are evolving to evaluate the research quality along with the traditional components”¹. “Altmetrics is a metric which is used to measure the research impact in various platforms such as social networking sites, blogs, news, patents, Mendeley and many others”². “It provides an opportunity for researchers to promote their research work online by using various social media tools because altmetrics measures the online impact of various research work and proffer the altmetric score for the particular research publication”³.

“Altmetrics are metrics and qualitative data that are complementary to traditional, citation-based metrics. They can include (but are not limited to) peer reviews on Faculty of 1000, citations on Wikipedia and in public policy documents, discussions on research blogs, mainstream media coverage, bookmarks on reference managers like Mendeley, and mentions on social networks such as Twitter”². “The advent of social media for discussion, sharing and posting of research related articles leads to the development of new metrics, i.e. called altmetrics that track the online scholarly communication and measures the impact of research”⁴.

The significance of new metrics in the research world of scholarly literature is the insertion of altmetric badges which tells a lot about the impact of research. The increased reputation of

altmetrics in a recent time prompted many scientists to study the correlation between citation and altmetric score. With respect to digital library literature, there is no such comparative study found to study the correlation between citation and altmetric score in the digital library in Brazil and India. Therefore, the aim of the study is to do a comparative study of highly cited publications on digital library in Brazil and India.

2. Review of Literature

During literature survey plethora of articles found and some of the articles are described here, which shows the need of the present study. Batcha⁵ “analyze top 15 articles of University of Madras, which have scored high citations and aims to find out to what extend the top cited articles have secured Altmetric scores”. Ezema and Ugwu⁶ “made an attempt to contribute to this discussion with focus on the field of library and information science and extracted citation data from Web of Science, Scopus and Google Scholar, and altmetric attentions from 85 LIS journals indexed by Web of Science and found a positive correlation between citation scores and altmetric attention of the nine journals that maintained consistent presence in the three databases”. Livas and Delli³ “evaluate the online visibility of the most popular orthodontic articles on Web platforms in relation to publication details and citations”. De Melo Maricato and Dalton⁷, discusses “the complexities, challenges and scientific communication in social media of altmetrics, to have more depth understanding. The authors mention that there are various complexities such as complexity of assessing publics, the different tools and sources related to Altmetrics present an even greater difficulty i.e., Different manners to measure research actions such as save, discuss, recommend, cite, etc.”. Baheti and Bhargava⁸, discusses “the altmetric score and growing role of altmetrics for measuring research impact by mentioning that topic are more reliable to general attention as compared to traditional method.” Banshal, et al⁹, tried to attempts “present findings of an exploratory analysis of the relevance of Altmetrics data through a case study of scholarly articles from India published during 2016 and indexed in Web of Science and also updated on ResearchGate. It is observed that about 61% papers indexed in Web of Science have an entry in ResearchGate.” Bornmann, and Haunschild¹⁰, studies “the relation of altmetrics to scientific quality papers by underlying the dimensions of measurement for traditional metrics and altmetrics, using principal component analysis (PCA) and factor analysis (FA).” De Melo and Jayme¹¹, “analyses the aspects, characteristics and potentialities for measuring social impact provided by altmetrics in social media by collecting 100 papers with higher altmetric scores using Scientific Electronic Library Online (SciELO’s) database with altmetric.com tool.” Nabout, et al¹², studies “the traditional citation-based indicators and activities on Online Social Media Platform (OnSMP) to assess the impact of scientific research by using multivariate models. The result reveals that most activities were concentrated on Twitter and Mendeley and those activities in these two OnSMP are highly correlated.”

3. Purpose of Study

The purpose of the study is to study the correlation between citation and altmetric score on the digital library in Brazil and India during 1989-2017.

4. Objectives of Study

- (i) To do a comparative study by calculating the altmetric score of highly cited publications on digital libraries in Brazil and India;
- (ii) To find out the level of discussion among the students and Professionals on social media platform on Facebook, Twitter, Mendeley, etc;
- (iii) To find out Geographical and demographic details of Twitter and Mendeley users for discussion on digital libraries in studied countries;
- (iv) To find out top ten highly cited publications Brazil and India; and
- (v) To capture and rank the altmetric attention of the research publications Brazil and India.

5. The Scope of the Study

The scope of the study is limited to top ten highly cited publications from the year 1989 to 2017 of Brazil and India country on “Digital Libraries” using altmetrics score provided by altmetric.com and *Plum Analytics tools/ aggregators*. The two mentioned countries i.e. India and Brazil are considered for the study because both of them are developing countries in BRICS countries and the other reason is that the full study on BRICS countries is very lengthy because of this, the study needs to do shortened.

6. Methodology

The *Observation method* was adopted for this study. The primary data is retrieved from the Web of Science (core collection of humanities, sciences and social science) during the last week of May and the first week of June. The top ten articles with top citations are only considered on a digital library in Brazil and India country during the time period 1989-2017. The data is analysed by the Altmetric tool i.e. Altmetric.com from July 2018 to August 2018 to find out the platforms of social media to get the maximum attention and the reason for giving the attention by a particular person. The data were tabulated in Microsoft Excel for analysis and other purposes.

6.1. Data Source

“Web of Science (WoS) is an online subscription-based scientific citation indexing service originally produced by the Institute for Scientific Information, now maintained by Clarivate Analytics, that provides a comprehensive citation search” (<https://clarivate.com>).

“Altmetric.com is a London based digital science company with a vision to track and analyze the online activity around scholarly research outputs” (Altmetric.com).

6.2. Data Extraction

The search query consists of the keywords "Digital Library", "Brazil" and "India" in the respective corresponding address field. The data extraction process considers the time period from 1989 to 2017 on a digital library in respective countries. After this, the top ten highly cited publications take into account. Through Web of Science data such as Title, Type of Publication, Number of Authors, Cited Reference, Times Cites, Research Areas, Language, Publication date, Name of the journal, Volume, Issue, Pages and DOI extract manually from the citation database. After completing this, to study the online attention on social media, Altmetric and Plum Analytics tool is used for Altmetric analysis.

7. Data Analysis

The study involves the individual analysis of each country and provides a comparative study of their highly cited publications by using Plum Analytics and Altmetric tools.

7.1(a) Details of Highly Cited Publications in Brazil

The study consists of having highly top 10 cited publications in Digital Library of Brazil but in the field of Digital Library only top nine publications were retrieved which are listed in a tabular format (Table 7.1a). The bibliographical details collected from the Web of Science core collections of highly cited publications in Brazil Digital Library in order to get the details of citations received to articles. The article "A digital library environment for integrating, disseminating and exploring ecological data" received the highest citation i.e. 3 in digital library in Brazil whereas publications including, "Satisfaction of the user of the Capes Portal of Scientific Journals: a study on the success in the use of the system", and "Use of web surveys for use studies" cited 2 times whereas rest publications didn't receive any citation.

Table 7.1 (a): Details of Highly Cited Publications in Brazil on Digital Library

S.no	Title	Type of publication	Times cited	Cited reference	Research areas	Language	Publication Date	Name of Journal	Volume (Issue)
1	A digital library environment for integrating, disseminating and exploring ecological data	Article	03	22	Digital libraries; Ecological data management; Data integration; User evaluation	English	2008	Ecological informatics	3(4-5)
2	Satisfaction of the user of the Capes Portal of Scientific Journals: A study on the success in the use of the system	Article	02	36	Use and user studies; user satisfaction; Capes Portal of Scientific Journals; Digital library	Portuguese	2011	Perspectivas em Ciéncia da informacáo	16(2)
3	Use of web surveys for use studies	Article	02	22	Web Survey; CAPES' Digit	Portuguese	2010	Informacáo &	20(3)

					al Library of Scientific Journals; Digital Libraries of Scientific Journals; Information Use Studies			sociodestudos	
4	Academic literature about National Regulatory Agency for Private Health Insurance and Plans: A view from the Brazilian Digital Library of Theses and Dissertations	Article	00	70	Supplemental Health Care; Review; Health Care Coordination and Monitoring	Portuguese	2017	Saude e sociedade	26(3)
5	The quality of the metacommunication of the interface and search system of the CAPES Portal of e-Journals	Article	00	23	User interfaces; User satisfaction; Human-computer interaction; Capes Portal of e-Journals; Semiotics engineering; Semiotics inspection method	English	2017	Electronic Library	35(3)
6	A method for measuring satisfaction of users of digital libraries: A case study with engineering faculty	Article	00	09	Methodology; E-journals; Digital Libraries; Users Satisfaction; User Studies	English	2015	Qualitative & quantitative methods in libraries	
7	The preservation of historical collections in the state of Minas Gerais: Memorial Project Uberaba - creation of the Digital Newspaper Library of Triangulo Mineiro and Alto Paranaiba	Article	00	07	Digitalization of Historical collections; Preservation of Historical Collections; Digital Libraries	Portuguese	2015	Cadernos de historia	16(25)
8	Use of digital libraries of scientific journals: A comparison of the use of the Portal Capes in different domains of knowledge	Article	00	26	Electronic journals; Digital libraries; Capes Digital Library of Scientific Journals; Information seeking behaviour; Use study	Spanish	2010	Perspectivas em ciencia da informacao	15(1)
9	Reducing the information gap: Digital library development in Brazil	Article; Proceedings Paper	00	06	Computer Science; Information Science & Library Science; Social Issues	English	2002	ASIST 2002: proceedings of the 65th ASIST annual meeting	39

7.1 (b) Altmetric Attentions Received by Highly Cited Publications in Brazil on Digital Library

The Altmetric Attentions received by the top nine highly cited publications are listed in a tabular format (Table 7.1(b)). The Altmetric scores are mentioned for each publication but for these publications, the Altmetric scores were found to be zero because these articles are not discussed in social media platform, the reason for this may be that most of the publications are in their regional language, hence didn't receive attention in social media platform.

Table 7.1(b): Altmetric Attentions Received by Highly Cited Publications in Brazil on Digital Library

Item No.	Title	Altmetric Score	News	Peer Review Site	Blogs	Twitter	Facebook	Sina Weibo	Wikipedia	Policy Documents	Q&A Thread	F1000/Pubblons/Pubpeer	YouTube	Reddit/Pinterest	F1000	LinkedIn	Open Syllabus	Google+	Mendeley	CiteULike	Connetea
1	A digital library environment for integrating, disseminating and exploring ecological data	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Satisfaction of the user of the Capes Portal of Scientific Journals: a study on the success in the use of the system	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Use of web surveys for use studies	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	Academic literature about National Regulatory Agency for Private Health Insurance and Plans: a view from the Brazilian Digital Library of Theses and Dissertations	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	The quality of the metacommunication of the interface and search system of the CAPES Portal of e-Journals	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	A method for measuring satisfaction of users of digital libraries: a case study with engineering faculty	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	The preservation of historical collections in the state of Minas Gerais: Memorial Project Uberaba - creation of the Digital Newspaper Library of Triangulo Mineiro and Alto Paranaiba	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	Use of digital libraries of scientific journals: a comparison of the use of the Portal Capes in different domains of knowledge	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	Reducing the information gap: Digital library development in Brazil	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

***Note-** 0 represents that particular article doesn't received any altmetric attention, - represents no attention is received by a particular paper on a particular site

7.1 (c) PlumX Attentions Received by Highly Cited Publications in Brazil on Digital Library

PlumX is an aggregator tool for capturing the online attention in social media platforms similar to Altmetric but it provides the details of attention in the form of Usage, Captures, Mentions, Social Media, and Citations. It also provides the Field-Weighted Citation Impact and Citation Benchmarking. Table 7.1 (c) provides the details of attentions tracked by PlumX for highly cited publications in Brazil in a digital library.

Table 7.1 (c): PlumX Attentions Received by Highly cited Publications in Brazil on Digital Library

Item No	Title of Paper	PlumX Metrics					Field weighted Citation Impact	Citation Benchmarking (In Percentile)
		Usage	Captures	Mentions	Social Media	Citations		
1	A digital library environment for integrating, disseminating and exploring ecological data	74	53	00	00	06	0.32	40
2	Satisfaction of the user of the Capes Portal of Scientific Journals: a study on the success in the use of the system	2738	40	00	00	00	00	00
3	Use of web surveys for use studies	-	-	-	-	-	-	-
4	Academic literature about National Regulatory Agency for Private Health Insurance and Plans: a view from the Brazilian Digital Library of Theses and Dissertations	816	00	00	00	00	00	00
5	The quality of the metacommunication of the interface and search system of the CAPES Portal of e-Journals	94	13	00	00	00	00	00
6	A method for measuring satisfaction of users of digital libraries: a case study with engineering faculty	-	-	-	-	-	-	-
7	The preservation of historical collections in the state of Minas Gerais: Memorial Project Uberaba - creation of the Digital Newspaper Library of Triangulo Mineiro and Alto Paranaiba	-	-	-	-	-	-	-
8	Use of digital libraries of scientific journals: a comparison of the use of the Portal Capes in different domains of knowledge	00	03	00	00	00	00	00
9	Reducing the information gap: Digital library development in Brazil	00	01	00	00	00	00	00

***Note:** - represents that particular article doesn't received any PlumX attention

7.1 (d) Citation and Altmetric Score of Highly Cited Publications in Brazil in Digital Library

Table 7.1 (d) represents the total citations received and the Altmetric score received by the highly cited publications in Brazil in a digital library. Although comparing the Citations and Altmetric Score along with PlumX reveals that the research publications receive the online attention which can be tracked by using tools, for instance, PlumX is able to aggregate the attention for a particular paper which was not captured by the Altmetric.com.

Charles Edward Spearman in 1904 developed the Spearman correlation method based on “Karl's Pearson Correlation coefficient method, used to measure the direction and association between the two ranked variables. The closer R is to +1 or -1, the stronger the likely correlation. A perfect positive correlation is +1 and a perfect negative correlation is -1” (Aggarwal and Gupta, 2011).

Table 7.1 (d): Citation and Altmetric Score of Highly Cited Publications in Brazil on Digital Library

Articles	Citation (X)	Rank c	Altmetric Score (Y)	Rank a	D=Rc-Ra	D ²
Article 01	03	1	00	5	-4	16
Article 02	02	2.5	00	5	-2.5	6.25
Article 03	02	2.5	00	5	-2.5	6.25
Article 04	00	6.5	00	5	1.5	2.25
Article 05	00	6.5	00	5	1.5	2.25
Article 06	00	6.5	00	5	1.5	2.25
Article 07	00	6.5	00	5	1.5	2.25
Article 08	00	6.5	00	5	1.5	2.25
Article 09	00	6.5	00	5	1.5	2.25
Total						42

$$R = 1 - \frac{6 \left\{ \sum D^2 + \frac{1}{12} (m_1^3 - m_1) + \frac{1}{12} (m_2^3 - m_2 + \dots) \right\}}{N^3 - N}$$

$$\begin{aligned} R &= 1 - 6 \{ 42 + 1/12(2^3-2) + 1/12 (6^3-6) + 1/12 (9^3-9) \} / [(9)^3-(9)] \\ &= 1 - 6 \{ 42 + 10 + 10 + 82.5 \} / 720 \\ &= 1 - 867 / 720 \\ &= 1 - 1.20 \\ &= -0.2 \end{aligned}$$

Table 7.1 (d) presented the Spearman rank correlation between citation and altmetric score by the Spearman correlation method. Through the formula given by Spearman, the R-value of a presented data is -0.2 because the altmetric score is computed zero, as most publications didn't receive any altmetric attention.

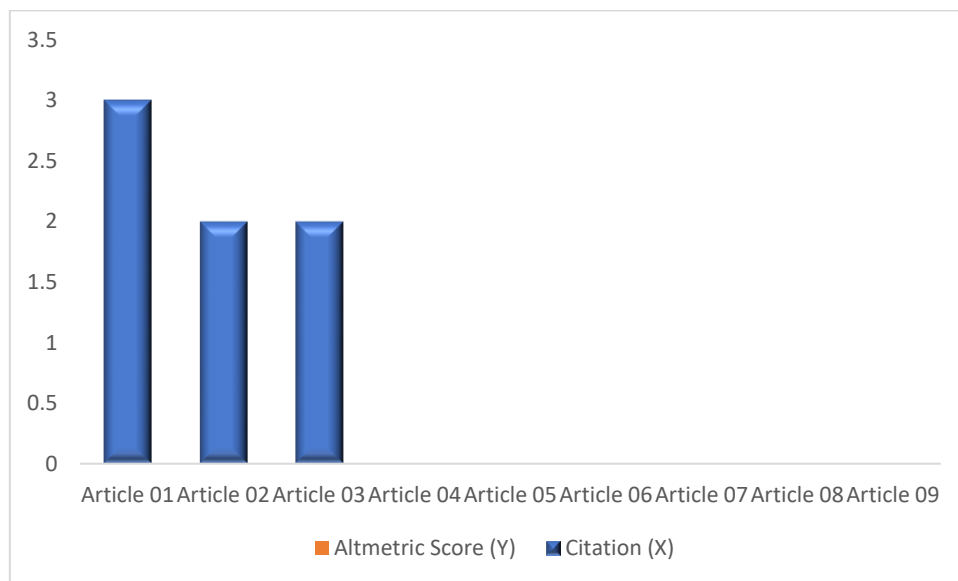


Figure 7.1 (a) Citation and Altmetric Score of Highly Cited Publications in Brazil on Digital Library

7.2 (a) Details of Highly Cited Publications in India on Digital Library

Table 7.2(a) represents the highly cited publications in India on Digital Library covering English language only. DOI and the number of citation are recorded as retrieved by the Web of Science database to study the online attention. The publication titled, “Access to scholarly communication in higher education in India Trends in usage statistics via INFLIBNET” received the maximum citations i.e. 12 whereas publication titled, “Design and development of institutional repositories: A case study” received the least citation i.e. 4.

Table 7.2(a): Details of Highly Cited Publications in India on Digital Library

S. no	Title	Type of publication	Times cited	Research areas	Language	Publication Date	Name of Journal	DOI
1	Access to scholarly communication in higher education in India Trends in usage statistics via INFLIBNET	Article	12	Academic libraries; India; Digital libraries	Eng	2008	Program electronic library and information systems	10.1108/00330330810912061
2	Digital libraries and repositories in India: An evaluative study	Article	09	Digital libraries; India project evaluation; collections management	Eng	2008	Program electronic library and information systems	10.1108/00330330810892695
3	A comprehensive information resource on traditional, complementary, and alternative medicine: Toward an international collaboration	Article	08	Information; library; and information and science	Eng	2001	Journal of alternative and complementary medicine	10.1089/10755530152755289
4	IIM digital library system: Consortia-based approach	Article	07	India; library management; in formation technology strategy; partner ing; cost effectiveness	Eng	2002	Electronic library	10.1108/02640470210432357
5	Indian National Digital Library in Engineering Science and Technology (INDEST): A proposal for strategic co-operation for consortia-based access to electronic resources	Article	07	Digital Library, INDEST	Eng	2001(June-Sep)	International information & library review	10.1006/iilr.2001.0165
6	Using open source software for digital libraries: A case study of CUSAT	Article	06	Open source software; Digital libraries; D Space; India; Li braries	Eng	2013	Electronic library	10.1108/02640471311312393
7	Digital content creation and copyright issues	Article	06	Digital libraries; Copyri ght law; Digital storage; India	Eng	2009	Electronic library	10.1108/02640470910979615
8	Use of information and communication technology in libraries and information centres: An Indian scenario	Article	06	communication; technology led strategy; special libraries; purcha sing groups; library networks; India	Eng	2004	Electronic library	10.1108/02640470410552974

9	Development of a digital library of manuscripts: A case study at the University of Pune, India	Article	05	Digital libraries; Digital storage; National cultures; Heritage; University libraries; India	Eng	2011	Program-electronic library and information systems	10.1108/0033033111129697
10	Design and development of institutional repositories: A case study	Article	04	Digital Libraries, repositories	Eng	2005	International information & library review	10.1016/j.lilr.2005.07.006

7.2 (b) Altmetric Attentions Received by Highly Cited Publications in India on Digital Library

The Altmetric Attentions received by the top ten highly cited publications are listed in a tabular format (Table 7.2(b)). The Altmetric scores are mentioned for each publication but for these publications the Altmetric scores are found only for two publications, including "Digital libraries and repositories in India: an evaluative study" and "Using open source software for digital libraries A case study of CUSAT" whereas rest of the publications are didn't received any online attention in social media platform.

Table 7.2 (b): Altmetric Attentions Received by Highly Cited Publications in India on Digital Library

Item No.	Title	Altmetric Score	News	Peer Review Site	Blogs	Twitter	Facebook	Sina Weibo	Wikipedia	Policy Documents	Q&A Thread	F1000/Publns/Pubpeer	YouTube	Reddit/Pinterest	F1000	LinkedIn	Open Syllabus	Google+	Mendeley	CiteULike	Connetea
1	Access to scholarly communication in higher education in India Trends in usage statistics via INFLIBNET	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Digital libraries and repositories in India: an evaluative study	8	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	57	-	-
3	A comprehensive information resource on traditional, complementary, and alternative medicine: Toward an international collaboration	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	IIM digital library system: consortia-based approach	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Indian National Digital Library in Engineering Science and Technology (INDEST): A proposal	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	for strategic co-operation for consortia-based access to electronic resources																						
6	Using open source software for digital libraries A case study of CUSAT	2	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	20	-	-		
7	Digital content creation and copyright issues	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
8	Use of information and communication technology in libraries and information centres: an Indian scenario	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
9	Development of a digital library of manuscripts A case study at the University of Pune, India	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
10	Design and development of institutional repositories: A case study	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

***Note:** 0 represents that the particular paper doesn't received any altmetric attention whereas – represents that the particular paper doesn't received attention at particular platform

7.2 (c) PlumX Attentions Received by Highly cited Publications in India on Digital Library

The PlumX attention received by the highly cited publications in India on Digital Library for the highly cited publications and it traces out that it tracks the online attention of the publications in the captures, metrics, usages, citations, and social media (Table 7.2 (c)). Table 7.2(c) depicts that publication, namely, "Access to scholarly communication in higher education in India Trends in usage statistics via INFLIBNET" received maximum attention in the form of usage and captures whereas publication, namely, "Design and development of institutional repositories: A case study" received the least attention.

Table 7.2 (c) PlumX Attentions Received by Highly Cited Publications in India on Digital Library

Item No	Title of Paper	PlumX Metrics					Field weighted Citation Impact	Citation Bench marking (In Percentile)
		Usage	Captures	Mentions	Social Media	Citations		
1	Access to scholarly communication in higher education in India Trends in usage statistics via INFLIBNET	907	123	00	00	12	1.08	70
2	Digital libraries and repositories in India: an evaluative study	719	105	00	00	15	1.3	75
3	A comprehensive information resource on traditional, complementary, and alternative medicine: Toward an international collaboration	611	45	00	00	10	1.87	35
4	IIM digital library system: consortia-based approach	214	77	00	00	08	00	40
5	Indian National Digital Library in Engineering Science and Technology (INDEST): A proposal for strategic co-operation for consortia-based access to electronic resources	149	22	00	00	07	00	00
6	Using open source software for digital libraries: A case study of CUSAT	1421	94	00	00	10	1.62	82
7	Digital content creation and copyright issues	482	83	00	00	08	0.22	55
8	Use of information and communication technology in libraries and information centres: an Indian scenario	90	126	00	00	09	00	45
9	Development of a digital library of manuscripts: A case study at the University of Pune, India	68	41	00	00	06	0.67	60
10	Design and development of institutional repositories: A case study	00	20	00	00	12	1.25	40

7.2 (d) Citation and Altmetric Score of Highly Cited Publications in India in Digital Library

Table 7.2 (d) represents the total citations received and the Altmetric score received by the highly cited publications in Russia in a digital library. Although comparing the Citations and Altmetric Score along with PlumX shows that the research publications receive the online attention which can be tracked by using tools, for instance, PlumX is able to aggregate the attention whereas it wasn't captured by the Altmetric.com.

Table 7.2(d): Citation and Altmetric Score of Highly cited Publications in India in Digital Library

Articles	Citation (X)	Rank c	Altmetric Score (Y)	Rank a	D= Rc -Ra	D ²
Paper 01	12	01	00	6.5	-5.5	30.25
Paper 02	09	02	08	01	01	01
Paper 03	08	03	00	6.5	-3.5	12.25
Paper 04	07	4.5	00	6.5	-2	04
Paper 05	07	4.5	00	6.5	-2	04
Paper 06	06	07	00	6.5	0.5	0.25
Paper 07	06	07	00	6.5	0.5	0.25
Paper 08	06	07	00	6.5	0.5	0.25
Paper 09	05	09	00	6.5	2.5	6.25
Paper 10	04	10	02	02	08	64
Total						122.5

$$R = 1 - \frac{6 \left\{ \sum D^2 + \frac{1}{12}(m_1^3 - m_1) + \frac{1}{12}(m_2^3 - m_2 + \dots) \right\}}{N^3 - N}$$

$$\begin{aligned} R &= 1 - 6 \{ 122.5 + 1/12(2^3 - 2) + 1/12(3^3 - 3) + 1/12(8^3 - 8) \} / [(10)^3 - (10)] \\ &= 1 - 6 \{ 122.5 + 0.5 + 2 + 42 \} / 990 \\ &= 1 - 1002 / 990 \\ &= 1 - 1.11 \\ &= -0.11 \end{aligned}$$

Table 7.2(d) presented the Spearman rank correlation between citation and altmetric score by the Spearman correlation method. Through the formula given by Spearman, the R-value of a presented data is -0.11 showing negative relationship because most publications didn't receive many citations and any altmetric attention.

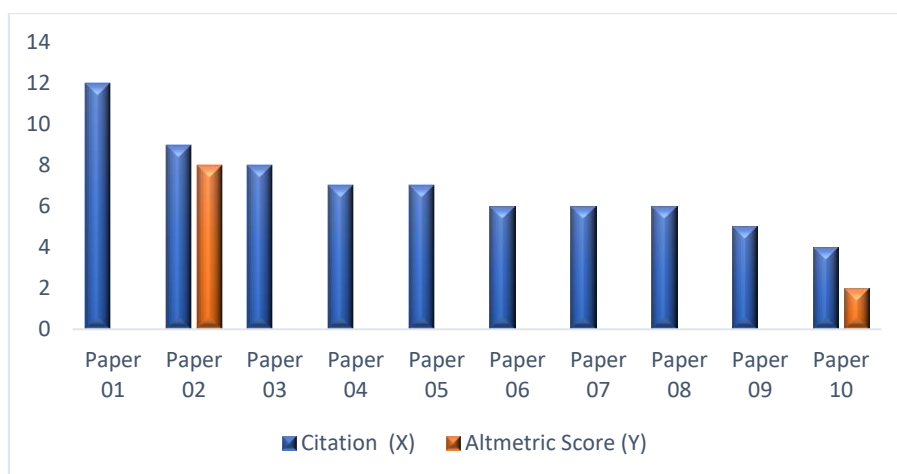


Figure 7.2 (a) Citation and Altmetric Score of Highly Cited Publications in India on Digital Library

7.2 (e) Geographic Distribution of Users of Publications in India through Mendeley

Table 7.2(e) represents the geographic distribution of users of publications through Mendeley (which is a free reference management tool for researchers to organize, share and discover research). It shows that the article “Digital libraries and repositories in India: an evaluative study” have total 57 Mendeley Readers in which maximum are from unknown sources followed by India whereas “Using open source software for digital libraries A case study of CUSAT” have total 20 Mendeley Readers which are all from unknown source. Although these Mendeley numbers are not considered in Altmetric Score calculation, these help the researcher to know readers of their articles are belong to which country and to what extent at the global level their research article is popular.

Table 7.2(e): Geographic Distribution of Users of Publications in India through Mendeley

Country	Article 1	Article 2	Article 3	Article 4	Article 5	Article 6	Article 7	Article 8	Article 9	Article 10	Total
Mendeley Total	-	57	-	-	-	20	-	-	-	-	77
India	-	06	-	-	-	03	-	-	-	-	09
Indonesia	-	01	-	-	-	-	-	-	-	-	01
Iran, Islamic Republic of	-	01	-	-	-	-	-	-	-	-	02
United States	-	-	-	-	-	02	-	-	-	-	02
Spain	-	-	-	-	-	01	-	-	-	-	01
unknown	-	49	-	-	-	14	-	-	-	-	63

(Source: Altmetric.com), <https://www.altmetric.com/details>, (accessed on 28 Oct 2018).

7.2 (f) Demographic Distribution of Users of Publications in India through Mendeley

Demographic distribution is also observed in altmetric attention, which tells us what is the profession of a reader of our article at the global level. Table 7.2(f) represents the demographic distribution of users of publications through Mendeley, which shows that maximum users are Librarians apart from others followed by PhD Scholars and master students of the “Digital libraries and repositories in India: an evaluative study” and “Using open source software for digital libraries A case study of CUSAT” articles.

Table 7.2(f): Demographic Distribution of Users of Publications in India through Mendeley

Readers by Profession	Article 1	Article 2	Article 3	Article 4	Article 5	Article 6	Article 7	Article 8	Article 9	Article 10	Total
Librarian	-	16	-	-	-	21	-	-	-	-	37
Student > Ph. D. Student	-	09	-	-	-	07	-	-	-	-	16
Student > Master	-	08	-	-	-	10	-	-	-	-	18
Student > Doctoral	-	-	-	-	-	03	-	-	-	-	03
Student > Postgraduate	-	06	-	-	-	00	-	-	-	-	06
Student > Bachelor	-	00	-	-	-	03	-	-	-	-	03
Unspecified	-	05	-	-	-	00	-	-	-	-	05
Other	-	13	-	-	-	06	-	-	-	-	19

(Source: Altmetric.com), <https://www.altmetric.com/details>, (accessed on 28 Oct 2018).

7.2(g) Subject wise Distribution of Users of Publications in India through Mendeley

Altmetric.com provides the readers by discipline aspect as now- a- days of interdisciplinary research is of high interest in research scholars. Table 7.2(g) demonstrates readers by discipline at the global village to measure the research impact and it reveals that the maximum readers are from social sciences discipline (26) in “Digital libraries and repositories in India: an evaluative study” followed by Computer science whereas in “Using open source software for digital libraries A case study of CUSAT” shows the maximum citation from social science(18) followed by computer sciences(16). In total the social sciences and computer sciences, both the disciplines contribute equal citations i.e. 25 followed by other sources.

Table 7.2 (g): Subject wise Distribution of Users of Publications in India through Mendeley

Readers by Discipline	Article 1	Article 2	Article 3	Article 4	Article 5	Article 6	Article 7	Article 8	Article 9	Article 10	Total
Social science	-	26	-	-	-	18	-	-	-	-	44
Computer Science	-	21	-	-	-	16	-	-	-	-	37
Unspecified	-	05	-	-	-	00	-	-	-	-	05
Arts and Humanities	-	01	-	-	-	05	-	-	-	-	06
Agricultural and Biological Sciences	-	01	-	-	-	00	-	-	-	-	01
Engineering	-	00	-	-	-	04	-	-	-	-	04
Business, Management and Accounting	-	-	-	-	-	02	-	-	-	-	02
Other	-	02	-	-	-	05	-	-	-	-	07

(Source: Altmetric.com), <https://www.altmetric.com/details>, (accessed on 28 Oct 2018)

8. Comparison between Brazil and India

Table 8.1 represents the comparison of the Altmetric score and Citation of Brazil and India countries. Citations are the indicators which are used to evaluate the research impact in the particular area and are a part of a traditional method of research assessment whereas altmetric score is an important component of Altmetrics study, as it is created by Altmetric.com by capturing the impact of scholarly literature in an online platform. Through the comparison between these two indicators, revealed by the table 8.1 infers that Brazil is having top nine highly cited publications whereas India has top ten highly cited publications as compared to Brazil. The Citation and Altmetric score, both are high in the case of India as compared to Brazil.

Table 8.1: Comparison of Citation and Altmetric Score

Countries → Articles ↓	Brazil		India	
	Citation	Altmetric Score	Citation	Altmetric Score
Article 1	03	00	12	00
Article 2	02	00	09	08
Article 3	02	00	08	00
Article 4	00	00	07	00
Article 5	00	00	07	00
Article 6	00	00	06	00
Article 7	00	00	06	00
Article 8	00	00	06	00
Article 9	00	00	05	00
Article 10	-	-	04	08
Total	07	00	70	08

9. Findings

The findings of the study have discovered various facets of altmetrics, via studying highly cited publications in Brazil and India, focuses on the online attention received by the publications in the digital library area during the mentioned period. It is found that highly cited publications of India on digital library received the online altmetric attention whereas

Brazil doesn't have altmetric attention for its highly cited publications on the digital library. But by using PlumX tools, we get the received attention of publications in the form of mentions, usage, citations, social media, and captures. Demographically Librarians followed by PhD Scholars contribute for the maximum readership of the publications. Discipline wise computer science professionals have provided major attention to the digital library publications followed by others. It is also found that there is less correlation between citation and altmetric scores in case of Brazil, as most publications didn't get much attention. The reason could be that they are publishing their work more in their regional language rather than English. So, it is the need of time to explore the area more so that altmetric would become one of the standard indicators to measure the research impact in a professional. Based on the study, it infers that India is the country which received more altmetric attention as compared to Brazil. PlumX is a tool which shows the attention for the publications in the form of captures, mentions, social media, citations and usage which are not presented by altmetric.com aggregator for the same publications. As per discipline, Librarians followed by PhD scholar are the maximum readers. Subject- wise, Computer science professionals contribute the maximum readership followed by social science disciplines. Unknown sources are the major places having maximum readership geographically.

10. Suggestion

The study proposes following suggestions for the effective use of Altmetrics in research study:

- (i) There is a need to train professionals about the altmetric so that it can be used by them effectively.
- (ii) Many altmetric indicators are there like kudos, plumX, altmetric.com, and impact story which are useless unless they used effectively, so to use it effectively various demo sessions, conferences, and workshops need to be conducted in research institutions.
- (iii) It should be explained in a society that, for the effective use of the altmetric tool by the researchers, one has to update their research work timely on the sites.

11. Conclusion

Social media within altmetrics play a very prime role as it works on connectivity, communities, and measurement of the information that is shared via various academic and non- academic social networking sites. It is the way through which we used to highlight the research work and it helps in simplifying the communication process. Altmetrics is a part of major shift within academia which is a need of current and near future time period. It's a high time period, where academicians have to understand the role of altmetric in the research work, to measure the effect of their research work in a minimum time period. Despite the many changes in academics, it is important to remember that there should requirement of applying technology in the realm at this moment. There are various academic social networks, cloud-based reference management, Twitter, blogs, and altmetrics tools of the web 2.0, through which researchers can engage in innovative technologies to measure their research work and also at the same time work on some application based work for the profession.

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About Authors:

Ms. Sapna Verma is a Research scholar at the Department of Library and Information Science, University of Delhi, India. She is pursuing her Master of Philosophy in Library and Information Science from the Department of Library and Information Science, University of Delhi, India. She also did her M.L.I.Sc. from the same Department. Her research interests include Altmetrics and Data Analytics. She presented several papers in Conference/Seminar and published few papers in National and International Journals. She has attended several workshops and training programmes in her area and can be contacted at: sapnaverma.du@gmail.com.

M. Madhusudhan is currently working as an Associate Professor in the Department of Library and Information Science, University of Delhi. Under his supervision 7 PhDs, 23 MPhils and more than 125 project reports were awarded. He has published three books, more than 70 research articles and 25 chapters. His areas of interest are evaluation of websites and web-OPACs, ICT in libraries, social networking sites, e-resources, mobile-based library services, etc. He is **corresponding author** and can be contacted at: mmadhusudhan@libinfosci.du.ac.in.