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**Information Use Pattern of Researchers in Commerce: A Citation
Analysis of Doctoral Dissertations**

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Abstract

The article analyses the citations of doctoral dissertations in Commerce awarded by University of Kerala, India from 2001 to 2010. Data extracted include year of submission of thesis, title of the thesis, title of the cited work, year of the publication of the cited work type of the document and if journal title of the journals. The citations were divided into six categories; books, journals, conference papers, reports, theses/dissertations and electronic documents. The journal articles are cited more and it is 38.79% of total documents cited. *Economic and Political Weekly* (50) got highest number of citation. The latest document used is published in the year 2007 and the oldest one in the year 1923. The decade 1991-2000 got highest citation (35.73%). Bradford's law do not find fit with Commerce literature. The rate of self citation is very less i.e 0.0022953. Scattering of literature among different subjects include core areas of Commerce to distant areas like public administration.

Keywords: Author Collaboration, Conferences, Research Productivity, Scientists,
Scientometrics, Seminars

Introduction

Information is produced every now and then across the globe, as a result of scientific, academic and industrial research. This new information is communicated to the users through scientific publications. This has led to the growth of literature. Along with the exponential growth of literature the interdisciplinary or multidisciplinary nature and specialization in research have posed many problems both to the information seekers as well as information providers. The information seekers need more relevant information, at right time at reasonable cost. But in the midst of information overflow it is difficult to select a right source in their field of interest. But at the same time librarians as information providers find it difficult to get a perfect balance between the need of their users and ever growing, multidisciplinary and costly nature of information resources.

Bibliometrics includes the study of the relationship among the documents. Typically these descriptions focus on constituent patterns involving authors, monographs, journals, subject, language, etc. Bibliometric techniques have extreme applications in sociological studies of science, information management, librarianship, history of science, science policy, etc. The techniques of bibliometrics vary from simple to complex in nature. The basic units of bibliometrics are all facets of written communication. Bibliometrics have established itself as a viable and distinctive technique for evaluation of science based on bibliographical and citation data.

Citation analysis has been used in the assessment of scientific activity for decades. Librarians have used citation count to study the adequacy of collection of information materials. Economists and historians of science have looked upon publications and citation counts as indicators of productivity and eminence. The efficiency of the research group can be considered in terms of result generated from the research activity. This can be known through research publication such as articles, research papers, reports or theses. The quality of

such publications can be known by analysing citations made by the paper itself and citations got by other authors. This can be done through citation analysis.

According to Ravichandra Rao (1983, p.199) “ the main objective of the citation analysis are to evaluate and interpret citations received by articles, authors, institutions and other aggregates of scientific activities. It is also used as a tool for measuring communication links in the sociology of the science.” So it is clear that the citation analysis helps to know the links among producers of scientific information with consumers of information and their inter relationship in further production of scientific information. This producers and consumers include institutions as well as institutes.

The academic and scientific research is taking place across the globe both in Science and Social Science to find solutions to problems existing in each field. The Doctoral Studies Programme aims at training professionals and teachers in the skills and competences related to the systematic investigation of various issues and problems in the area of their study. At this level, the study is expected to provide new and original insights into the problem or the area under investigation. As a branch of Social Science there were many researches are taking place in Commerce in both practical and theoretical level. The University of Kerala is leading in the support and promotion of PhD research in commerce. Within the short span of more than a couple of decades the Department of Commerce, University of Kerala, awarded many PhD degrees in Commerce. Citation analysis as a tool for planning of library and information centre this study aims at measuring the information needs and usage of researchers at the department by counting their citations for a period of ten years.

University of Kerala

One of the first 16 Universities in India, the University of Kerala was founded as the University of Travancore in the erstwhile princely state of Travancore in 1937. The Kerala University Act (Act 14 of 1957) was brought into force and

the University of Travancore was renamed University of Kerala. At present, the University has sixteen faculties and forty one departments of teaching and research in addition to study centres and other departments. Teaching, Research and Knowledge extension are the mandate of the Departments. They primarily focus on post-graduate (masters) programmes, MPhil programmes (1-year research degree) and doctoral research. The Departmental Councils consisting of all faculty members of the Departments have financial and academic powers. Headship of the Department is on a rotation-basis. Each Dept falls under one of the Faculties which are headed by a Dean of Faculty.

Department of Commerce of University of Kerala

The Department of Commerce was established in 1985 as teaching and research department of University of Kerala. Within a short span of twenty five years the department could establish itself as a centre of excellence with focus on education, research, consultancy and extension services. The department offers post-graduate level programmes in Commerce like M.Com, M.Phil and Doctoral programmes leading to PhD. The Department imparts quality business education that focuses on empowerment through learning and enrichment through research.

Review of Literature

Ardanuy (2013) gave an overview of studies that have used citation analysis in the field of humanities in the period 1951 to 2010. The results confirm that use of this technique in the humanities is limited, and although there was some growth in the 1970s and 1980s, it has stagnated in the past 2 decades. Most of the work has been done by research staff, but almost one third involves library staff, and 15% has been done by students. The study also showed that less than one fourth of the works used a citation database such as the Arts & Humanities Citation Index and that 21% of the works were in publications other than library and information science journals. The United States has the

greatest output, and English is by far the most frequently used language, and 13.9% of the studies are in other languages.

Watkins & Gunapala (2013) reported that facilitating access to journals for a multidisciplinary field of study requires an understanding of the literature used by those researchers. This study examines the journals used for publication and those cited by 85 faculty affiliates of the New Mexico State University (NMSU) Water Science and Education Centre (WSEC), a multidisciplinary faculty group with a water research focus. The authors have used information gained from science inevitably leads to the increasing need for a citation theory constituting a theoretical frame for both citation analysis and the description of citers' behaviour.

Zhang, Ding & Milojevic (2013) proposed a new framework for citation content analysis (CCA), for syntactic and semantic analysis of citation content that can be used to better analyze the rich sociocultural context of research behaviour. This framework could be considered the next generation of citation analysis.

Bigdeli, Morteza, & Gholam (2013) conducted the study to reveal the worldwide patterns of authors' information scattering through illustrating the possible differences among authors based on subject, country, geographic region, institution, economic and scientific level factors. Second, changes in patterns of information scattering during the past 21 years are checked. The findings revealed that patterns of information scattering have changed during the past 21 years, and the number of journals in the core and middle zones has almost doubled. It was also found that authors tend to use a small number of journals to retrieve the majority of their required information, while a small amount of their information needs come from a wide variety of journals.

Ketzler & Zimmermann (2013) studied the citation analysis of the research output of the German economic research institutes presented here is based on

publications in peer-reviewed journals listed in the Social Science Citation Index for the 2000-2009 period. The novel feature of the study is that a count data model quantifies the determinants of citation success and simulates their citation potential. Among the determinants of the number of cites the quality of the publication outlet exhibits a strong positive effect. The same effect has the number of the published pages, but journals with size limits also yield more cites. Field journals get fewer citations in comparison to general journals. Controlling for journal quality, the number of co-authors of a paper has no effect, but it is positive when co-authors are located outside the own institution. It found that the potential citations predicted by the best model lead to different rankings across the institutes than current citations indicating structural change.

Anilkumar & Rajaram (2013) opined the most reliable way to know the contribution of research to the world knowledgebase is through publication and citation data. The research papers and doctoral thesis are the instruments through which results of the research are communicated to the outside world. Both these scholarly publications conclude with the list of references. The study of these references (citations) gives an idea about the development of any research topic or a researcher and also indicates the kind of literature referred by the researchers. In today's world of ever escalating cost of serials, citation analysis is also being used to determine which titles to purchase and which ones to discontinue. The present study aims to better understand and manage the library resources by examining the resources used (cited) by the doctoral students of the Physical Research Laboratory (PRL) during 1997–2006. It was found that electronic format was preferred to the printed format from 2001 through 2006. Journal articles are used (cited) the most, followed by books and other documents like proceedings and reports. With more and more availability of online resources, use of non-subscribed content was also on the rise from 1997 through 2006. This study also confirms the Bradford's law that a

set of core journals in a subject field satisfy more than 50% of the total number of journal citations.

Kumar & Reddy (2012) studied citations in Master's degree dissertations submitted to the Department of Library and Information Science, Sri Venkateswara University, Tirupathi during the period 2000 - 2007, were analysed for finding possible relationships between citing, citing articles and bibliographic forms. Frequency and percentage distributions (Presented in charts, tables and graphs) and measures of central tendency were used to analyse data. Findings showed that journals were the most utilized reference materials in the dissertations. Also, library science in general had the highest number of citations followed by library management and cataloguing. The lowest numbers of citations were from education, literature and social sciences respectively. The findings from this study could serve as a user study with implications for collection, development and user services designing in libraries.

Mahapatra (1994) conducted a bibliometric analysis of 1,456 articles appearing in Indian Library and Information Science journals between 1975 and 1985 and revealed that the average rate of citations per article in the field was quite low. Books and journals were identified as the major categories of documents referred to in these articles and both were positively related. It is concluded that the increase in journal citations and rate of citations between 1975 and 1985 indicates that Indian Library and Information Science journals are now publishing a higher number of research-oriented articles in comparison with earlier years.

Ramesh & Nagaraju (2000) opined that citation analysis is defined as an activity involving analysis of the citations or references, which forms a part of the primary scientific communication. When the scientific paper makes mention of or makes reference to another scientific paper, the latter has been

cited by the former as a source of information as the support for the points of view as authority for the statements of facts etc.

Kushkowski, Parsons, & Wiese (2003) reported the results of a longitudinal study of over 9100 citations from 629 master and doctoral theses written between 1973 and 1992 at a large mid western land-grant university. The results of this study suggest that graduate students writing theses favour current research regardless of disciplinary affiliation. The length of theses increased over time and the number of citations in thesis bibliographies varied by discipline.

Relevance of the Study

So far no attempt has been made to study the characteristics of research in Commerce in the University of Kerala. The change in nature of research and interdisciplinary/ multidisciplinary nature of subject is a matter of concern to study the research trends in an institution. So it needs to study the characteristics of research periodically to know the direction and magnitude of the research. This will help to plan the research and infrastructure for the research activities. As a subject of combination of several fields and links with many areas of knowledge it is essential to study the trend in research in Commerce at the University through citation analysis of theses of Commerce for a period of ten years.

Objectives of the study

1. To understand the different type of the documents used by researchers in Commerce in University of Kerala.
2. To prepare ranked list of periodicals based on frequency of use by the researchers.
3. To study authorship pattern in citations.
4. To identify country-wise distribution of literature used by doctoral students.

5. To determine the age distribution of literature used by the researchers.

Methodology

Ten PhD theses in Commerce awarded by the University of Kerala from 2001 to 2010 were selected as a source of data. Each thesis was examined and citations were extracted from the bibliography part. Data extracted include year of submission of thesis, title of the thesis, title of the cited work, year of the publication of the cited work type of the document and if journal title of the journals. The citations were divided into six categories; books, journals, conference papers, reports, these/dissertations and electronic documents. A total of 1306 citations were found in all ten theses. Data pertaining to each citation were prepared using MS excel. The column were devoted to each field such as author, title of the document, place of publication, type of document and in the case of journal articles the title of the journal. All the entries are sorted according to the author, place of publication, year of publication, type of document and other relevant parameters.

Analysis

1. Types of Document Study

Researchers used different types of documents to write their theses. It includes books, journal articles, conference proceedings, reports, theses and dissertations, electronic sources and news paper articles.

Table 1: Type of Document Study

Sl. No.	Form of document cited	Number of documents cited	Percentage of documents cited
1	Journal Articles	507	38.79
2	Books	492	37.64
3	Reports	170	13.00
4	Theses/Dissertations	70	5.36
5	Conference proceedings	33	2.53
6	News paper articles	28	2.14
7	Electronic documents	7	0.54
Total		1307	100

The study revealed that around 2/5th of the literature using are journal articles (38.79%) to prepare their theses. In the second position they used books and it is 37.64% of total works cited. Reports (13%), theses and dissertations (5.36%), conference proceedings (2.53%) and news paper articles (2.14%) are the other types of documents used by the researchers. It is found that they used very small number of electronic documents and which is only 0.54% of total cited documents.

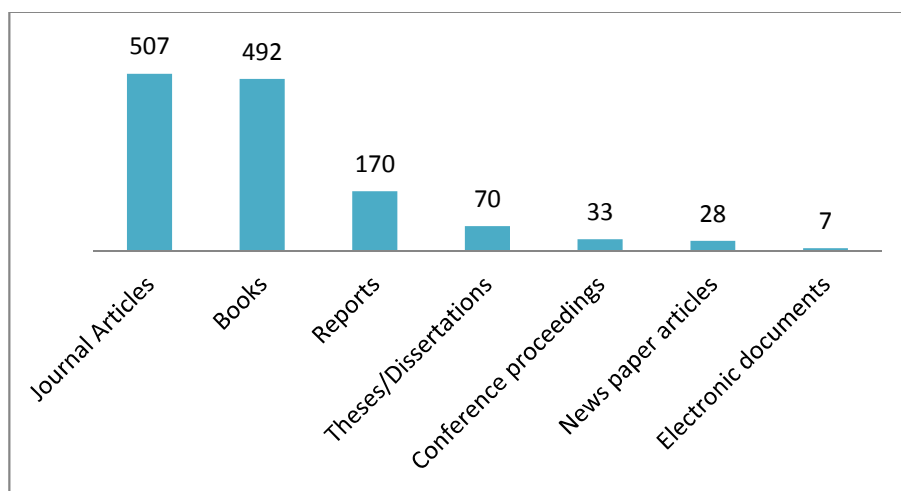


Fig.1: Types of Document Cited

2. Geographical Distribution of the Documents Cited

Research across the globe is influenced by researchers in other countries also. So library and information professionals must be careful for a balanced selection of documents. In order to do this judiciously it should study the use pattern of documents, which produced from different countries, by the researchers.

Table 2: Geographical Distributions of Sources Used

Sl. No.	Country	Number of citations	Percentage of citations

1	India	924	70.65
2	USA	250	19.12
3	UK	58	4.43
4	New Zealand	39	2.98
5	Australia	20	1.53
6	Singapore	7	0.53
7	Japan	3	0.22
8	Canada	1	0.076
9	Finland	1	0.076
10	France	1	0.076
11	Italy	1	0.076
12	South Africa	1	0.076
13	Switzerland	1	0.076
Total		1307	100

The study shows that researchers used Indian publications than foreign origin. 70.65% (924) of total cited documents are Indian and 29.35% were foreign publications. On analyzing foreign publications the highest citation is received by publication from USA and it is 19.12% of total cited documents. Other countries that received citations are UK (58) – 4.43%, New Zealand (39) - 2.98%, Australia (20) -1.53%, Singapore (7) -0.53%, Japan (3)-0.22%. Six countries (Canada, Finland, France, Italy, South Africa and Switzerland) have received just one citation each.

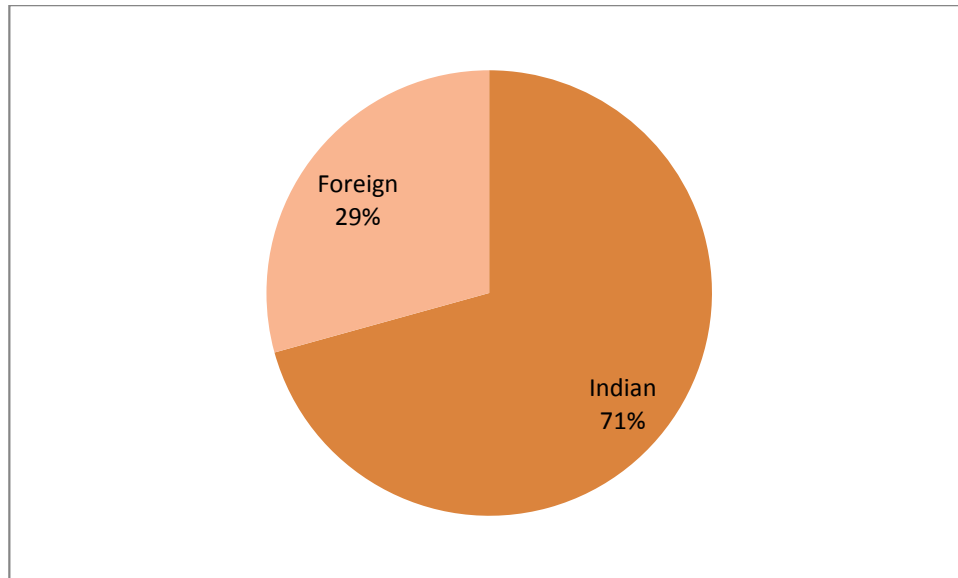


Fig.1: Distribution of Documents between India and Foreign Countries

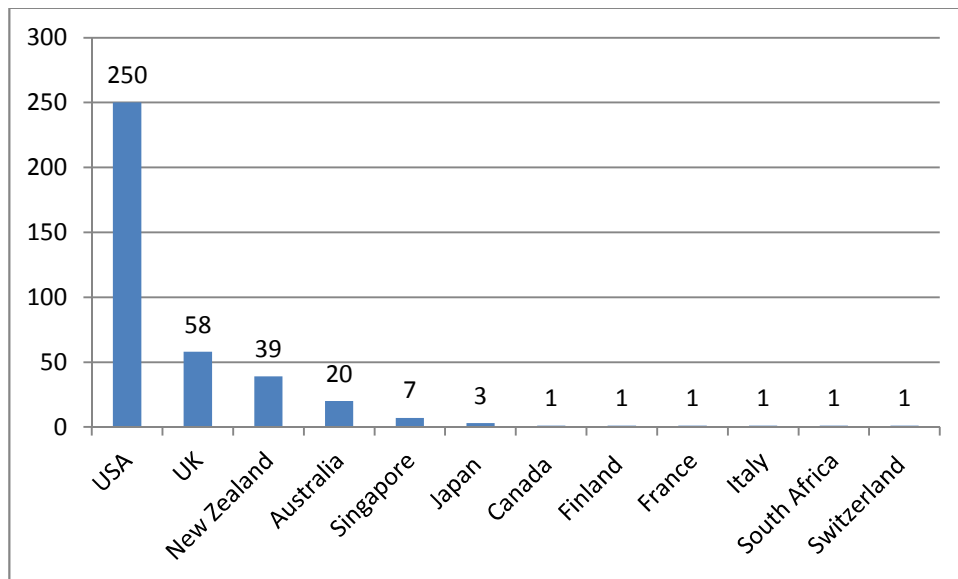


Fig.2: Distributions of Documents among Foreign Countries

3 Authorship study

Authorship studies mainly deal with kind of authors and nature and degree of collaboration among them. The various kinds of authors appeared in the publications are grouped as personal author, corporate authors and anonymous authors. The personal author may further grouped according to the

collaboration among them. So collaboration is a major area of authorship study, which indicates how authors work together to bring out publications. To conduct authorship analysis the authors of publications are the main element of the study.

Table 3: Types of Authorship

No.	Types	No. of citations	Percentage of citation
1	Personal author	1121	85.77
2	Institutional author	132	10.09
3	Edited work	30	2.30
4	Anonymous author	24	1.84
Total		1307	100

From the study it revealed that majority of the literature (85.77%) used are created by personal authors. The second highest citation is received by institutional authors and it is 10.09%. Other categories edited work and anonymous authors. They share citations 2.30% and 1.84% respectively.

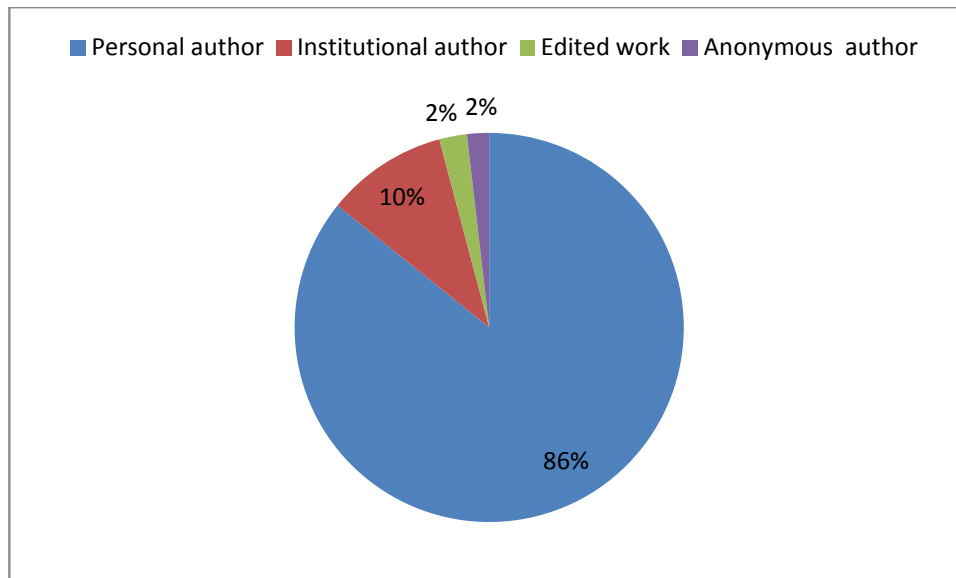


Fig.3: Type of Authorship

Table 4: Authorship Pattern

Sl. No.	Authorship	No. of citation	Percentage of citation
1	Single	897	71.59
2	Double	253	20.19
3	Triple	57	4.55
4	Multiple	46	3.67
Total		1253	100

Analysing the authorship information of 1253 citations (literature by personal and institutional authors) revealed that most of the cited works (897) are single authored and this is 58.53%. The second highest citation is received by collaboration of two authors, which is 253 citations, 20.19%. Literature created by the collaboration of three authors and more than three authors come in the third and fourth position with 4.55% and 3.67% respectively. So it can say collaborative writing in the Commerce is less.

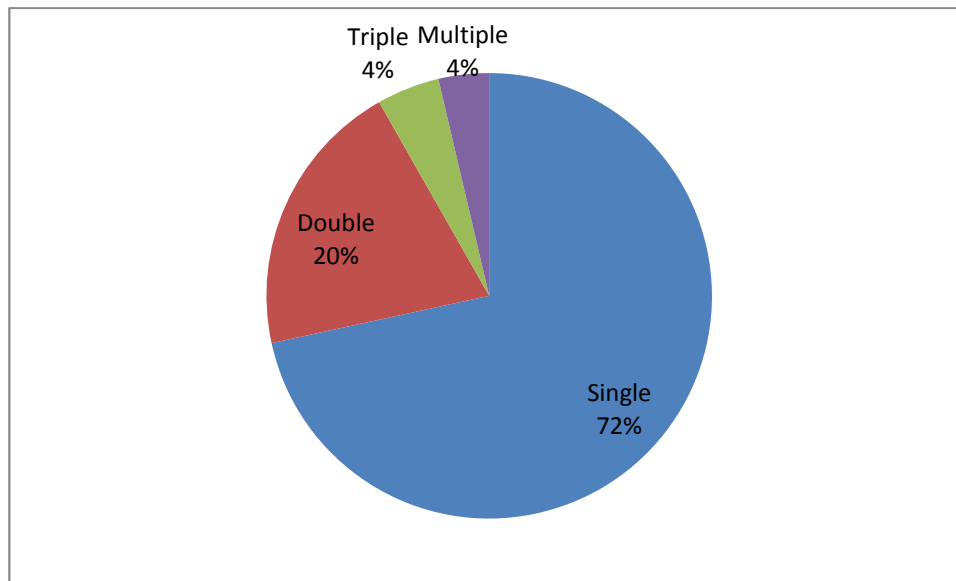


Fig. 4: Authorship Pattern

4 Degree of Collaboration

The author collaboration study is a matter of concern. Subramanyam (1983) proposed a mathematical formula for calculating author's degree of collaboration in a discipline. The degree of collaboration among authors is the

ratio of the number of collaborative publications to the total number of publications published in a discipline during certain period of time. The mathematical expression of this formula is;

$$g = \frac{Nm}{Nm + Ns}$$

Where g = Group Coefficient of a discipline

N_m = Number of multiple authors during a specific period in a discipline

N_s = Number of single authored works in a discipline during a given period of time.

In this study, 1121 citations are by personal authors. Among these 765 are single authored citations and 356 citations are of collaborative authors. So group coefficient can be finding out of it. Total number of collaborative authors is 907.

Here $N_m = 907$

$N_s = 765$

So group coefficient $g = 907 / 907 + 765$

$g = 0.54$

5 Age of Cited Documents and Citation Relationship

Researchers mainly consult recent documents. This is because the research is conducted to find a solution to a present problem or the research will be an extension of another research of the preceding period. But depending on the nature of research, especially researches in Social Science subjects may depend older documents.

Table 5: Chronological Distributions of Documents Used

No	Period of production of document	Number of citations	Percentage of citations

1	2001-2010	293	22.42
2	1991-2000	467	35.73
3	1981-1990	267	20.43
4	1971-1980	115	8.80
5	1961-1970	105	8.04
6	1951-1960	42	3.21
7	1941-1950	6	0.45
8	1931-1940	11	0.84
9	1921-1930	1	0.08
Total		1307	100

It is revealed from the study that more citation is received for the documents that published in the preceding decade of the current study. That is for the period 1991- 2000, that received 467 citations and this is 35.73% of total citations. The second highest citation is received for documents in the decade 2001-2010 and it is 22.42% of total citations. When it goes back from the period 1991-2000 it is found that there is a gradual decline in the number of cited documents period by period. But for the period 1931-1940 there was a hike. The oldest document that cited was published in the year 1923 and there was only one citation in this study that published in the 1920s.

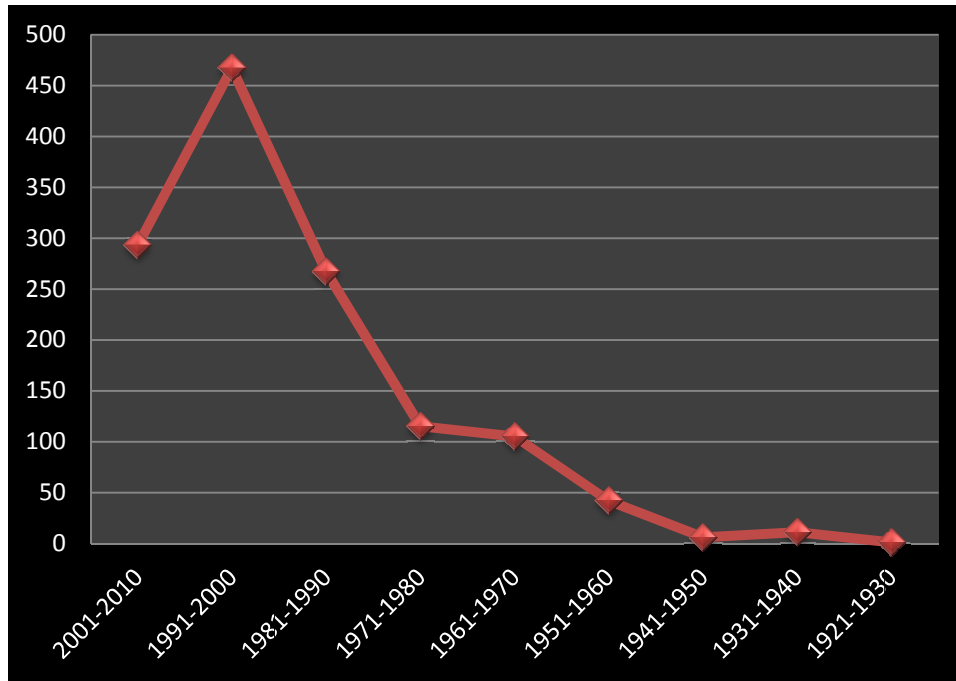


Fig.5 Chronological Distribution of Document

6 Currency of Journal Use

Houghton (1975) pointed out that there is a higher probability of use of papers soon after its publication but there rate of subsequent use diminishes rapidly with their age.

Table 6: Time Lag in Journals with Reference to Year of Publication

Time Gap	Number of Journal Citation	Percentage	Cumulative Percentage
0-5	70	13.8067	13.8067
6-10	76	14.9901	28.7968
11-15	110	21.6964	50.4932
16-20	86	16.9625	67.4557

21-25	55	10.8481	78.3038
26-30	50	9.8619	88.1657
31-35	20	3.9448	92.1105
36 -40	18	3.5503	95.6608
41 or more	22	4.3392	100.000
Total	507	100.000	100.000

The study revealed that more than 50% of the journal article cited within 15 years after its publication. The time lag of citing journal articles is given in above table. The currency of journal citations shows that nearly 14% of the journals are belongs to less than 5 year, nearly 15% of the citations made between five and ten year period and above 21% of the citations made between 11-15 year period. Less than fifty percentages of the citations are made after 15 year its publication. The dependence of recent literature is more among researchers in Commerce is observed. The dependence decreases with the increase of age of article. Therefore it may be concluded that there are more chances for the recent literatures to be cited than the older ones.

7 Ranked list of journals used

Journal rank list study is intended to find core journals in the field of research. In every subject there are some journals which are frequently referred by the researchers because of the close relation between the subject of the journals and the areas of research work. The highly cited journals are listed as core journal of the specific subject. The core journals always contain a higher concentration of relevant articles on a particular discipline and rest of the papers on the subject are scattered over a large number of journals. Appendix 2 describes the ranked list of journals used by the researchers.

From the ranked list of journals it revealed that ‘The Economic and Political Weekly’ got the maximum number of citations (50) and this is 9.86% of total

number of journal cited. Second ranked journals are ‘Cashew Bulletin’ and ‘Journal of Applied Psychology’ with 25 citations each. In the third place ‘Pranjan’ with 21 citations and in the fourth position ‘Indian Journal of Industrial Relations’ with 18 citations. 89 journals got just one citation only

7.1 Ranked List of Indian Journals Used

The analysis revealed that among 154 journals used 70 journals was Indian. This less than 50% of the total number of journals used. But Indian journals got more citation than foreign journals. Among 507 total journal citations 60.55% (307) were Indian journals and 39.45% (200) were Foreign Journals.

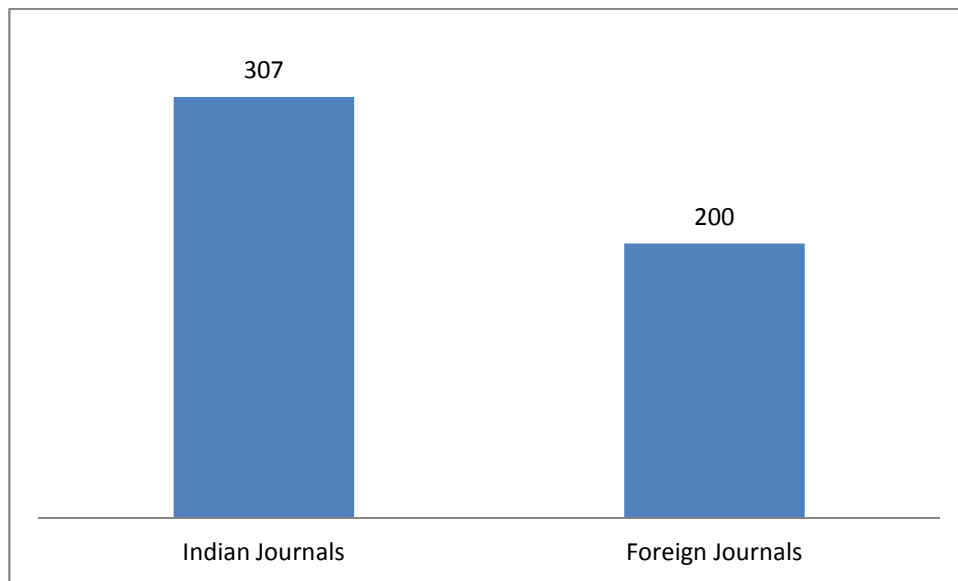


Fig.6: Geographic Distribution of Journals Used

Among the Indian journals Economic and Political Weekly got Highest Citation with 50 citations. This is 16.29% of total Indian Journals Cited and 9.86% of total journal citation. Other Indian journals cited more include Cashew Bulletin (25), Pranjan (21), Indian Journal of Industrial Relations (18), The Management Accountant (14), The Cashew (12), IBA Bulletin (11), Agriculture Service Bulletin (11) and Professional Banker (10). One journal

got 9 citations, one got 8 citations, two got 7 citations, three got 6 citations, 2 got five citations, four got 4 four citations, two got 3 citations, seven got 2 citations and forty Indian journals received just one citation each.

7.2 Validity of Bradford's law in Commerce journals

The Bradford's law derived its universality in application in application from the basic use in scientific field. If a bibliography is to be compiled on any subject, it is marked that there is always a small group of core journals that account for a substantial percentage (1/3) of the articles on that subject or discipline. Then there is a second larger group of journals that account for another third while a much larger group of journals pick up the last third.

Table 7: To Examine the Validity of Bradford's Law

No.	x	y	X	Y	LogX	LogY
1	1	50	1	50	0	1.6989
2	2	25	3	75	0.4771	1.8750
3	1	21	4	96	0.6020	1.9822
4	1	18	5	114	0.6989	2.0569
5	1	14	6	128	0.7781	2.1072
6	1	13	7	141	0.8450	2.1492
7	1	12	8	153	0.9030	2.1846
8	2	11	10	164	1	2.2148
9	1	10	11	174	1.0413	2.2405
10	2	9	13	183	1.1139	2.2624
11	1	8	14	191	1.1461	2.2810
12	5	7	19	198	1.2787	2.2966
13	5	6	24	204	1.3809	2.3096
14	5	5	29	209	1.4623	2.3201
15	7	4	36	213	1.5563	2.3283
16	6	3	42	216	1.6232	2.3344
17	23	2	65	218	1.8129	2.3384
18	89	1	154	219	2.1875	2.3404

Note: x = number of journals, y = number of citations, X = cumulative number of journals, Y = cumulative number of citations

The analysis shows that only few journals got maximum citations and it decreasing while going down. The decrease in number of citations over different journals is not uniform in number. So it is difficult to map different zones of journals with equal number of citations.

7.3 Scattering of Journals and Citations over Bradford Zones

Journals are ranked and divided into groups or categories depending on the citations they received. These groups are termed Bradford zones.

Table 8: Scattering of Journals and Citations over Bradford Zones

Zone	x	$\sum x$	y	$\sum y$	Ratio
1	73	73	3	3	1
2	73	146	4	7	1.75
3	73	219	147	154	1.04

Note: x = number of citations (each 1/3), $\sum x$ = cumulative number of citations, y = number of journals, $\sum y$ = cumulative number of journals

From the table it is found that three zones are provided and the ratio is calculated as 1:2:3. The ratio between the number of journals in subsequent zones has been observed to be approximately 1: n: n². Therefore here the expected ratio will be 1: 2: 4. By calculating the Bradford's law here it comes 1: 1.75: 1.04 and therefore it does not fit Bradford's law.

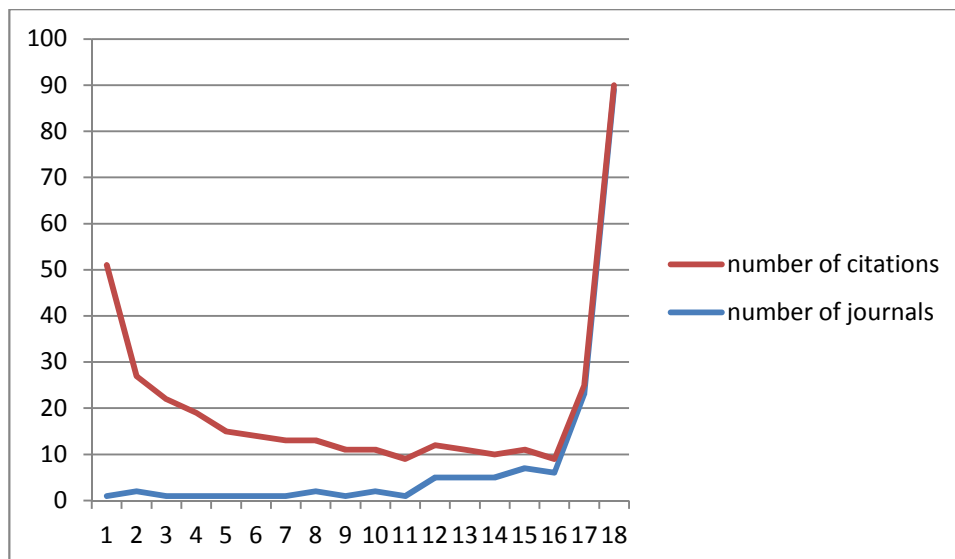


Fig.7: Bradford's Curve

Here X-axis marks number of journals and Y-axis marks number of citations. The graph does not prove the Bradford's law.

8 Core Journal List

Core journals of a subject are the journals that use for research and write literature more than other journals in the same and related fields. Here journals that received more than ten citations can be considered as core journals in Commerce.

Table 9: Core Journal List

No.	Journal Title	Rank	Number of Citation	Percentage of Citation
1	Economic and Political Weekly	1	50	9.86193
2	Cashew Bulletin	2	25	4.93097
3	Journal of Applied Psychology	2	25	4.93097
4	Pranjan	3	21	4.14201
5	Indian Journal of Industrial Relations	4	18	3.5503
6	The Management Accountant	5	14	2.76134
7	Administrative Science Quarterly	6	13	2.5641
8	The Cashew	7	12	2.36686
9	Agriculture Service Bulletin	8	11	2.16963
10	IBA Bulletin	8	11	2.16963
11	Professional Banker	9	10	1.97239

8.1 Geographical Distribution of Core Journals

Majority of the journals that found as core journal in Commerce are Indian journals. 11 journals were found as core journals in Commerce. Among these only one journal is foreign journal (Journal of Applied Psychology) and all other journals are Indian Journals.

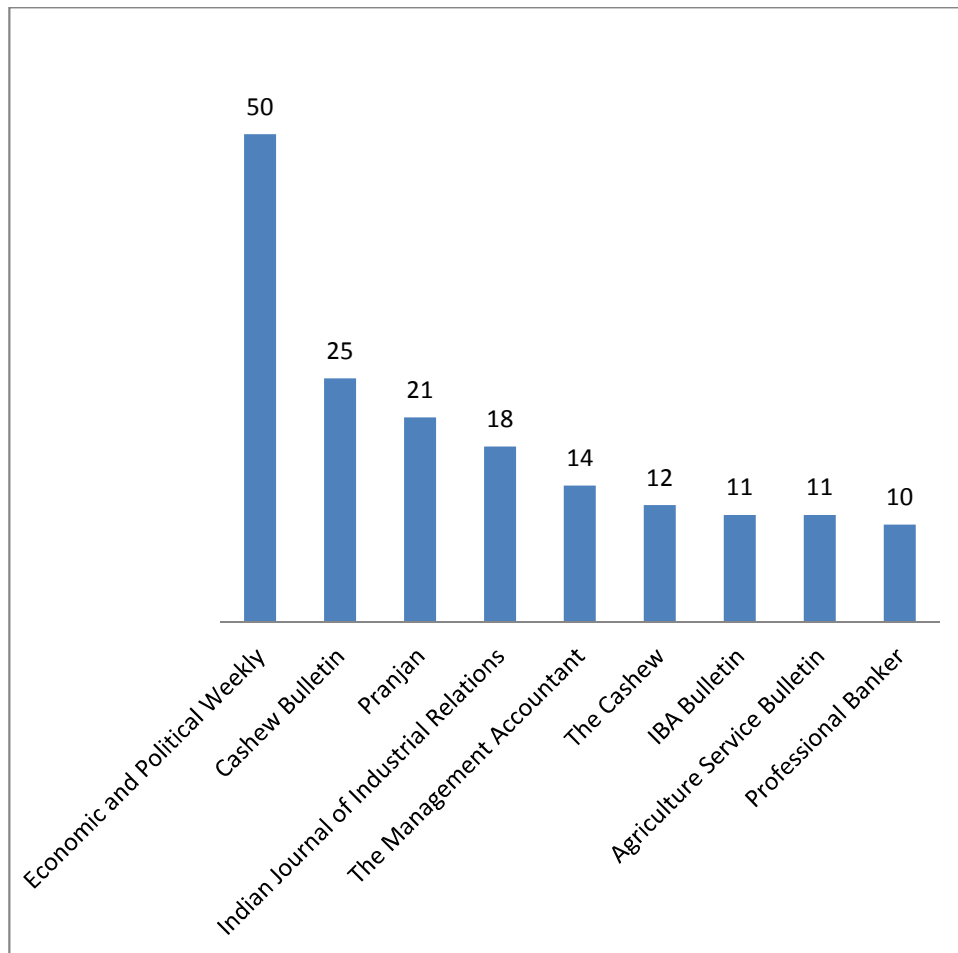


Fig. 8: Core Indian Journals

9 Core Books Study

Core books are studied on the basis of the number of times a particular title was cited.

Table 10: Ranked List of Core Books

Sl.No.	Rank	Book	No. of Citation	Percentage of Citation
1	1	Marketing Management	11	2.2368
1	2	Financial Management	8	1.6270
3	3	Management Accounting	7	1.4238
4	3	Organisational Behaviour	7	1.4238
5	4	Nationalisation of banks : retrospect and prospect	6	1.2195
6	5	Motivation and Job Satisfaction	5	1.0173
7	6	Corporation Finance	3	0.6098
8	6	Indian Economy	3	0.6098
9	6	Introduction to Financial Management	3	0.6098
10	6	Management Accountancy	3	0.6098
11	6	Marketing	3	0.6098

The study revealed that the title *Marketing Management* got the maximum citations among books cited with 11 citations and it is 2.2368% of total books cited. The title *Financial Management* got second rank with 8 citations (1.6270%). *Management Accounting* and *Organisational Behaviour* shared

third rank with 7 citations each. *Nationalisation of banks: retrospect and prospect* and *Motivation and Job Satisfaction* got 4th and 5th rank with 6 and 5 citations respectively. Six titles received 3 citations each. Among one is *Research Methodology* which is not come under the purview of Commerce. The above mentioned highly cited books can be considered as core books in Commerce that used by the researchers of University of Kerala. 24 books received 2 citations each and in total it is 9.756% of total books cited. Maximum number of titles received just one citation each. In total 382 titles received one citation each and it is 77.6423% of total books used. So it can say that only few books were cited more times and majority of books used only one time to write the theses. Table given below describes this in details.

Table 11: Number of Books in Each Rank

Rank	No. of Books	No. of Citations	Percentage	Cumulative Percentage
1	1	11	2.2356	2.2356
2	1	8	1.6260	3.8616
3	2	14	2.8455	6.7071
4	1	6	1.2195	7.9266
5	1	5	1.0163	8.9429
6	6	18	3.6585	12.6014
7	24	48	9.7561	22.3575
8	382	382	77.6429	100.00
Total	418	492	100	100

10 Self Citation Study

The self citation of an author refers to those cited references, which have been authored or co-authored by the same citing author. The amount of self citation in a bibliographic data can be determined by calculating the degree of self citation. The degree of self citation is the ratio between number of self cited

documents to the sum of number of self cited documents and number of non-self cited documents. The degree of self citation will be a number between '0' and '1'.

On analyzing all the ten theses it revealed that only one researcher, Shina D, cited her on article. She cited three articles that published earlier. Among 1307 citations only three were self cited. So the degree of self citation is very less.

$$\text{Degree of self citation, (DSc)} = \frac{Sc}{NSc}$$

Where *DSc* is the degree of self citation, *Sc* is number of self cited documents, and *NSc* is the Non-self cited documents.

Here *Sc* = 3, *NSc* = 1304

$$DSc = \frac{3}{3+1304} = 0.0022953$$

11 Subject wise Distribution of Documents Cited

Subject wise distribution study helps to understand the amount of documents that used by the researchers in each subjects. It will help to understand major area of research and the collection development policy can be made based on this analysis. For this purpose the documents are classified in to nine main subject fields such as Industry, Banking, Finance, Human Resource Management, Marketing, Agri-business, Tourism, Business Management, Public Administration and other fields of study as a tenth class.

Table 12: Subject wise Distribution of Documents Used

No.	Subject	No. of citations	Percentage of citations
1	Industry	101	7.73
2	Banking	243	18.59
3	Finance	234	17.90
4	Human Resource	274	20.96

	Management		
5	Marketing	28	2.14
6	Agri-business	178	13.62
7	Tourism	79	6.04
8	Business Management	47	3.60
9	Public Administration	60	4.59
10	Others	63	4.83
Total		1307	100

On analysing this data it revealed that Human Resource Management (20.96%), Banking (18.59%) and Finance (17.90%) used more with first, second and third position respectively. Other subjects cited are Agri-business (13.62%), Industry (7.73%), Tourism (6.04%), other subject fields (4.83%), Public Administration (4.59%) and Business Management (3.60%). The least number of citations is received by marketing and it is 2.14% of total citations made. This information can be represented diagrammatically as follows.

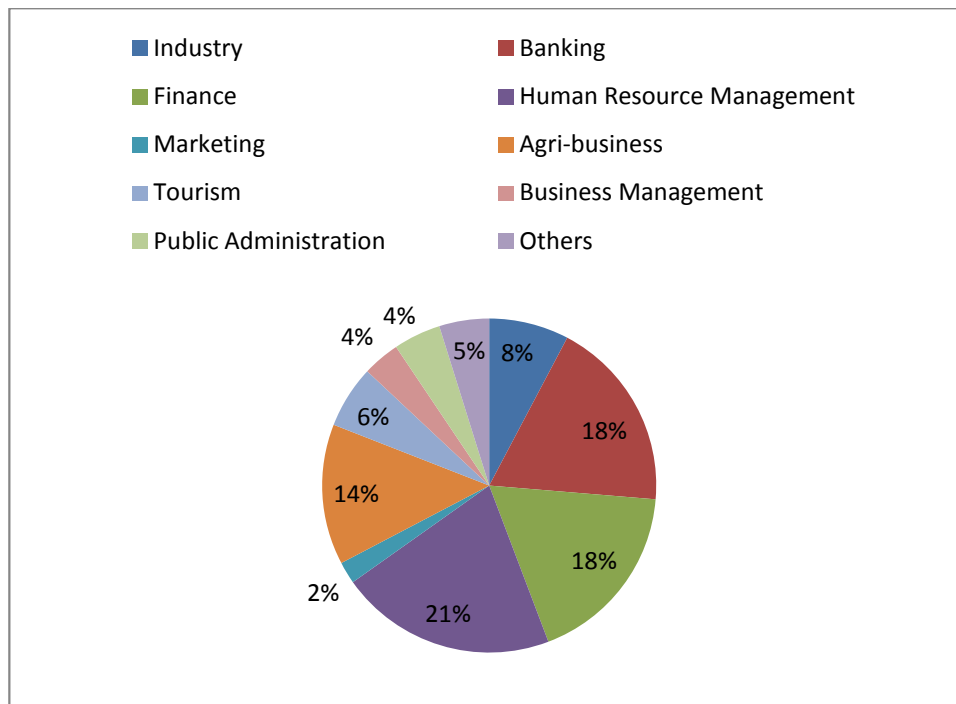


Fig. 9: Subject wise Distributions of Documents Used

12 Subject Wise Distribution of Journals Used

Journals are the main source of reference in every field of research. In this study nearly 40% of the documents used were journals. The subject analysis of 507 journal citations will help to map the subject coverage under Commerce research. The following table analyse the journal citations in all ten theses under this study.

Table 13: Subject Wise Distribution of Journal Used

No.	Subject	No. of citations	Percentage of citations
1	Human Resource Management	106	20.9074
2	Banking	93	18.3432
3	Finance	90	17.7515
4	Agri-business	69	13.6094
5	Industry	39	7.6923
6	Tourism	31	6.1144
7	Public Administration	26	5.1282
8	Others	24	4.7337
9	Business Management	18	3.5503
10	Marketing	11	2.1696
Total		507	100

The study found that the subject Human Resource Management got highest number of citation among journal article literature with 106 citations and it is 20.9074% of total journals cited. Other major subjects cited are Banking (18.3432%), Finance (13.6094%), Industry (7.6923), Tourism (6.1144), Public Administration (5.1282%), Business Management (3.5503%) and Marketing (2.1696%). Other discipline including Law, Medicine, Statistics, Research Methodology, etc constitute 4.7337 % of total journal articles cited.

13 Subject Wise Distribution of Books Used

Books are the major source of reference after journal articles for writing theses in this study. So libraries for Commerce research must attention in the balanced collection of books in all the relevant subject fields. In order to do this the library authorities must know the amount of books needed in each subject. The subject analysis of books used by the researchers will help to quantify amount of books needed in each discipline. Here 492 citations are received by books and these citations are analysed in the table below.

Table14: Subject Wise Distributions of Books Used

No.	Subject	No. of citations	Percentage of citations
1	Human Resource Management	103	20.9350
2	Banking	91	18.4959
3	Finance	88	17.8862
4	Agri-business	67	13.6179
5	Industry	38	7.7236
6	Tourism	29	5.8943
7	Others	23	4.6748
8	Public Administration	22	4.4715
9	Business Management	17	3.4553
10	Marketing	14	2.8455
Total		492	100

The analysis revealed that more citation is made in the subject Human Resource Management and it is 20.9350% of total books cited. In the subsequent positions Banking (18.4959%), Finance (17.8862%), Agri-business (13.6179%), Industry (7.7236%), Tourism (5.8943%), Public Administration (4.4715%), Business Management (3.4553%) and Marketing (2.8455%). Other discipline including Law, Medicine, Statistics, Research Methodology, etc constitute 4.6748% of total books cited.

14 Ranking of Authors

Total 1550 author citations were drawn from 1237 authors. The authors on the basis their frequency of occurrence in the citations was grouped in to 11 ranks. The number of authors within first five ranks was one each. Later ranks showed increase in number of authors in each rank and the last rank contained maximum number of authors (1089). This indicates that in lower ranks number of authors were available than in the upper ranks. **Table 4.15 Number of**

Table 15: Authors in Each Rank

No.	Rank	Number of Citations	Number of Authors	Total Citations	Cumulative Citations	Percentage of Citations	Cumulative Percentage
1	1	55	1	55	55	3.5484	3.5484
2	2	17	1	17	72	1.0968	4.6452
3	3	13	1	13	85	0.8387	5.4839
4	4	10	1	10	95	0.6452	6.1291
5	5	7	1	7	102	0.4516	6.5807
6	6	6	2	12	114	0.7742	7.3549
7	7	5	5	25	139	1.6129	8.9678
8	8	4	11	44	183	2.8387	11.8065
9	9	3	28	84	267	5.4194	17.2259
10	10	1	97	194	461	12.5161	29.7420
11	11	1	1089	1089	1550	70.2580	100.00
Total	1237	1550	1550	100.00	100.00	100.00	100.00

From the analysis of 1550 citations of 1237 authors it is found that Molan P (3.5484%), Wilkins A L (1.0968%), Tan S T (0.8387%), Porter L W (0.6452%) and Steers R M (0.4516) occupied the first five positions respectively. One thing revealed from this is all these authors were foreign. In subsequent ranks two authors shared 6th rank with 0.7742%, five authors shared 7th rank with 1.6129%, 11 authors in the 8th position with 2.8387%, 28 authors in the 9th rank with 5.4194%, in the tenth position 97 authors with 12.5161% and in the final rank 1089 authors with 70.2580% of total author

citations respectively. This shows that the majority of the authors cited were received just single citation each.

Discussion

The journal articles are cited more and it is 38.79% of total documents cited. Second highest citation is received by books (37.64%), followed by reports (13%), theses and dissertations (5.36%), conference proceedings (2.53%) and newspaper articles (2.14%). An important finding in the document type study is that the researchers used electronic documents very few and it is less than one percentage (0.545%) of total documents cited.

By analysing the ranked list of journals based on the number of citation received it revealed that *Economic and Political Weekly* (50) got highest number of citation. *Cashew Bulletin* and *Journal of Applied Psychology* came in the second position with 25 citations each. The journal *Pranjan* is in the third position with 21 citations. *Indian journal of Industrial Relations* got fourth rank with 18 citations. *The Management Accountant* (14 citations), *Administrative science quarterly* (13 citations) and *The Cashew* (12 citations) got fifth, sixth and seventh rank respectively. *Agriculture Service Bulletin* and *IBA Bulletin* shared eighth rank with eleven citations each. The journal *Professional Banker* got ninth rank with ten citations. Among 154 total journals cited other 143 journals got less than 10 citations. Among that the highest in number is journals which got only one citation. 89 journals received just only one citation each. 23 journals received 2 citations, 6 journals received 3 citations, 7 journals received 4 citations, 5 journals received 5 citations, 5 journals received 6 citations, 5 journals received 7 citations, 1 journal received 8 citations and 2 journals received 9 citations each. Indian journals were used less in number but they got maximum citation.

Majority of the literature used was by personal authors. Works by Institutional authors cited nearly 10% of the total works cited. Edited works and works by anonymous authors cited very low number of citations.

Analysing the number of authors of each citation it found that majority of the cited works are by single authors. The number of citation in other categories such as two authors, three authors and multiple authors goes on decreasing.

Indian publications more and it is 70.65% of total documents used. Foreign publications are only 29.35%. Among the foreign publications the highest citation is received by USA and it is 19.12% of total citations. U K received 4.43%, New Zealand received 2.98% and Australia received 1.53% of total citations. Singapore and Japan received 0.53% and 0.22% respectively. Countries such as Canada, Finland, France, Italy, South Africa and Switzerland received just a single citation.

The latest document used is published in the year 2007 and the oldest one in the year 1923. In order to make the study convenient the documents are classed in to a ten year period. The decade 1991-2000 got highest citation (35.73%). It shows that the much used documents are produced in the preceding decade of the study. In the second and third position 2001-2010 (22.42%) and 1981-1990 (20.43%) periods respectively. All together the documents produced in the recent three decade were much used and got 78.58% of total citation. Then it shows a gradual decrease in the number of citations and from 1921-1930 to 1971-1980 it got only 21.42% of total citation.

The study of time lag of citation revealed that more than a half of total citations were made within the 15 years of its publication. This shows that Commerce researchers use current literature for their research. Bradford's law is not fit with Commerce literature. It found that only one researcher made self citation in her theses. She made three self citations and when it compared to total 1307 citations the rate of self citation is very less. Degree of self citation = 0.0022953.

The scattering of literature among different subjects include core areas of Commerce to distant areas like public administration. The highest number of citation is received by Human Resource Management. Other major subject

fields are Banking, Finance and Agri-business. Industry, Tourism, Business Management and Marketing are the other subjects in the Commerce. Among other subjects the highest number of citations is made by Public Administration. There are many other subjects are cited in less number. It is found that the literature used in Commerce research is not confined to a specific field or specialised subject, but from different fields. From the individual analysis of books and journal citation it revealed that the subject Human Resource Management is most cited subject field. Public Administration, which is a distant field from the core area of Commerce were cited many times and this occupy more than some core areas of Commerce. Ranking of authors was made on the basis of number of citations received. The first five positions only one authors each was there. In the subsequent positions the number of authors increasing and in the final rank, which occupies authors with single citation, having maximum number of authors. This shows that majority of the cited authors were just received a single citation and the top ranked authors were few in number.

Suggestions

1. The selection policy must be framed with equal emphasis for both books and journals.
2. Researchers should be encouraged to use electronic documents so that very recent information can use for research without any delay.
3. The journal found as highly cited should subscribe and journals with low rate of citations should acquire from other information centres or subscribe them article wise if they are available online when needed.
4. Indian literature is mostly demanding and it should include in the collection than foreign literature.

5. The composition of subject in the collection should be maintained as per the composition of different subject cited by the researchers. This will help maintain a balance between supply and demand.

Conclusion

Bibliometric analysis is a process of mapping subjects and to understand different bibliometric factors. The bibliometric studies may be using full text or the bibliometric data attached to the literature as data for research. Here in this study it used citation data that attached with ten Commerce theses for the bibliometric analysis. Form the study it revealed the nature of researchers in using different kind of literature. The study helped to found the attributes of literature that are useful for researchers in Commerce. Information gained through the study is helpful to made collection development activities of Commerce research centres and for the development of a research support information system for Commerce.

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