BULLETIN OF THE CALCUTTA MATHEMATICAL SOCIETY: A BIBLIOMETRIC STUDY

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Abstract

The present study deals with quantitative analysis of 210 peer reviewed articles published in the journal "Bulletin of the Calcutta Mathematical Society" which was contributed by 445 authors during the period 2012-2016. The finding are based on the study of authorship pattern, number of references, geographical distribution, length of articles, authorship pattern of cited references etc.

Keywords: -Bibliometrics, Authorship, Citation analysis, Geographical distribution etc.

Introduction

Bibliometrics is a set of mathematical and statistical methods used to analyze and measure the quantity and quality of books, articles and other forms of publication. Alan Pritchard the father of bibliometrics used the word 'Bibliometrics'for the first time in his article' Statistical Bibliography or Bibliometrics' published in the journal of documentation in 1969. He defined the term as" the application of mathematics and statistical methods to books and other media of communication.   According to Harrod's Librarian Glossary bibliometrics is "The application of mathematical and statistical methods to the study of the use made of books and other media within and between library systems".

Source Journal

Calcutta Mathematical Society was founded on September 6, 1908.Society has been publishing its research journal" Bulletin of the Calcutta Mathematical Society" since 1909.It is a first Mathematical Society of Asia and the 13th in the world. Journal is being published from Kolkata.Its board of editors includes experts from Canada, Romania,

France, Ireland, China, Germany and India. The ISSN Number of the journal is 0008-0659.The subscription charges for the journal in the year 2016 were Rs2500 for Indians and $ 250 for foreigners.

Review of Literature:

Kumar (2004) conducted study of Library Herald Journal and found that 57.02% articles were contributed by the single authors followed by42.98% by two authors. Most of the authors i.e. 89.47% were of Indian origin. The maximum number of citations 29.63% was produced in 2013 followed by 26.03 % in 2014. Maximum number of articles 30.70% has the length of 6-10 pages. The study revealed that 43.98% citations have single authors followed by 56.02% citations having multiple authors.

Narang (2004) conducted a bibliometric study of Indian Journal of Pure and Applied Mathematics. The study revealed that 47.46% of papers were written by two authors followed by 35.14 % by single authors. It was found that vol. 33 has the highest number of citations i.e. 24.47%. It was also found that Uttar Pradesh contributedmaximum 13.70% articles followed by Tamil Nadu with   12.37%.

Gomathi (2014) found during the bibliometric analysis of 'SRELS Journal of Information Management' that in 2013 highest number of articles 22.86% were in the 6th issue and the lowest number 12.86% were in the 3rd issue. It was found that 47.14 % articles were written by the two authors followed by 34.29% by the single authors. It was also found that most of the articles 57.14%have been contributed by Universities. The study reveals that most of the contributions are in 5-10 pages in length. The highest number of contributions 78.57% by the Indian authors and 21.43% were by foreign authors.

Thavamani (2017) conducted a study of authorship patterns and collaborative research in the journal of Biofuels, 2010-16. The study revealed that the highest number of articles was published in 2010(28.30%). It was also found that most of the papers 93.39% have been written in joint authorship. The maximum number of author's productivity 3.23% was in 2007 and minimum was in 2012 i.e. 2.61%.

Objectives of the study

The objectives of the study are to analyse the following aspects.

1. To make an analysis of articles published in the Bulletin of the Calcutta Mathematical Society Journal from 2012 to 2016.
2. To find out the number of contributions published during the period of study.
3. To know the year wise distribution of articles.
4. To find out the authorship pattern.
5. To ascertain geographical distribution of articles.
6. To identify the length of articles.

Methodology

In order to analyze the journal "Bulletin of the Calcutta Mathematical society" the primary sources are the issues/volumes of the journal published from the year 2012 to 2016 covering volume 104 to 108.A total 30 issues comprising 210 articles have been taken as the source for the data. All the issues/volumes were thoroughly scanned to collect the necessary data.

Analysis of data:-

Table 1: Year Wise Distribution of Articles

Year	Volume No.	No Of issues	No of Contributions	%age
2012	104	6	54	25.71
2013	105	6	37	17.62
2014	106	6	40	19.05
2015	107	6	40	19.05
2016	108	6	39	18.57
Total Articles			**210**	**100**
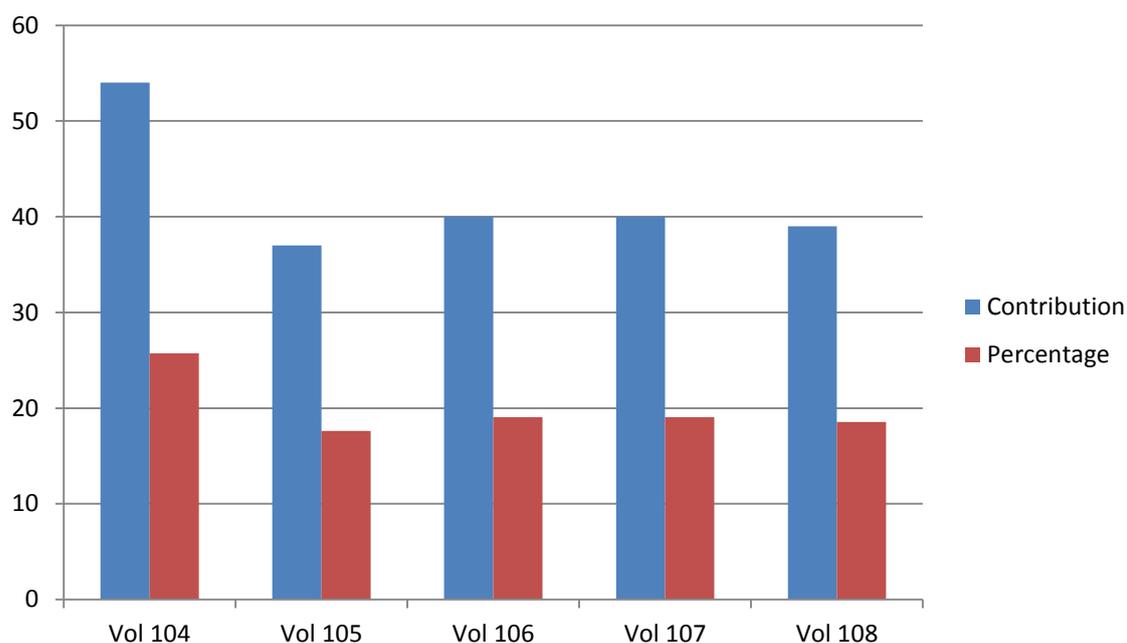
The above table shows that there were 210 articles published from the year 2010 to 2016 in 30 issues comprising 5 volumes of the journal. On an average the journal published 42 research articles per year. The highest number of articles 54(25.71%) were published in the volume 104 followed by volume 106; 40(19.05%), 107; 40 (19.05%), Volume 108; 39(18.57%) and Volume 105; 37(17.62%).

Table2: Distribution of Articles (issue- wise)

Month	Volume Number					Total
	104	105	106	107	108	
Feb	7	7	8	10	9	41
Apr	8	6	5	7	6	32
June	13	6	6	6	5	36
Aug	7	4	6	4	6	27
Oct	10	8	6	7	6	37
Dec	9	6	9	6	7	37
Total	54	37	40	40	39	210

Table 2 reveals the distribution of articles issue wise. Almost the first issue of all the years under study has highest number of contributed articles.

Table 3: Authorship Pattern

Year	Number Of Authors				Total
	1	2	3	More than 3	
2012	13	26	10	5	54
2013	8	17	9	3	37
2014	8	21	8	3	40
2015	13	16	8	3	40
2016	12	17	9	1	39
Total	54	97	44	15	210
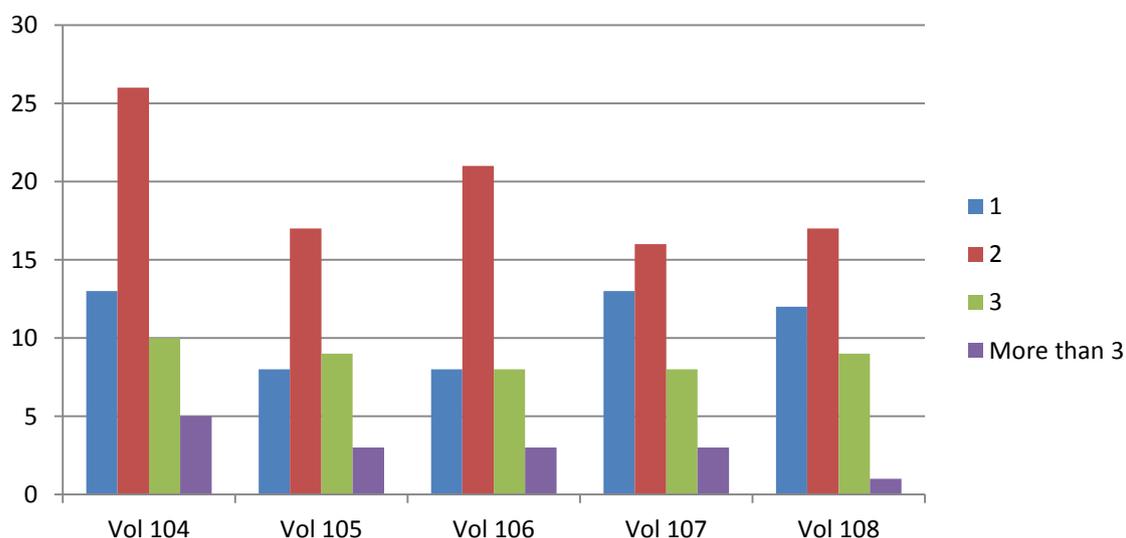
The above table shows that out of 210 articles more number of articles 97(46.19%) were published by two authors followed by single authored papers 54 (25.72%), three authored papers 44 (20.95%) and more than three authored papers 15(07.14%) respectively.

Table 4: Year Wise Authorship Pattern

Authorship	Year					Total	%age
	2012	2013	2014	2015	2016		
Single	13	8	8	13	12	54	25.71
Joint	41	29	32	27	27	156	74.29
Total	54	37	40	40	29	210	100
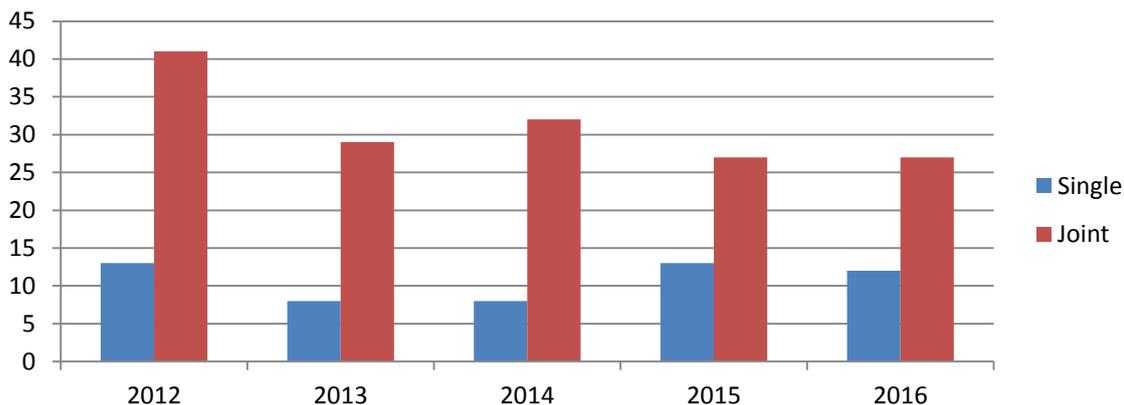
The table 4 shows that out of 210 articles single author contributed 54 (25.71%) while the rest 156 (74.29%) articles were contributed by joint authors. Study points towards the collaborative nature of article publication by the mathematicians.

Table 5: Geographical Distribution of Authors

Country	No of Authors	%age
India	386	86.74
Foreign	59	13.26
Total	445	100
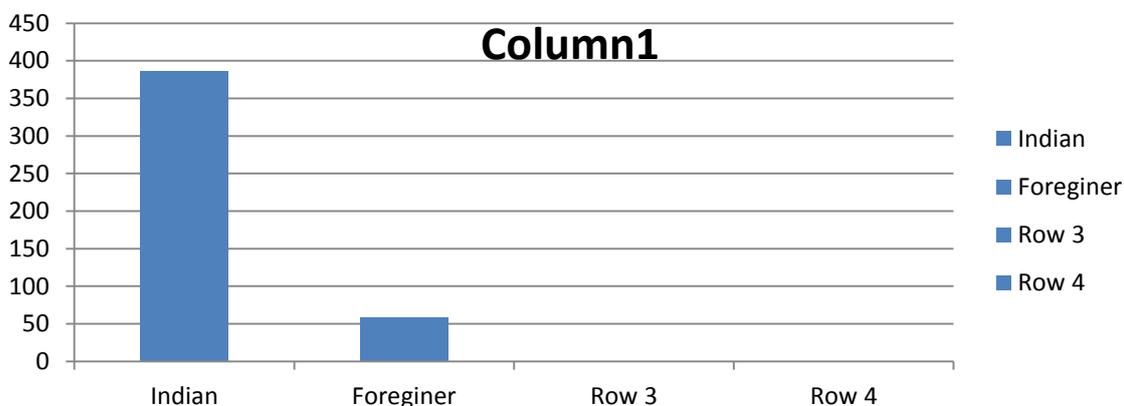
The table5 depicts that most of the contributions are from India with 86.74% and the rest 13.26% only from foreign countries.

The geographical distribution of the contributors to the Journal is presented in below table. Out of the total 445 authors in the five volumes of this journal, 386 authors are from Indian states and the rest 59 are from foreign countries. West Bengal has the maximum authors 158 (40.93%) followed by Tamil Nadu, Maharashtra and Uttar Pradesh.

Geographical distributions of Contributors State wise

Sr. no	State	No of Authors	%age
1	Andhra Pradesh	14	3.63
2	Assam	10	2.59
3	Bihar	1	0.26
4	Chhattisgarh	10	2.59
5	Delhi	11	2.86
6	Haryana	8	2.07
7	Himachal Pradesh	12	3.11
8	J&K	09	2.33
9	Jharkhand	12	3.11
10	Karnataka	12	3.11
11	Kerala	05	1.29
12	MP	14	3.63
13	Maharashtra	21	5.44
14	Mizoram	3	0.78
15	Odisha	6	1.55
16	Punjab	5	1.30
17	Rajasthan	10	2.59
18	Tamil Nadu	22	5.70
19	Telangana	8	2.07
20	Tripura	5	1.30
21	Uttrakhand	10	2.59
22	UP	20	5.18
23	West Bengal	158	40.93
	Total	386	100%

Geographical distributions of contributors country wise

Sr.no	Country	No of Authors	%age
1.	Albania	4	6.79
2.	Algeria	1	1.69
3.	Bangladesh	14	23.74
4.	Botswana	1	1.69
5.	China	1	1.69
6.	Egypt	13	22.03
7.	Georgia	1	1.69
8.	Iran	1	1.69

9.	Japan	1	1.69
10.	Jordan	1	1.69
11.	Macedonia	1	1.69
12.	Malaysia	4	6.79
13.	Nepal	1	1.69
14.	Nigeria	1	1.69
15.	Oman	3	5.09
16.	Plovdiv	1	1.69
17.	Romania	1	1.69
18.	Serbia	1	1.69
19.	South Africa	3	5.09
20.	South Korea	2	3.40
21.	USA	2	3.40
	Total	59	100%

Among the foreign countries contribution it was Bangladesh with maximum 14 articles followed by Egypt with 13 articles.

Table 6: Length of Articles

| Pages	Year					Total	%age
	2012	2013	2014	2015	2016		
1-10	32	16	19	18	15	100	47.62
11-20	18	19	20	19	22	98	46.67
21-30	4	1	1	2	02	10	4.76
More than 30	--	1	--	1	--	2	0.95
Total	54	37	40	40	39	210	100
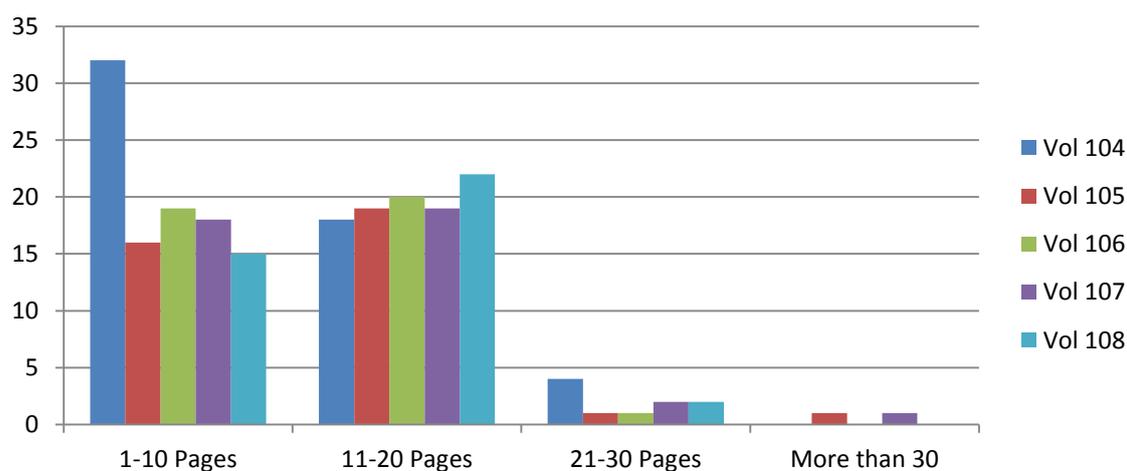
The above table shows that majority of articles 47.62% (100) have the length of 1-10 pages followed by 46.67% (98) articles with 11-20 pages, 4.76% (10) articles with 21 to 30 pages and remaining 0.95% (2) articles have length of more than 30 pages.

Table7: Year Wise Distribution of Citations

The references provided by the authors at the end of articles are the basis of citation analysis. Citation traces a connection between two documents, one which cites and other which is cited.

Year	No. Of Citations	%age
2012	913	27.33
2013	586	17.54
2014	512	15.32
2015	673	20.15
2016	657	19.66
Total	3341	100
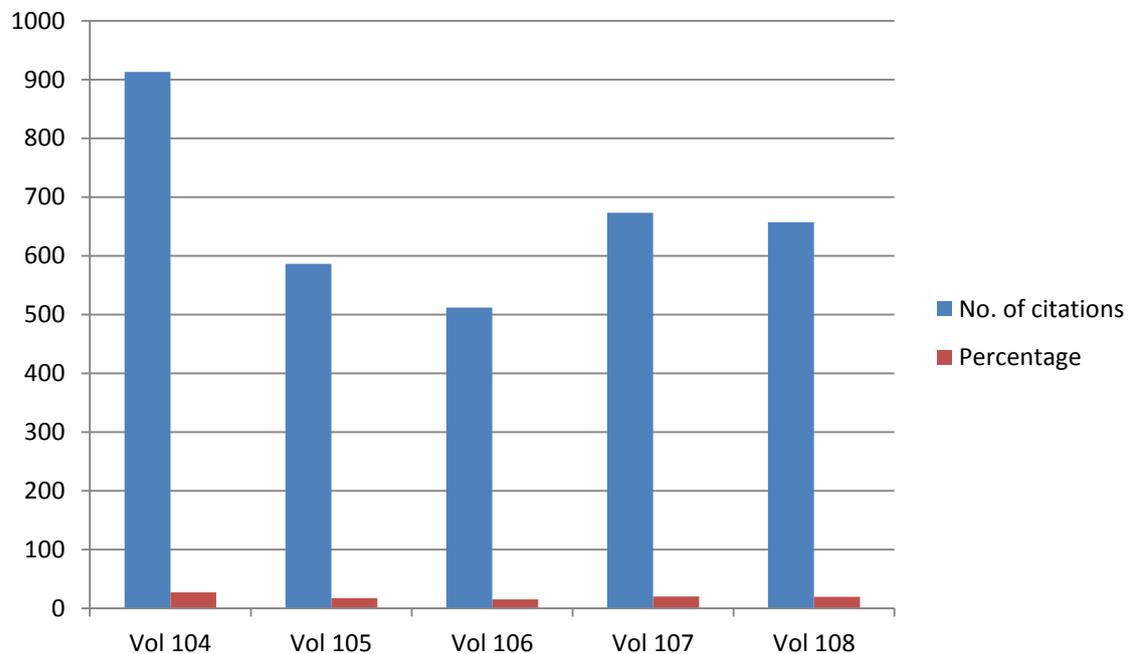
The table 7 provides information that maximum number of Citations 913 (27.33%) were produced in the year 2012 followed by 673(20.15%) citations in 2015, 657 (19.66%) in 2016, 586(17.54%) in 2013 and 512(15.32) in the year 2014.

Table 8: Authorship Pattern of Cited References

Authorship pattern	Total no of Citations	%age
Single	1428	42.74
Two	1222	36.57
Three	499	14.94
Four & More	192	5.75
Total	3341	100
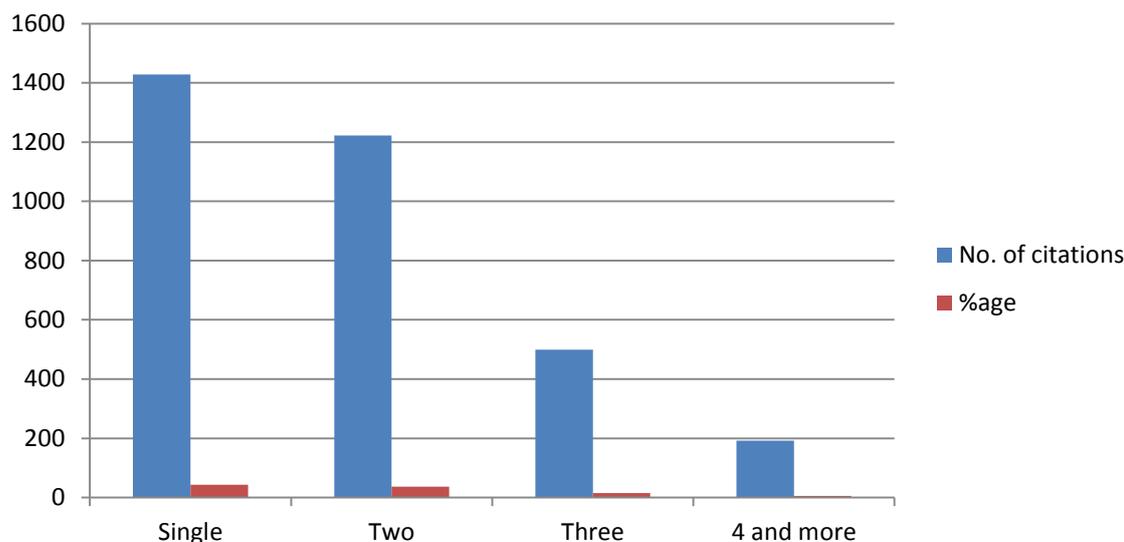
On analyzing the extent of collaborations, it is found that only 42.74% Citations (1428) involved single authors followed by 36.57% Citations (1222) involved two authors, 14.94% (499) Citations involved three authors and 05.75% (192) citations involved four and more authors.

Conclusion:-

Bibliometric studies are done in order to know the scenario of research in a particular field. Amount of literature published, level of collaborations, geographical collaborations and sources used for study are answered by bibliometric analysis. The present study analyzed research contributions for the Bulletin of the Calcutta Mathematical Society from 2012-16. The highest number of articles is in the volume no 104, 2012. The majority of articles were written by multi authors and most of the contributions are from India. Majority of contributions have the length of 1-10 pages.

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