Bibliometric Analysis of Research Publications of Geology Department, Delhi University, India, 2001 – 2015

Nazrul Islam Azmi
Librarian, Ramanujan College (Delhi University), Kalkaji, New Delhi-110019
Email:azminazrul@gmail.com

ABSTRACT

The aim of this work is to analyse research productivity of faculty members at the Geology department of Delhi University. The research is conducted with the intention to know the research productivity over 15 years (2001 - 2015), the citations received, and authorship patterns. SCOPUS database was used for the bibliographic and citation data. Data were analysed by using bibliometric techniques. Results show that the research productivity of faculty members is increasing, their publications are getting good citations and their journals have better Impact Factor. The paper is based on empirical data exclusively gathered for this research.

0 INTRODUCTION

Citation analysis is being used as a tool for evaluation of research contributions made by scientific community. It is used for counting of citations of particular research institute or scientists. Citation analysis apply methods that interlink a document with another on a specific subject. This performance measure assumes that influential scientists and important works are cited more often than others.

Researchers working in this field have used various parameters, viz., number of papers, citations received, h-index, impact factor of journals, etc., to measure the research output of researchers and organisations. Hirsch calculated the h-indices that correlate positively with citation counts, publication counts and peer evaluation of research impact and quality.

In the present study, the research contributions by faculty members of Geology departments of Delhi University, New Delhi was measured on the basis of various bibliometric parameters. The department has received recognition as Centre for Advanced Studies (CAS) by the University Grants Commission (UGC).

Department conducts MSc and PhD programmes and has acquired distinction in teaching and research as well as for dissemination of geological knowledge both at the national and international level. Conducting seminars, workshops and other educational activities are regular features of this department.

1 LITERATURE REVIEW

Numbers of quantitative studies have been conducted and reported based on bibliometric parameters to measure the research output of individual scientists, universities, research institutes, and research areas. Bibliometric parameters, viz., authorship pattern, citations received per paper, highly cited journals, international collaborations, h-index, etc., were used in these studies. Many of the studies have used Web of Science (WoS) and Scopus databases as the source of data. Various software tools are used for data analysis and visualisation, viz., VOSViewer, HistCite, Pajek, etc.

Some studies measured research output of individual departments of different universities. Nandi & Bandopadhaya14 analysed 719 articles from 216 PhD thesis submitted to department of zoology, University of Burdwan during 1960-2000. Results indicated that highest numbers of theses are submitted in the subject entomology. Indian journals were highly cited whereas multi-authored papers are cited more than single and double authored papers. Scientometric analysis of Indian research output using SCI for 1997 was undertaken by Garg et.al. Authors found that universities/colleges are the major contributors of research papers, whereas IITs, medical colleges and CSIR institutes are followed for further ranks. Physical, chemical and medical sciences are the dominant research areas. Mahrana conducted bibliometric analysis of Orissa University of Agricultural Technology's research output as indexed in Scopus in 2008-2012. It was noticed that most of the papers are published in Indian journals and in collaborations. Collaborations are at national and international levels. The growth rate of publications is slow and steady.

Majority of the above studies used quantitative methods for measuring the research. Web of Science and Scopus databases were used for data sets. The results of these studies indicate that there is a steady growth in publications and citations received. The studies also identified strong and weak areas of research as well as national and international collaborations of researchers. USA is the first choice of researchers for international collaborations.

2 OBJECTIVES OF THE STUDY

The various objectives of the present study are summarized below

a) To analyze yearly contribution of publications

b) To recognize most productive authors

c) To highlight contribution of publications by type of document

d) To identify the most productive journals

e) To study research impact of publications

3 METHODOLOGY

In order to get require data for the study "Scopus" used as the main source of data provider from where data were retrieved on 5/4/2016 by making advanced search choosing affiliated name option putting Geology Department as affiliated name then limited to the Delhi university from the year 2001-2015.The retrieved data i.e. 337 number of publications were exported into MS Excel and then data were arranged and processed based on the objectives of the study to make analysis of the data .

4 SCOPE AND LIMITATIONS

The scope of the present study covers the research productivity of Geology department, Delhi university. Only the peer reviewed research publications of department are taken in consideration. The other publications of department which are not included in the SCOPUS have been excluded from the study.

5 DATA ANALYSIS

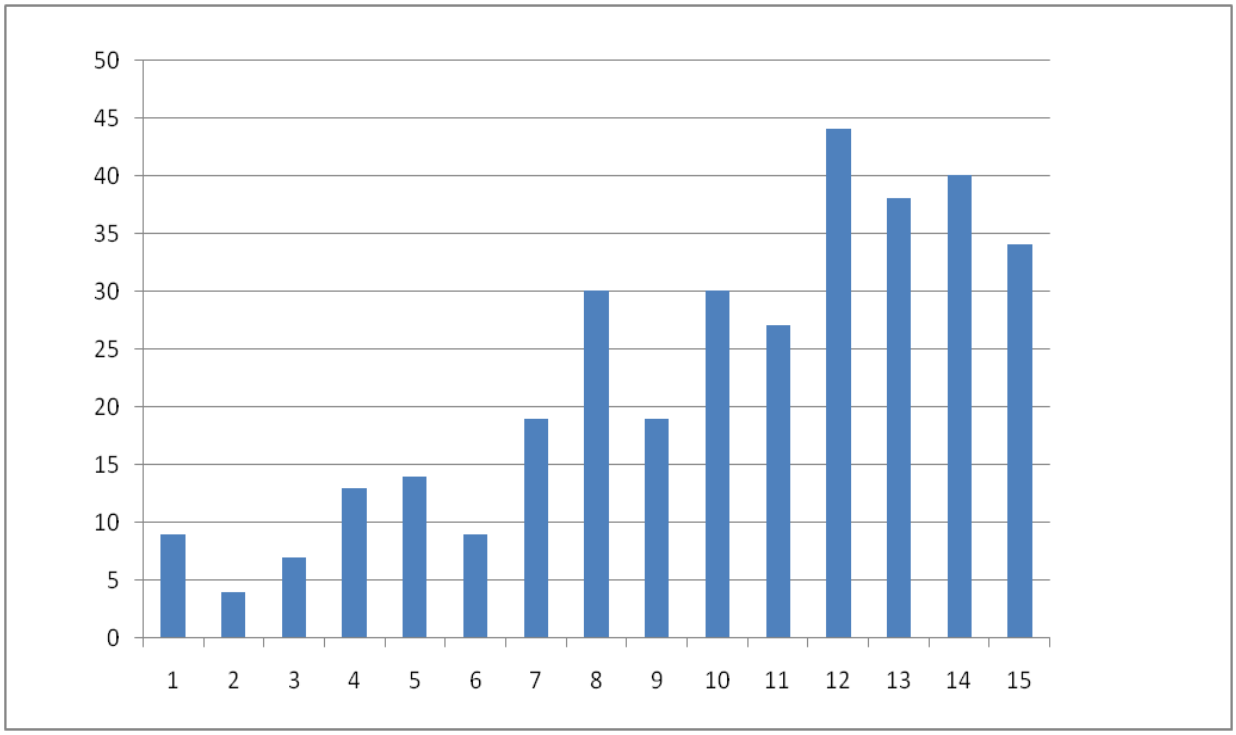
5.1 Yearly Distribution of Publications

Table 1 reveals the yearly distribution of publications by Geology department of Delhi University during 2001 to 2014. it is observed that out of total 337 publications published during the period of study, maximum 156 (46%) are published between 2012-2015. Only 4 (1%) publications published in 2002 which is lowest during the period of study. Further the average growth rate of the publications is 38 (11.27%).

Table1: Yearly Distribution of Publications

Year	No. of Publications	Percentage	Growth
2015	34	10	-6
2014	40	12	2
2013	38	11	6
2012	44	13	7
2011	27	8	-3
2010	30	9	11
2009	19	6	-11
2008	30	9	11
2007	19	6	11
2006	9	3	5
2005	14	4	1
2004	13	4	6
2003	7	2	3
2002	4	1	-5
2001	9	3	0
	337	100	38

Figure 1: Yearly Distribution of Publications 2001-2015 (1 to15)



5.2 Most Productive Authors

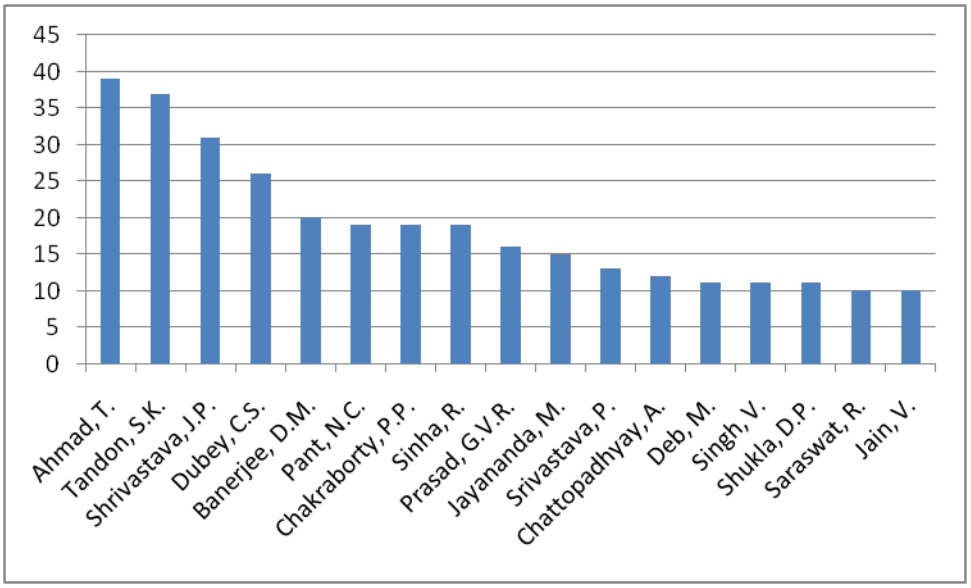
To find out top ten authors productivity, total count method was used and equal weightage was given to each author. The analysis of Table reveals that out of 319 numbers of publications Ahmad, T is the most productive author with highest numbers of publications i.e.39 (12.2%) securing 1st rank. It is followed by Tandon, S.K.; Shrivastava, J.P.; Dubey, C.S. and Banerjee, D.M.; with 11.6%, 9.7%, 8.2% and 6.3% publications securing 2nd, 3rd, 4th and 5th ranks respectively. Three authors such as Pant, N.C.; Chakraborty, P.P.; Sinha, R. with 6% each securing 6th rank. Similarly Prasad G.V.R.; Jayananda, M.; Shrivastva, P.; Chattopadhayay, A. with 5.0 %, 4.7%, 4.1%, 3.8% secures 7th, 8th, 9th, 10th ranks.

Table 2: Most Productive Authors

Author Name	Publications	Percentage	Rank
Ahmad, T.	39	12.2	1
Tandon, S.K.	37	11.6	2
Shrivastava, J.P.	31	9.7	3
Dubey, C.S.	26	8.2	4
Banerjee, D.M.	20	6.3	5

Pant, N.C.	19	6.0	6
Chakraborty, P.P.	19	6.0	6
Sinha, R.	19	6.0	6
Prasad, G.V.R.	16	5.0	7
Jayananda, M.	15	4.7	8
Srivastava, P.	13	4.1	9
Chattopadhyay, A.	12	3.8	10

Figure 2: Most Productive Authors of the Departments



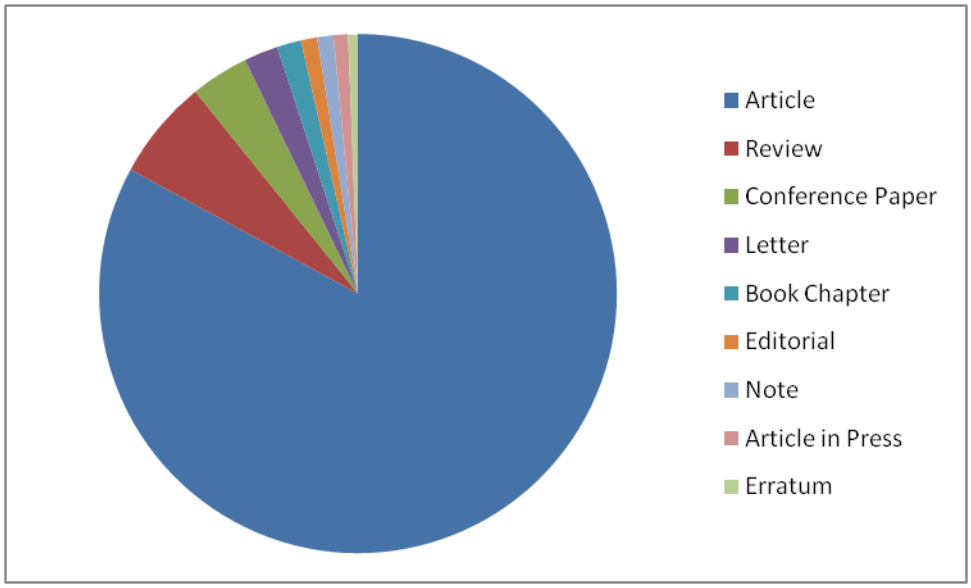
5.3 Type of Publications

Table shows the type of publications by research communities of Geology department, Delhi university during the study. It is found that out of total 337 numbers of publications, article is the most preferred type with 277(82.2%) number of publications; followed by review with 21(6.2%); Conference Paper with 12 (3.6%); Letter with 7 (2.1%). Book Chapter; Editorial; Note; with 5 (1.0%) publications each. The Article in press are 3 (0.9%) and Erratum numbers 2 (0.6%).

Table 3: Type of Publications of Department

Document type	Publications	Percentage
Article	277	82.2
Review	21	6.2
Conference Paper	12	3.6
Letter	7	2.1
Book Chapter	5	1.5
Editorial	5	1.0
Note	5	1.0
Article in Press	3	0.9
Erratum	2	0.6

Figure 3: Percentage of Document Type of Publications



5.4 Most Productive Journals

Table lists the most productive journals with their rank where the researchers of geology department of delhi university published their research outputs. The analysis of data reveals that both "Journal of Geological Society of India" and "Current Science" are in 1st and 2nd rank with 40(24.2%) and 33 (20%) numbers of publications respectively; followed by Journal of the Asian Earth Sciences (16, 9.7%); Precambrian Research (15, 9.1%); Proceedings of the Indian National Science Academy (12, 7.3%); Episodes (9, 5.5%). Geomorphology (7,

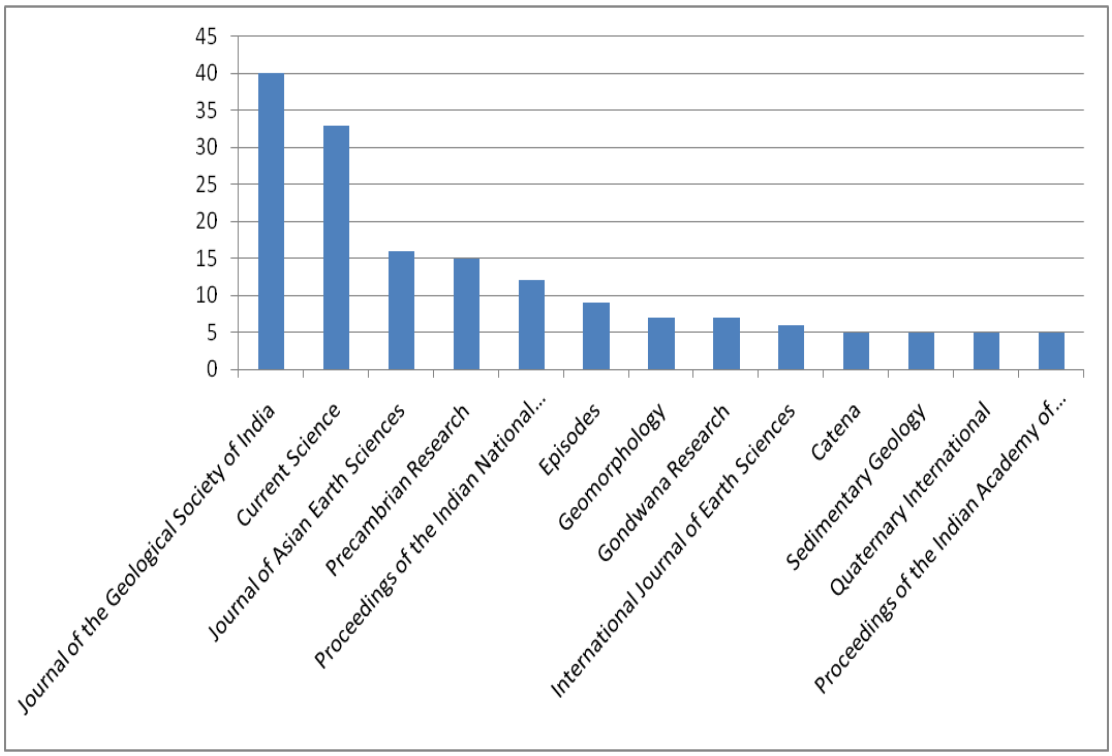
4.2%); Gondwana Research (7, 4.2%) secures 3rd, 4th, 5th, 6th, ranks respectively. The International Journal of Earth Sciences (6, 3.6%) is in 7th rank.

Catena (5, 3%); Sedimentary Geology (5, 3%);Quaternary International (5, 3%);Proceedings of the Indian Academy of Sciences Earth and Planetary Sciences (5, 3%) stands on 8th rank.

Table 4: Most Productive Journals

Journals	**Nos. of Publications**	**Percentage**
Journal of the Geological Society of India	40	24.2
Current Science	33	20.0
Journal of Asian Earth Sciences	16	9.7
Precambrian Research	15	9.1
Proceedings of the Indian National Science Academy	12	7.3
Episodes	9	5.5
Geomorphology	7	4.2
Gondwana Research	7	4.2
International Journal of Earth Sciences	6	3.6
Catena	5	3.0
Sedimentary Geology	5	3.0
Quaternary International	5	3.0
Proceedings of the Indian Academy of Sciences Earth and Planetary Sciences	5	3.0

Figure 4: Most Productive Journals



5.5 Impact of Research

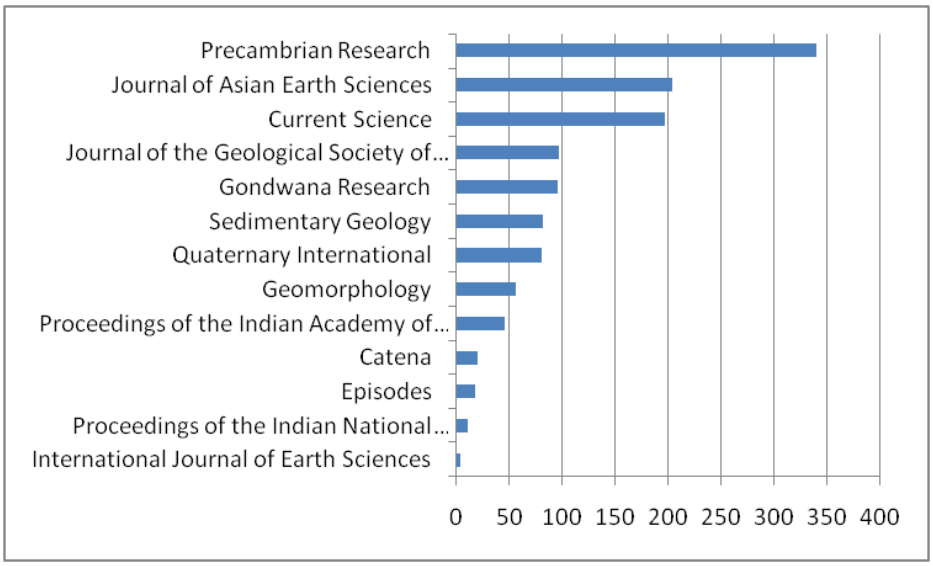
Citation is tool to measure the impact of research. Table listed top journals in which department research are published with their impact factors and citations received. Total 1246 citations are received by 165 publications in top most journals of publications.

Table 5: Top Journals with Impact Factor

Journals	Impact Factor (2014)	Nos. of Publications	Citations
Journal of the Geological Society of India	0.596	40	96
Current Science	0.926	33	197
Journal of Asian Earth Sciences	2.741	16	203
Precambrian Research	6.023	15	340
Proceedings of the Indian National Science Academy		12	11
Episodes	2	9	18
Geomorphology	2.785	7	56

Gondwana Research	8.235	7	95
International Journal of Earth Sciences	2.093	6	4
Catena	2.82	5	20
Sedimentary Geology	2.665	5	81
Quaternary International	2.062	5	80
Proceedings of the Indian Academy of Sciences Earth and Planetary Sciences	1.04	5	45

Figure 5: Citations Received on Publications of Top Journals



6 Findings of the Study

The major findings are :

a) The growth rate of the publications of the department of Geology, Delhi University have increased on an average of 11.27% since 2001 to 2015. Sa, M. K (2015) made a study on Research output of institute of minerals and materials technology India indexed in Scopus during 2004-2013: a bibliometric analysis. He found that average growth rate of publications is 7.43%.

b) T. Ahmad, S.K. Tandon, J.P Shrivastava, C.S. Dubey and B.M. Banerjee are the most productive authors of the Department of Geology, Delhi University.

c) Article is the most preferred document type with 82.2% of total publications of geology department, delhi University, which seems to be quite natural. Chaurasia, N. K. & Chavan, S. B (2014) in their study on Research output of Indian Institute of Delhi(IIT Delhi) during 2001-2010: a bibliometric analysis found that out of total 6109 number of publications

journal articles were observed as the most favoured document type having 5731 publications followed by proceeding paper with 461 publications and Review with 192 publications .

d) The journal "Journal of Geological Society of India" is recognized as most productive journal with 24.2% of publications,

7 Conclusion

It is found that research publications of the Geology department of Delhi University have a trend of growth during the period of 2001- 2015. Researchers are contributing the articles and other publications which are covered by indexing databases like SCOPUS. Most of the research published in the Journals having good Impact Factors. It is felt that findings of the study would be useful to researchers, scientists, faculty members, science policy makers, and above all LIS professionals for developing their collection development policy.

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