

BIBLIOMETRIC STUDY OF MATHEMATICAL SCIENCE THESES LITERATURE AVAILABLE IN R. C. UNIVERSITY LIBRARY: A STUDY

Maranna O

Assistant Professor, Dept. of Library and Information Science, Rani Channamma University, Vidhya Sangama, NH-4, Bhutaramanahatti-591156. Karnataka, India.

omaranna@gmail.com

ABSTRACT

This paper studies the Bibliometric study of mathematical literature PhD dissertations submitted by the students for the award of Doctor of philosophy at RCU University, Belagavi, between 1962 and 1972. This article outlines the general methodology used during the study is a quantitative analysis of references appended to theses in the field of Mathematics, this research work is based on the analyses of the Ph.D theses and References. and it covers chronological distribution, authorship pattern, obsolescence, geographical distribution, language wise distribution and subject wise breakup of citations literature.

Keywords: Mathematical literature; PhD theses; RCU Library.

1. INTRODUCTION

The Library and Information Science is a discipline that investigates the forces governing the flow of information and the means of processing information for optimum usability. It is concerned an interdisciplinary science derived from and related to such fields as mathematics, logic, linguistics, psychology, computer technology, operation research, the graphic arts, communication and library science etc., With that body of knowledge relating to mathematical science Ph.D Thesis to the collection organisation, storage, retrieval, interpretations, transmission, transformation and utilization of mathematical information in Rani Channamma University. This includes the investigation of mathematical science information represents in natural systems of use of codes like matrices for efficient message transmission and the study of bibliographical information processing and using of mathematical matrix techniques and Bibliometrics application laws such as brod ford's law, lotka's law, zips law.

2. HISTORICAL REMARKS

The origin of the name 'Bibliometrics' and scientometrics were almost simultaneously introduced by Pritchard and by Nalimov and Mulchenko in 1969. While Pritchard explained the term bibliometrics as "the application of mathematical and statistical methods to books and other media of communication", Nalimov and Mulchenko defined scientometrics as "the application of those quantitative methods which are dealing with the analysis of science viewed as an information process".

According to these interpretations the speciality scientometrics is restricted to the measurement of science communication, whereas bibliometrics is designed to deal with more general information processes.

Basic concepts of elements, units and measures of bibliometric research As mentioned above, books, monographs, reports, theses and papers in serials and periodicals are units of bibliometric analyses. Since certain standards are postulated for such units, the scientific paper published in refereed scientific journals proved to be the unit most suitable for bibliometric studies. Among the common standards, we find the reviewing system, the criterion of originality of research results, the availability of literature and the more or less transparent rules. The scientific paper has become the basic unit of bibliometric research.

3. SIGNIFICANCE OF THE STUDY

The Theses are the indicators of literature growth in any field of knowledge. They emerge as the main channel for transmitting knowledge. Due to the escalating cost of the periodicals and lack of adequate library budgets the selection of any particular journal for a library should be done more carefully. Therefore, the library authorities are forced to reduce the number of Theses collection. Bibliometric analysis has many applications in the Library and Information science filed in identifying the research trends in the subject, core journals, etc. and thereby framing new subscription and collection policy for tomorrow. These studies will be helpful for librarians to plan a better collection development.

4. OBJECTIVES OF THE STUDY:

The basic objectives of the Rani Channamma university education are conservation, expansion and dissemination of knowledge. These objectives are achieved through instructions, research, publications and extension activities.

1. To assess the distribution of references in theses and average number of references.
2. To find out the publication trend of research scholars
3. To identify the type of document used by the researchers in Ph.D. thesis
4. To know length of article
5. To know authorship pattern,
6. To know bibliographical form of references,
7. To know number of chapters in totals thesis.
- 8.

5. SCOPE AND LIMITATION OF THE STUDY:

The present research study is confined to the attempt on the pattern of information use by researchers in the field of mathematics. Under the study a focus will be given at deriving qualitative and quantitative analysis based on the References collected from the end of the chapters of doctoral theses submitted in Mathematics at Rani Channamma University, Belagavi from 1962-1972.

6. METHODOLOGY:

The literature references in the Ph.D. thesis of mathematics are the basic source of information to assess the information used by the researchers. Accordingly the references in the Ph.D. theses have been taken as the source data. The Ph. D. thesis submitted Rani Channamma University during the ten years 1962-1972 in Mathematics has been studied. There are 11 Ph. D. thesis submitted during these 10 years. Thesis wise various work sheet diagrams have been designed and generated for the purpose of data collection. Initially the data collected in excel sheet in different fields. Data collected on the basis of different factor and analysis of the different aspect such as length of articles, Rank of guide, authorship pattern etc. its presentation of data by different tables and graphs i.e. ranking of author, ranking of journal/periodicals.

7. Data Analysis and Interpretation

This study presents the results of statistical tests and discussion on various aspects of the discipline of Mathematics Theses References analysis is one of the important aspects of Bibliometric study, dealing with the literature use pattern. It can bring out useful information pertaining to authorship pattern in different disciplines and of different periods. The relative use of literature and different kinds of documents such as books, periodicals, reports, theses, speeches, collections, reviews, dictionaries & encyclopaedias Internet sources (websites) etc. The findings and conclusions drawn from such studies, as evinced from the review of previous Bibliometric studies, are helpful in solving many of the problems, specific to, collection management and general management issues, like space, budget management, and customization of information services to users and so on.

In this study, the references data collected from 11 PhD theses on Mathematics and its sub disciplines is analyzed, keeping in view the objectives stated and hypothesis formulated by the researcher. The findings drawn from the analysis were critically examined, verified and tested the validity of hypotheses on one hand and to meet the objectives of the study on other. For the purpose of References analysis, the details are presented in the form of tables and the necessary statistical tests are employed, followed by the graphical representation wherever necessary. The data is analyzed and presented under different headings, in addition to citation analysis from different viewpoints.

7.1 DATA ANALYSIS ON THESES AND REFERENCES:

The analysis and discussion of the present study are presented under the following Sections:

1. Year wise analysis of Theses and References
2. Form wise Distribution of References
3. Language wise Distribution of References
4. Country wise distribution of References
5. Authorship patterns of References
6. Obsolescence References Literature during 1962
7. Obsolescence References Literature during 1966
8. Obsolescence References Literature during 1972

The present study is a quantitative analysis of references appended to theses in the field of Mathematics awarded by Rani Channamma University. The Department of Mathematics, Rani channamma University, Belegavi has produced 11 PhD theses between 1962 and 1972 and the details of the Ph.D theses are listed in the table-4.1 this research work is based on the analyses of the PhD theses and References.

The data relating to the references has been presented in the form of tables covering various aspects, viz. in terms of authorship, bibliographic form, language, core documents, core journals, single and multiple authorship patterns, etc. It is hoped that the References analysis would throw light on the information use patterns of scholars of Mathematics theses and Literature and ventilate the nature of documents they required and used in the course of their research work. The References study would also help in understanding the problems faced in regard to availability of and access to required literature and materials in the concerned University Library and also to point out the gaps in available documents.

7.2 Year-Wise Analysis of PhDs Awarded:

The analysis of the data covers a period of 11 years between 1962 and 1972. During this period about 11 theses were produced and awarded doctoral degrees. But no theses were awarded the doctoral degree in the Department of Mathematics, during the years form 1965 and 1968, 1969, 1970 respectively. The average number of theses produced per year was 1 Theses and the highest numbers of theses 3 were awarded (27.27%) during the year 1966. In the following table, the total number of theses awarded during 1962-1972 was analyzed. It was found that the highest number of theses i.e. 3 (27.27%) were awarded out of the total 11 PhD theses during 1966, followed by 2 (5.16%) in 1963, 1964 and the lowest number of theses were produced, i.e. 1 (1.03%) in the years 1962, 1971 and 1972 respectively, in the Department of Mathematics, Rani Channamma

University, Belagavi. The study concluded that on an average about 1.10 theses per year were produced during the period from 1962 to 1972. It indicates that the research output is significant.

Table No-7.1

Year wise distribution of references

Sl No.	Year of submission	Total no of PhD theses	Total no of references	Average of references %
1	1962	1	95	12.77
2	1963	2	143	19.22
3	1964	2	124	16.67
4	1965	0.00	0.00	0.00
5	1966	3	246	33.06
6	1967	1	49	6.59
7	1968	0.00	0.00	0.00
8	1969	0.00	0.00	0.00
9	1970	0.00	0.00	0.00
10	1971	1	66	8.87
11	1972	1	21	2.82
	Total	11	744	100.00

In the years of study between (1962 and 1972), 11 PhDs were produced and awarded doctoral dissertations in the Department of Mathematics Rani Channamma University, Belagavi. The average number of Ph.D. theses produced per year 1 and the highest number of theses i.e.3 were awarded in the year 1966, the total of 11 PhD theses. The total 744 references are having these 11 theses. The average number of References is 63.63% percentage per theses. The study concluded that the timely efforts of the Research supervisors, as well as the sincere and continuous efforts of research scholars may be the reason for this research output.

7.3 FORM-WISE DISTRIBUTION OF THESES

The analysis of various forms of literature focused in the total sample of theses reveals four major forms of content of theses.

Table No-7. 2

Form wise distribution of references

Sl No.	Types of sources	Total	Average %
1	JOURNALS	351	47.18
2	BOOKS	221	29.70
3	THESES	172	23.12
	Total	744	100.00

Among the 11 theses on Mathematics, the total 744 references in these theses. The highest percent (47.18%) are on Journals. The second place was occupied by theses on Books with (29.70 %) percent last one is Theses (23.12%) percent of the total number of these References.

Table No: 7.3**Language Wise Distribution of References**

SL.No.	Language	Total	Average %
1	English	737	99.06
2	French	2	0.27
3	Greek	2	0.27
4	Cheney	3	0.40
	Total	744	100.00

It is also important to note the language of References. As usual English is the predominant language of References (Table 7.3). Out of the 744 records, English occupies the first position with 737 records (99.06%). Cheney language is occupying second position with 3 records (about 0.40 %). Also Greek and French 2 each record found in respectively. So English is the dominant language in Bibliometrics because English is official language in many countries and many Documents are published in English language only.

7.4 COUNTRY WISE DISTRIBUTION OF REFERENCES

The Geographical distribution of Theses references in any discipline and for the present purpose in Mathematics Theses references enables the researcher to identify the research output published by any country as the progress and development of any country depends upon its research productivity and research activity. Now information is considered as a vital resource by all the nations.

The table below represents the geographical distribution of References in Theses refers by the researchers in the Mathematics Theses.

Table No:7.4**Country Wise Distribution of References**

SL. No.	Country	References	Average %
1	India	530	71.24
2	U K	76	10.22
3	U S A	94	12.63
4	Japan	19	2.55
5	France	14	1.88
6	Other	11	1.48
	Total	744	100.00

The analysis of data in table 4 shows that the country-wise distribution of References in the forms of Theses scattered among 10 countries. The Highest References are found to be from India (71.24%) followed by USA, UK, Japan, France, (12.63%), (10.22%), (2.55%), (1.88%) respectively. The remaining 5 countries contributed to less than 1 percent of the references in the Theses.

7.5 AUTHORSHIP PATTERN:

The Research has now become a team activity wherein the individual, being the member of the team, shares the cooperative authorship. With the increase in the collaborative research there has been increase in the number of papers having single, two authors, three authors and more than three authors.

Table No-7.5**Authorship Pattern of References**

S.L. No.	Authors	Total	Average %
1	Single	649	87.23
2	Joint	92	12.37
3	Three or More	3	0.40
	Total	744	100.00

The authorship pattern of Theses references in Mathematics are grouped under different 3 classes with single, joint and three or more authors as class intervals, in the table above. Among various types of authorship, single authorship is found to be very high 87.23% percent in the references in theses on Mathematics. Thus, the two authors with 12.37% percent, Three authors and more than three authors' (0.40) references represent less than 1% percent.

7.6 Obsolescence of Reference Literature

The problem like space, organization of library materials, limited staff, made to librarian to assess the obsolescence rate of literature. By that one can know how for a researcher will go back to obtain a particular refers literature in a given subject field, Based on obsolesces study librarian can decide about organization of reading materials and discard the less use materials.

A References practice varies from subject to subject and also depends on the nature of the work and the people involved. Despite the various reasons, researchers refer other researchers work. One factor in references practices which appears to be universal is that refer to the past literature are distributed randomly irrespective of the time of publication and a majority will always relate to fairly recent articles. The obsolescence frequently occurs in the literature of Bibliometric and references analysis studies. Analysis of references by the age of the refer documents indicated the useful life of documents. This period of reference of the articles in journals is referred to as "half life of periodicals" or often quoted as "obsolescence of the literature." The half life literature used for many studies in a particular discipline depends on the number of years respectively needed to satisfy one half of all the literature refer on the subject, or one half of all the references made to the literature in the current year. Ageing or obsolescence of documents usually assesses the decline in the use of a representative set of documents over time. The growth of literature and growth of the number of authors as generators and users of information and their varying literature use patterns, differentiations and integration of scientific disciplines, and social and political factors have considerable influence on these phenomena.

The year wise distribution of references journals Theses and books and also the half-life journal literature, Theses and books are discussed in the following section.

Table No-7.6**Obsolescence of Reference Literature During -1962**

SL, No.	Year	No of citations	%	Total	Cumulative %
1	1962	0	0	0	0
2	1961	0	0	0	0
3	1960	4	4.21	4	4.21
4	1959	4	4.21	8	8.42
5	1958	3	3.16	11	11.58
6	1957	11	11.58	22	23.16

7	1956	5	5.26	27	28.42
8	1955	6	6.32	33	34.74
9	1954	2	2.11	35	36.84
10	1953	2	2.11	37	38.95
11	1952	8	8.42	45	47.37
12	1951	10	10.53	55	57.89
13	1950	10	10.53	65	68.42
14	1949	5	5.26	70	73.68
15	1947	2	2.11	72	75.79
16	1945	4	4.21	76	80.00
17	1935	2	2.11	78	82.11
18	1934	2	2.11	80	84.21
19	1932	2	2.11	82	86.32
20	1931	2	2.11	84	88.42
21	1930	4	4.21	88	92.63
22	1927	2	2.11	90	94.74
23	1920	1	1.05	91	95.79
24	1909	3	3.16	94	98.95
25	1896	1	1.05	95	100.00

The year wise distribution of article references in Mathematics and Literature are presented in Table 4.6. The maximum year of refers Articles in Mathematics and Literature is 1957. It is observed that nearly 11.57% percent of the Literature is 6 years old, While 10.52 percent Literature are 11 years old, and also 10.52 percent of Literature 12 years old. The remaining 30.57 percent of Literature are above 25 years old.

Table No-7.7

Obsolescence of Reference Literature During -1966

SL No.	Year	No of References	%	Total	Cumulative %
1	1966	1	0.78	1	0.78
2	1965	3	2.34	4	3.13
3	1964	9	7.03	13	10.16
4	1963	7	5.47	20	15.63
5	1962	10	7.81	30	23.44
6	1961	12	9.38	42	32.81
7	1960	3	2.34	45	35.16
8	1959	7	5.47	52	40.63
9	1958	9	7.03	61	47.66
10	1957	6	4.69	67	52.34

11	1956	6	4.69	73	57.03
12	1955	3	2.34	76	59.38
13	1954	3	2.34	79	61.72
14	1953	4	3.13	83	64.84
15	1952	4	3.13	87	67.97
16	1951	3	2.34	90	70.31
17	1950	2	1.56	92	71.88
18	1949	5	3.91	97	75.78
19	1948	2	1.56	99	77.34
20	1947	2	1.56	101	78.91
21	1946	4	3.13	105	82.03
22	1944	3	2.34	108	84.38
23	1942	2	1.56	110	85.94
24	1941	2	1.56	112	87.50
25	1936	2	1.56	114	89.06
26	1935	2	1.56	116	90.63
27	1934	2	1.56	118	92.19
28	1929	3	2.34	121	94.53
29	1928	1	0.78	122	95.31
30	1925	4	3.13	126	98.44
31	1920	1	0.78	127	99.22
32	1907	1	0.78	128	100.00

The year wise distribution of article references in Mathematics and Literature are presented in Table 4.7. The maximum year of refers Articles in Mathematics and Literature is 1961. It is observed that nearly 9.37% percent of the Literature is 5 years old, While 7.81% percent Literature are 4 years old, and 7.03% percent of Literature 2 years old. And also 7.03% percent of Literature 7 years old. The remaining 52.34% percent of Literature are above 15 to 25 years old.

Table No-7.8

Obsolescence of Reference Literature During -1972

SL. No	Year	No of References	Percentage %	Total	CUMALATIVE %
1	1971	1	4.76	1	4.76
2	1969	2	9.52	3	14.29
3	1968	2	9.52	5	23.81
4	1967	4	19.05	9	42.86
5	1965	2	9.52	11	52.38

6	1964	1	4.76	12	57.14
7	1963	3	14.29	15	71.43
8	1962	1	4.76	16	76.19
9	1961	3	14.29	19	90.48
10	1936	1	4.76	20	95.24
11	1932	1	4.76	21	100.00

The year wise distribution of article references in Mathematics and Literature are presented in Table 6.8. The maximum year of refers Articles in Mathematics and Literature is 1957. It is observed that nearly 19.04% percent of the Literature is 6 years old, While 14.28% percent Literature are 9 years old, and also 14.28 percent of Literature 13 years old. The remaining 50% percent of Literature are less than 5 years old.

FINDINGS:

1. In the year wise distribution, out of the 11 thesis, that the maximum number of thesis shown 1966, i.e., 3 (Table 1)
2. The total 744 references are having these 11 thesis. The average number of References is 63.63% percentage per thesis.(Table 1)
3. The highest percent (47.18%) are on Journals and second place was occupied by thesis on Books with (29.70 %) percent last one is Thesis (23.12%) percent of the total number of these References. (Table 2)
4. As usual English is the predominant language of References and Out of the 744 record English occupies the first position with 737 records (99.06%). Cheney language is occupying second position with 3 records (about 0.40 %). Also Greek and French 2 each record found in respectively. (Table 3)
5. So English is the dominant language in Bibliometrics because English is official language in many countries and many Documents are published in English language only. (Table 3)
6. The Highest References are found to be from India (71.24%) followed by USA, UK, Japan, France, (12.63%), (10.22%), (2.55%), (1.88%) respectively. (Table 4)
7. single authorship is found to be very high 87.23% percent in the references in thesis on Mathematics Thus, the two authors with 12.37% percent, (Table 5)
8. Three authors and more than three authors' (0.40) references represent less than 1% percent, (Table 5)
9. The maximum year of refers Articles in Mathematics and Literature is 1957. It is observed that nearly 11.57% percent of the Literature is 6 years old, (Table 6)
10. While 10.52% percent Literature are 11 years old, and also 10.52 percent of Literature 12 years old and The remaining 30.57 percent of Literature are above 25 years old. (Table 6)
11. The maximum year of refers Articles in Mathematics and Literature is 1961. It is observed that nearly 9.37% percent of the Literature is 5 years old, While 7.81% percent Literature are 4 years old, and 7.03% percent of Literature 2 years old, and also 7.03% percent of Literature 7 years old, (Table 7)
12. The remaining 52.34% percent of Literature are above 15 to 25 years old. (Table 7)
13. The study concluded that the timely efforts of the Research supervisors, as well as the sincere and continuous efforts of research scholars may be the reason for this research output.

Conclusion

Bibliometric techniques are being used for a variety of purposes like determination of various scientific indicators, evaluation of scientific output, selection of journals for libraries and even forecasting the potential of a particular field. The popularity in the adaptation of bibliometric techniques in various disciplines stimulated stupendous growth of literature on bibliometrics and its related areas.

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