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A BIBLIOMETRIC ASSESSMENT OF GLOBAL LITERATURE ON "TWITTER AND LIBRARIES" DURING 2007-14

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Abstract *The present study examines 200 global publications on "Twitter and Libraries" as indexed in Scopus ranging from 2007 to 2014. The study reported 59.55% compound aggregate growth rate per annum and an average impact of 3.46 citations per publication. On the whole, researches on "Twitter and Libraries" came from 36 countries, of which the top 11 accounted for 89% of global publication share during 2007-14. A total of 164 organizations and 160 authors participated in global research on "Twitter and Library" during 2007-14, of which the top 18 organizations contributed 36% publications share and accounted for 54.27% citations share. The top 12 authors contributed 24.50% publications share and accounted for 43.13% citation share. The USA is world leader in research output on 'Twitter and libraries'. Social sciences, among subjects, contributed the largest publications share of 66.0%, followed computer science (55.5%), business, management & accounting (5.5%), decision sciences (5.0%) engineering (5.0%) and medicine (3.0%) during 2007-14. Of the total global publications, 132 appeared in 78 journals, of which the top 14 journals accounted for 43.18% of the journal output. The top 14 highly cited papers varied from 12 to 52 citations per paper, and together these papers accounted for 322 citations, leading to the average 23 citations per paper. Based on existing studies, the authors suggest the need to accelerate the pace of research on this subject, in particular underlined the need to carry out a more comprehensive research on innovative applications of Twitter to libraries, and to learn about their actual usage, problems encountered and perception of users and librarians.*

Keyword: *Twitter, Social media, Microblogging, Application, Libraries, Publications, Bibliometrics*

INTRODUCTION

Twitter which started off as a microbloging service to send or read up to 140 characters-text messages has since emerged the second most popular social media platform, next to 'Facebook' as per current available statistics. Twitter has indeed grown into a social media juggernaut and its popularity is often used as a benchmark of influence[1]. However, lately non-traditional use of Twitter in the library world has started emerging. According to Milstein, a library has the option to share all kinds of news that patrons want on Twitter[2]. Information professionals should think about implementation and better use of Twitter in library. Library users can use Twitter as a platform to raise queries about library services, request for documents, or seek assistance on technical problems, and practically expect to receive a series of answers in reply (Kenchakkanavar, 2015) . According to Steven Bell (2012), "Twitter is a golden opportunity to connect with members of the library community. Using Twitter for communication purposes, to listen to what their customers are saying about the library, to promote programs and services, including those of the library and also those of other organizations can be an excellent way to reach out to end-users, build conversations with them, address their concerns, and to advocate for library programs and services". Some of the libraries have already started using Twitter with the intent of making active contacts and connections with friends, people, and executives of the organizations as well as create their communities online (Gunton and Davis, 2012). Besides, Twitter can be used for reporting library happenings, promote library services and resources, build community of users, engage your users, monitor library related tweets, solicit feedback from users and create greater awareness about the library services (Burkhardt, 2011). Stuart (2010) found that 44% of 433 academic, public, state, and national libraries use Twitter accounts to 'broadcast library news/ information'. Milstein (2009) pointed out that, "Twitter was developed mainly for exchanging information and as such libraries should treat Twitter more as a conversation tool rather than as a broadcast medium".

It is observed that library and information professionals take immense benefit of the tools and techniques from the application of library 2.0 in the form of twitter and instant messaging for their professional benefits as well as serving their clientless in a better by feeding such techniques in their regular practice of the profession though it is found less so far as collaborative practice together among service

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institutions is concerned (London, 2010).

Twitter use is growing rapidly in all types of libraries for different purposes. Del Bosque, Leif, and Skarl (2012) surveyed 296 academic libraries that use Twitter accounts to offer Twitter-based library services. Moreover, the authors noticed seven key content types in the libraries under Twitter streams namely, " campus events", "community events", " hours", "library events", "responses to reference questions", "links to outside sites", and "resources". Stuart (2010) in his study of 433 academic, public, state, and national libraries identified that 44 percent use Twitter account to 'broadcast library news/ information'. Milstein (2009) emphasizes that, "Twitter is developed more for ''exchanging information'' and supports libraries to 'treat Twitter as a conversation rather than a broadcast medium.' Of all the options discussed so far the outlook of using Twitter for reference is actually by far the simplest. The primary difficulty may be the potential learning curve of becoming familiar with the language of Twitter, which is used in symbols (most prominently, '@' it indicates that you are directing a tweet at another user and prompts it to show up in their 'replies' tab) and unique verbiage, such as RT which indicates a ''re-tweet'' of a statement from another user".

This paper undertakes bibliometric analysis of a small body of 200 research papers on Twitter-based library services during 2007-14. The data for the study was sourced from Scopus database.

LITERATURE REVIEW

Until 2013, no studies which focused per se on quantitative assessment of published work on 'Twitter based library applications' were found in the body of bibliomeric literature. However, a small body of literature that focused on 'assessment and evaluation of Twitter-centric research' was found in Twitter literature. Cheong and Ray (2010) and Cormod et al. (2010) identified the broad areas of research on twitter into two categories, one, "the user domain (the sender of the tweet)" and two "the message domain (the tweet itself)". In the similar vein, some of the research scholars studied the domains of such research and identified the core facets and assorted facets like quantitive analysis on number of tweets, messages, message properties and other such parameters (Cheong and Lee 2010; Cormod et al.2010). Similarly, Barnes and Bohringer (2011) classified Twitter studies into two broad groups namely, "understanding microblogging" and " use of microblogging in special cases". The field of research were sub grouped as: "descriptive and statistical research about Twitter and studies of usage practices", " model building", "enterprise microblogging, based largely around case studies" and "computer science--oriented research, based around technologies supporting microblogging". Williams, Terras and Warwick (2013) classified published work in order to understand and review Twitter based research and establish classification dimensions of microblogging research. The classification of Publications were mainly based on qualitatively analysis by the use of open coded content analysis as a means to analyze research methods, subjects, and approaches. Majority of the published work on Twitter-centric research highlighted the quantification of message interaction between senders and receivers. Of the original 1161 papers (published during 2007-2011), 575 papers were reported to have exclusively centered their research on Twitter and assorted facets on microblogging research, while 550 papers though included explicit mention of the topic but considerably lacked the intensity of research thereby losing focus.

Zimmer and Proferes (2014) provided "the first bibliometric study conducted to describe the scientific literature available on Twitter. The study analyzed 382 academic publications from 2007 to 2012 that used Twitter as their primary platform for data collection and analysis. The analysis of publications revealed noteworthy trends relating to the growth of Twitter-based research in overall, the disciplines engaged in such a research, the methods used in acquiring Twitter data for analysis, and the emerging ethical considerations of such research". Fausto and Aventurier (2015) presented second bibliometric study covering 2338 documents on Twitter during 2007-14 indexed in Scopus database. The study analyzed the year wise distribution of publications, authorship pattern, analysis of documents by affiliations, geographical distribution of documents and subject coverage of the documents.

AIMS AND OBJECTIVES OF THE STUDY

The key objectives of this investigation are to analyze the status of global research work on "Twitter and Libraries" published during 2007-14 as per the record of Scopus. More particularly, the study keeps the following objectives in its ambit of discussion:

- To study growth and distribution of world literature type of documents and sources;
- To ascertain the pattern of citation of the output of research on twitter;
- To study the contribution of top 8 most productive countries and their global share and citation impact;
- To examine the trends of global research on twitter on specific domains with an intent to identify significant keywords on this specific area of research;
- To reveal the research productivity of veteran authors and respective institutions, and
- To identify the leading channel of communications and to measure the influence and impact of highly cited papers.

METHODOLOGY

Research publications of the 11 most productive countries around the world on "Twitter and Libraries" were retrieved from Scopus (http://www.scopus.com) ranging from the period 2007 to 2014. In the search statement the keyword used was "Twitter" as found in "title, abstract and keyword" tag along with other keywords such as "Library" or "libraries" together in the "titles of papers", "source titles" and "keywords" tags and restricting search output by period 2007-14 in "date range tag". The main search statement used to search and retrieve global publication data is shown below.

The main search statement was restricted to 11 most productive countries one by one in "country tag", in order to search publication data on these individual countries. Further the statement was limited to "subject area tag", "country tag", "source title tag", as well as "affiliation tag" in order to obtain the required information on on the distribution of research output by subject, by collaborating countries, distribution of publications by institutions and the distribution of publications by journals. The data relating to citations was collected from date of publication till the end of April 2015. The study has used a few quantitative and qualitative indicators for measuring and comparing research performance in this fast growing area. The use of the term, "Relative Citation Index" refers to the ratio of global share of citations to that of the global share of publications.

ANALYSIS

The research publications output on "Twitter and Libraries" rose from 1 in 2007 to a total of 200 in 2014, registering 59.55% compound aggregate annual growth rate. The research publications output averaged 3.46 citations per paper during 2007-14 (Table 1). Of the total publications output on "Twitter and Libraries", 60% (120) appeared as articles, 27.50% (55) as conference papers, 4% (8) as reviews, 3% (6) as book chapters , 2% (4) as notes, 1.55% (3) as articles in press, 1% (2) as letters and 0.5% (1) each as book and conference review during 2007-14.

Table 1. Publications Growth and Citations on "Twitter and Libraries": 2007-14

Year	TP	TC	ACPP
2007	1	4	4
2008	2	4	2
2009	11	95	8.64
2010	24	227	9.46
2011	23	130	5.65
2012	46	78	1.7
2013	51	135	2.65
2014	42	18	0.43
Total	200	691	3.46

TP=Total Papers; TC=Total Citations; ACPP=Average Citations Per Paper

Table 2. Distribution of Citations by Publications on "Twitter and Libraries": 2007-14

Citations Range	No. of Publications	No. of Citations	Share of Publications	Share of Citations
0	97	0	48.5	0
1-10	83	254	41.5	36.76
11-20	12	165	6	23.88
21-30	4	107	2	15.48
31-40	2	66	1	9.55
41-50	1	47	0.5	6.80
51-100	1	52	0.5	7.52
Total	200	691	100	100

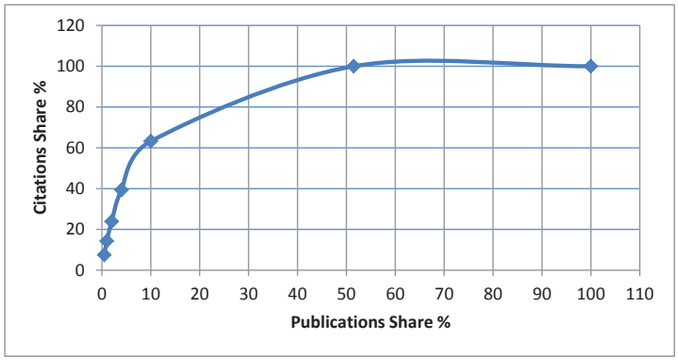

Figure 1. Citation Impact of Publications on Twitter & Libraries: 2005-14

Citations Distribution

Out of the total publications (200) on "Twitter and Libraries", 51.5% (103) were cited 1 or more times during 2007-14. Of the total publications, top 1% (2) publications (received citations 41 to 100) contributed 14.32% citation share, top 2% (4) publications (citations received from 31 publications to 100 publications) yielded 23.87% share of citations, top 4% (8) publications (citations received from 21 publications to 100 publications) yielded 39.35% share of citations, top 10% (12) publications (received 11 to 100 citations) yielded 63.23% share of citations; top 51.5% (103) publications (citations received from 1 publication to 100 publications) yielded 99.99% share of citations during 2007 to 2014 as evident from Table 2 (Fig 1).

COUNTRY-WISE DISTRIBUTION OF PUBLICATIONS AND CITATIONS

In all, 36 countries participated in research on "Twitter and Libraries" during 2007-14, out of which 14 contributed 1 publication each, 9 contributed 2 publications each, 1 contributed 3 publications, 1 contributed 4 publications, 2 contributed 5 publications each, 1 contributed 6 publications, 2 contributed 7 publications each, and 1 country each contributed 8, 9, 10, 11 and 16 publications respectively during 2007-14. The publications output of top 11 most productive countries varied from 5 to 94 and together these authors contributed 89% publications share and accounted for more than 100 citations during 2007-14. Only USA (with 94 publications) published more than the average productivity per country (18.18) of all countries. Only three countries registered above average citation per paper (4.01) of all countries: U.K (7.80), Canada (7.69) and USA (4.56) during 2007-14. Only three countries registered relative citation index above the average value of 1: U.K (2.26), Canada (2.23) and USA (1.32) during 2007-14. Four countries registered international collaborative publications share above the average share (20.1%) of all countries: China (50.0%), Canada (43.8%), U.K. (40.0%) and Australia (22.20%) during 2007-15 (Table 3).

Subject-Wise Distribution of Publications

The publications output was classified according to Scopus bibliographical database classification. The largest share of publications (66.0%)was classified under social sciences, followed by computer science (55.5%), business, management & accounting (5.5%), decision sciences (5.0%) engineering (5.0%) and medicine (3.0%) during 2007-14. The publication activity, as reflected in activity index, has increased in computer science (from 44.74 to 58.02), business, management & accounting (from 2.63 to 6.17), decision sciences and engineering (from 0.0 to 6.17 each) and medicine (from 2.63 to 3.09), as against decrease in social sciences (from 81.58 to 62.35) from 2007-10 to 2011-2114. Medicine registered the highest citation impact per

Table 3. Global Publications and Citations Profile of top 11 most Productive Countries on "Twitter and Libraries": 2007-14

Name of the Country	TP	TC	ACPP	%TP (Global)	%TC (Global)	RCI	ICP	%ICP
USA	94	429	4.56	47.0	62.08	1.32	14	14.9
Canada	16	123	7.69	8.0	17.8	2.23	7	43.8
Japan	11	4	0.36	5.5	0.579	0.11	0	0
U.K.	10	78	7.80	5.0	11.29	2.26	4	40
Australia	9	12	1.33	4.5	1.737	0.39	2	22.2
China	8	24	3	4.0	3.473	0.87	4	50
India	7	6	0.86	3.5	0.868	0.25	0	0
Spain	7	19	2.71	3.5	2.75	0.79	1	14.3
Germany	7	19	2.71	3.5	2.75	0.79	3	42.9
Singapore	5	2	0.4	2.5	0.289	0.12	0	0
South Korea	5	2	0.4	2.5	0.289	0.12	1	20
Total of 11 countries	179	718	4.01	89.5	103.9		36	20.1
Total of all countries	200	691		100	100			
Share of 11 countries in global total	89.5							

TP=Total Papers; TC=Total Citations; ACPP=Average Citations Per Paper; ICP=International Collaborative Papers; RCI=Relative Citation Index

Table 4. Subject-wise Distribution of Publications on "Twitter and Libraries": 2007-14

Broad Subject	Number of Papers (TP)			Activity Index		TC	ACPP	%TP (Global) 2007-14
	2007-10	2011-14	2007-14	2007-10	2011-14	2007-14	2007-14	
Social Sciences	31	101	132	81.58	62.35	402	3.05	66
Computer Science	17	94	111	44.74	58.02	396	3.57	55.5
Business, Management& Accounting	1	10	11	2.63	6.17	15	1.36	5.5
Decision Sciences	0	10	10	0	6.17	17	1.7	5
Engineering	0	10	10	0	6.17	19	1.9	5
Medicine	1	5	6	2.63	3.09	70	11.7	3
Total of the world	38	162	200	100	100	919	4.6	100

TP=Total Papers; TC=Total Citations; ACPP=Average Citations Per Paper

*There is an overlapping of publications among subjects and as a result, the sum total of publications under above 7 subjects are more than total global output (200)

paper (11.7), followed by computer science (3.57), social sciences (3.05),engineering (1.9), decision sciences (1.7), business, management and accounting (1.36), etc.(Table 4).

Significant Keywords

Twenty keywords on "Twitter and Libraries" have been identified as important both from the viewpoint of technology as well as in terms of Twitter applications in libraries. Their frequency distribution is given in Table 5.

Contribution and Citation Impact of Most Productive Organizations

A total of 164 organizations contributed to global literature on "Twitter and Libraries" during 2007-14, of which 120 contributed 1 publication each, 26 contributed 2 publications each, 13 contributed 3 publications each, 1 contributed 4 publications, 2 contributed 5 publications each, and 1 organization each contributed 7 and 12 publications during 2007-14. The top 18 organizations individually contributed 3 to 12 publications and together they contributed 72 publications (36% publications share) which accounted for 375 citations (54.27 % citation share) during 2007-14.

A scientometric profile of top 18 most productive organizations is shown in Table 6. Four organizations contributed more than the average productivity per paper (4.00) of all organizations: Indiana University, USA (12 publications), University of Tsukuba, Japan (7 publications), University of Illinois at Urbana-Champaign, USA (4 publications) and Yale University, USA (4 publications each) during 2007-14. Six organizations received more than the average citations per paper (5.21) of all organizations: University of Illinois at Urbana-Champaign, USA (18.60), University of Montreal, Canada (17.3), University of Alberta, Canada (11.0), University of North Carolina at Chapal Hill,

Table 5. Frequency Distribution of Significant Keywords on "Twitter and Libraries": 2007-14.

Name of Keyword	No of Papers	Name of Keyword	No of Papers
Twitter	50	Library 2.0	7
Social Media	34	Social Networking Sites	6
Facebook	21	Bibliometrics	5
Web 2.0	16	Blogs	5
Academic Libraries	15	Communication	5
Libraries	14	Digital Libraries	5
Social Networking	14	Information Services	5
Online Social Networks	11	Marketing	5
Micro blogging	8	Blogging	4
Internet	7	Information Retrieval	4

Table 6. Profile of Top 18 most Productive Organizations on "Twitter and Libraries": 2007-14

S.No	Name of the Organization	TP	TC	ACPP	HI	ICP	%ICP
1	Indiana University, USA	12	62	5.17	3	7	58.33
2	University of Tsukuba, Japan	7	2	0.29	1	0	0
3	University of Illinois ar Urbana-Champaign, USA	5	93	18.6	4	0	0
4	Yale University, USA	5	11	2.2	3	0	0
5	Bar Ilan University, Israel	4	23	5.75	2	3	75
6	University of Montreal, Canada	3	52	17.3	2	3	100
7	University of British Columbia, Canada	3	25	8.33	3	1	33.33
8	Queensland University of Technology, Australia	3	5	1.67	1	0	0
9	Drexel University, USA	3	4	1.33	2	0	0
10	University of Kashmir, India	3	6	2	2	0	0
11	Singapore Management University	3	2	0.67	1	0	0
12	Georgia Institute of Technology, USA	3	5	1.67	1	0	0
13	Texas A&M University, USA	3	3	1	1	0	0
14	University of North Carolina at Chapal Hill, USA	3	30	10	2	2	66.67
15	University of Tokyo, Japan	3	0	0	0	0	0
16	Tsinghua University, China	3	13	4.33	2	3	100
17	Heinrich Heine Universitat, Germany	3	6	2	2	2	66.67
18	University of Alberta, Canada	3	33	11	1	1	33.33
	Total of 18 organizations	72	375	5.21	1.83	22	30.56
	Total of the World	200	691				
	Share of top 18 organizations in global outputs	36	54.27				

TP=Total Papers; TC=Total Citations; ACPP=Average Citations Per Paper; HI=h-index

USA (10.00), University of British Columbia, Canada (8,33) and Bar Ilan University, Israel (5.75) during 2007-14. Ten organizations received more than the average h-index (1.83) of all organizations: University of Illinois at Urbana-Champaign, USA (4), University of British Columbia, Canada, Indiana University, USA, Yale University, USA, University of Montreal, Canada, University of North Carolina at Chapal Hill, USA, Bar Ilan University, Israel, Tsinghua University, USA, University of Kashmir, India and Heinrich Heine Universitat, Germany (2 each) during 2007-14. Seven organizations registered more than average share (30.56%) of international collaborative papers of all organizations: University of Montreal, Canada and Tsinghua University, China (100.0% each), Bar Ilan University, Israel (75.0%), University of North Carolina at Chapal Hill, USA and Heinrich Heine Universitat, Germany (66.67% each), Indiana University, USA (58.33%), University of British Columbia, Canada and University of Alberta, Canada (33.33% each) during 2007-14.

Contribution and Citation Impact of Top 27 Authors

In all 160 authors contributed to global literature on "Twitter and Libraries" during 2007-14, of which 110 contributed 1 publications each, 38 contributed 2 publications each, 7 contributed 3 publications each, 1 author each contributed 4 and 5 publications, 2 authors contributed 6 publications each and 1 contributed 7 publications during 2007-14. A scientometric profile of top 12 most productive authors is shown in Table 7. The contribution of 12 top authors varied from 3 to 7 publications and together they contributed 49 publications (24.50% publication share) and accounted for 298 citations (43.13% citation share) during 2007-14. Only four authors published more than the average productivity per paper (4.08) of all authors: Xin Shuai (7 publications), M Efron and Y Ding (6 publications each) and S Yamamoto (5 publications) during 2007-14. Three authors registered more than the average citation per paper (6.08) of all authors: M Efron (23.8), S Huustein (17.3) and J Priem (10.0) during 2007-14. Two authors scored more than the average h-index (2.00) of all authors: M Efron (5) and J Priem (3) during 2007-14. Eight authors registered more than the average

Table 7. Scientometric Profile of top 12 Authors on "Twitter and Libraries": 2007-14

S.No	Name of the Author	Affiliation of the Author	TP	TC	ACPP	HI	ICP	%ICP
1	Xin Shuai	Indiana University, USA	7	15	2.14	2	4	57.14
2	M Efron	University of Illinois at Urbana-Champaign, USA	6	143	23.8	5	0	0
3	Y Ding	Indiana University, USA	6	13	2.17	2	3	50
4	S Yamamoto	University of Tsukuba, Japan	5	1	0.2	1	0	0
5	J Busemeyer	Not Available	4	5	1.25	1	2	50
6	S Huustein	University of Montreal, Canada	3	52	17.3	2	3	100
7	S. Gul	University of Kashmir, India	3	6	2	2	0	0
8	S Chen	Indiana University, USA	3	13	4.33	2	3	100
9	I. Peter	ZBW Germany National Library of Economics, Lebniz Information Centre for Economics, Kiel	3	6	2	2	2	66.67
10	J Priem	University of North Carolina, USA	3	30	10	3	2	66.67
11	T Satoh	University of Tsukube, Japan	3	1	0.33	0	0	0
12	J Tang	Tsinghua University, China	3	13	4.33	2	3	100
	Total of 12 Authors		49	298	6.08	2	22	44.9
	Total of the World		200	691				
	Share of 12 authors in World Output		24.5	43.13				

share (44.90%) of international collaborative papers of all organizations: S Huustein, S Chen and J Tang (100% each), J Priem and I. Peter (66.67%), Xin Shuai (57.14%), Y Ding and J Busemeyer (50% each) during 2007-14.

Medium of Communication

Of the 200 global publications on "Twitter and Libraries", 132 appeared in journals, 39 in conference papers, 14 in book series, 8 in trade publications and 7 as books. The journal papers (137) had appeared in 78 journals, of which 48 journals published 1 paper each, 16 published 2 papers each, 5 published 3 papers each, 6 published 4 papers each, 2 published 5 papers each and 1 journal published 8 papers during 2007-14. The top 14 journals together accounted for 57 publications (43.18% share of the total journals) during 2007-14. The largest number of publications (8) had appeared in *ASIST Annual Meeting*, followed by *Library High Tech News* and *Reference Services Review* (5 publications each), *Computers in Libraries, Library High Tech, Journal of Web Librarianship, Library Review, Reference Librarian* and *New Library World* (4 publications each), *Evidence Based Library & Information Practice, First Monday, Library Journal, Public Service Quarterly* and *Science & Technology Libraries* (3 publications each) during 2007-14.

Highly Cited Papers

The top 14 highly cited papers (3 conference papers and 11 journal articles) on "Twitter and Libraries" accounted for citations varying from 12 to 52 (8 papers in citation range 12-18, 2 papers in citation range 25-29, 3 papers in citation range 33-52). Put together these 14 papers accounted for 322 citations, with an average of 23 citations per paper. The USA contributed 8 papers whereas U.K... Canada, Spain, China, Egypt and Israel contributed 1 highly cited paper each. Of the 14 highly cited papers, 7 were single-institution papers, 5 were national collaborative and 2 bilateral internationally collaborative. These 14 highly cited papers involved 38 authors, 29 organizations and were published in 12 journals, including 2 papers each in *International Information* and *Library Review* and Proceedings of the ASIST Annual Meeting and 1 paper each in *PLOS One, Library Review, First Monday, Journal of Web Librarianship, Journal of Librarianship & Information Science, Briefings in Bioinformatics, Library High Tech News, Serials Librarian, Medical Reference Service Quarterly* and *Journal of American Society for Information Science & Technology*.

Summary and Conclusion

The global output on "Twitter and Libraries" covering the period 2007-14 was 200 publications. The publications data in this study was sourced from Scopus database. The publication output rose from 1 in 2007 to 42 in 2014, averaging 59.55% compound aggregate growth per annum and citation impact of 3.46 citations per paper. Of the total publications, 51.5% were cited once or more times during 2007-14. The top 10% publications (20) accounted for 63.23% citation share. A total of 36 countries participated in research on "Twitter and Libraries". Among these, the top

11 most productive countries contributed as much as 89% publication share during 2007-14. The USA is world leader in research output on "twitter and libraries' accounting for largest number of highly cited papers. Seven countries contributed 14 highly cited papers, of these 8 were from USA, and 1 paper each from U.K., Canada, Spain, China, Egypt and Israel. Social Sciences accounted for the largest publications share (66%), followed by computer science (55.5%), business, management & accounting (5.5%), decision sciences (5%) engineering (5%) and medicine (3%) during 2007-14. The top 18 organizations out of 164 contributed 36% publications share and accounted for 54.27% citations share. The top 12 authors out of 160 contributed 24.50% publications share and accounted for 43.13% citations share. The most significant keywords on the topic "Twitter and Libraries" (which throw light on the Twitter technology used and its applications to libraries) were identified. The 'Twitter' keyword had appeared in 50 publications, followed by 'social media' in 34 publications, Web 2.0 in 16, academic libraries in 15, libraries in 14, social networking in 14, online social networking in 11, microblogging in 8, etc.

In conclusion it may be stated that over the years libraries have not been able to exploit the full potential of Twitter social media platform. While there are enough examples illustrating the benefits of Twitter, many libraries still face challenges in their integration and usage in library operations and services. Given the fact that Twitter platform is so easy to use, even non-techies can easily use and offer cutting-edge services right away, it is perplexing to note that Twitter-based library publications globally are still very low. The global publications output on 'Twitter and Libraries' averages to a low figure of 20 papers per year globally. The challenge is how to accelerate research pace on 'Twitter and in its library applications'. The library literature and conference proceedings on 'Twitter and libraries' is built up on individual ventures with this new technology. These studies tend to follow the "how we did it and lessons learned" format. Although these individual case studies serve to build a composite picture of best practices for Twitter, how early adopters used Twitter, however more detailed and comprehensive research is needed on innovative applications of Twitter to libraries, to learn about their actual usage, problems encountered and perception of users and librarians.

Notes

1. http//mashable.com/category/twitter
2. http://www.infotoday.com/ cilmag/ may09/ milstein. shtml

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