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BIBLIOMETRIC STUDY OF BIBLIOGRAPHY CITATIONS IN PH.D. THESES IN PHYSICAL SCIENCES ACCEPTED BY THE COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY (CUSAT), COCHIN: 1990-2012

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Abstract: The present study investigated the preferences and usage of different types of resources used by the research scholars from Cochin University of Science and Technology, Cochin to write PhD theses in the discipline of physical Sciences. The citations examined different type of literature cited such as journal articles, books, Conferences, Manuals, Patents, Reference books, Dissertations, Reports, Electronic Resources, Standards, Monographs, Magazines, Unpublished and Unidentified. The results indicate that researchers have cited nearly 83.09% of journals used for their research; the researchers have cited more foreign journals.

Keywords: Bibliometrics, Citation Study, PhD Theses, Bibliographies, physical Sciences physics and Chemistry.

1.0 Introduction

Bibliometrics is that branch of information science that attempts to analyses quantitatively the properties and behavior of recorded knowledge. Thus, it is a quantitative study of several of literature on a topic and to use to identify the pattern of publication, authorship citations, and secondary journal coverage with the objective of getting an insight into the dynamics of the growth of knowledge in the areas under consideration. Consequently all this leads to the better organization of information resources for its most effective and efficient use. In recent years, bibliometrics has attained sophistication and complexity having national, international and inter-disciplinary character.

2.0 Review of related literature

The review of literature is an important component of any research activity. It depicts the nature and quantum of research already done on the subject studied and further reveals the trend and direction in which the subject passes through. It also facilitates the researcher with information on methods adopted and tools and techniques used. It gives bird's eye view of the research carried on in related areas. Thus review of literature is helpful in planning and carrying out research and it is a continuous process.

In order to get an idea about the past studies conducted in the area of citation analysis and related areas, an exhaustive literature survey was carried out. This study gave an idea about what has already been done in publication pattern analysis, how these analysis have been carried out and what methodologies have been followed.

3.0 Methodology:

The analysis has been carried out on the total citations appended to the theses in Physical Sciences as a whole, and also on the citations in the theses belonging to the two sub-disciplines of Physical Sciences. This facilitates comparison of the results, and also enables better insight of literature use pattern in the different sub-disciplines of Physical Sciences. The methodology employed for the analysis of citations is described in the following subsections.

4. 0 Objectives of The Study:

The objectives of the present study are:

1. To find out the Year wise distribution of theses in Physical Sciences
2. To find out the Year wise distribution of theses in Physics
3. To find out the Year wise distribution of theses in Chemistry
4. To find out the various sources of literature consulted by researchers in Physical Sciences
5. To find out the various sources of literature consulted by researchers in Physics
6. To find out the various sources of literature consulted by researchers in Chemistry

5.0 Data Analysis

Table-5.1 Year wise distribution of theses in Physical Sciences

S.No	Year of Submission	Number	Percentage	Cumulative Number	Cumulative Percentage
1	1990	7	4.09	7	4.09
2	1991	6	3.51	13	7.60
3	1992	9	5.26	22	12.86
4	1993	6	3.51	28	16.37
5	1994	2	1.17	30	17.54
6	1995	7	4.09	37	21.63
7	1996	4	2.34	41	23.97
8	1997	5	2.92	46	26.90
9	1998	4	2.34	50	29.24
10	1999	4	2.34	54	31.58

11	2000	3	1.75	57	33.33
12	2001	4	2.34	61	35.67
13	2002	10	5.85	71	41.52
14	2003	8	4.68	79	46.20
15	2004	9	5.26	88	51.46
16	2005	2	1.17	90	52.63
17	2006	11	6.43	101	59.06
18	2007	9	5.26	110	64.32
19	2008	22	12.87	132	77.19
20	2009	13	7.60	145	84.79
21	2010	13	7.60	158	92.39
22	2011	10	5.85	168	98.24
23	2012	3	1.75	171	100.00

Table 5.1 shows that out of 171 theses in Physics, the highest numbers of theses (22) were awarded in the year 2008, followed by 13 theses in2009 and 2010, the lowest number of theses (2) was awarded in the year 1994 and 2005.

Table-5.2 Year wise distribution of theses in Physics

S.No	Year of Submission	Number	Percentage	Cumulative Number	Cumulative Percentage
1	1990	3	3.30	3	3.30
2	1991	4	4.40	7	7.70
3	1992	5	5.49	12	13.19
4	1993	4	4.40	16	17.59
5	1994	2	2.20	18	19.78
6	1995	2	2.20	20	21.98
7	1996	3	3.30	23	25.28
8	1997	4	4.40	27	29.67
9	1999	2	2.20	29	31.87
10	2001	2	2.20	31	34.07
11	2002	3	3.30	34	37.37
12	2003	4	4.40	38	41.76
13	2004	6	6.59	44	48.35
14	2005	2	2.20	46	50.55
15	2006	5	5.49	51	56.05
16	2007	5	5.49	56	61.54
17	2008	17	18.68	73	80.22
18	2009	7	7.69	80	87.92
19	2010	8	8.79	88	96.71
20	2011	2	2.20	90	98.90
21	2012	1	1.10	91	100.00

Table 5.2 shows that out of 91 theses in Physics, the highest numbers of theses (17) were awarded in the year 2008, followed by 8 theses in 2010, 7 theses in 2009, 6 theses in 2004, 5 theses in the year 1992, 2006 and 2007 respectively. The lowest number of theses (1) was awarded in the year 2012

Table-5.3 Year wise distribution of theses in Applied Chemistry

S.No	Year of Submission	Number	Percentage	Cumulative Number	Cumulative Percentage
1	1990	4	5.00	4	5.00
2	1991	2	2.50	6	7.50
3	1992	4	5.00	10	12.50
4	1993	2	2.50	12	15.00
5	1994	0	0	12	15.00
6	1995	5	6.25	17	21.25
7	1996	1	1.25	18	22.50
8	1997	1	1.25	19	23.75
9	1998	4	5.00	23	28.75
10	1999	2	2.50	25	31.25
11	2000	3	3.75	28	35.00
12	2001	2	2.50	30	37.50
13	2002	7	8.75	37	46.25
14	2003	4	5.00	41	51.25
15	2004	3	3.75	44	55.00
16	2005	0	0	44	55.00
17	2006	6	7.50	50	62.50
18	2007	4	5.00	54	67.50
19	2008	5	6.25	59	73.75
20	2009	6	7.50	65	81.25
21	2010	5	6.25	70	87.50
22	2011	8	10.00	78	97.50
23	2012	2	2.50	80	100.00

Table5.3 shows the out of 80 theses in Applied Chemistry, the highest numbers of theses (8) were awarded in the year 2011, followed by 7 theses in 2002, 6 theses in 2006 and 2009, 5 theses in the year 1995, 2008 and 2010 respectively.

Table 5.4 Bibliographic form-wise distribution of citations in Physical Sciences

S.No	Bibliographic Form	Number of Citations	Percentage	Cumulative Number	Cumulative Percentage
1	Journals	38058	83.09	38058	83.09
2	Books	5286	11.54	43344	94.63
3	Conferences	1003	2.19	44347	96.82
4	Manuals	360	0.79	44707	97.61
5	Patents	298	0.65	45005	98.26
6	Reference Books	296	0.65	45301	98.91
7	Dissertations	262	0.57	45563	99.48
8	Reports	147	0.32	45711	99.8
9	Electronic Resources	65	0.14	45777	99.94
10	Standards	10	0.02	45787	99.96
11	Monographs	4	0.01	45790	99.97
12	Magazines	3	0.01	45792	99.98
13	Unpublished	6	0.01	45798	99.99
14	Unidentified	7	0.01	45805	100

5.4. Bibliographic form-wise distribution of citations:

The distribution of citations among different bibliographic forms in Physical Sciences is shown in Table 5.4 and is represented graphically in Figure 5.1.

It is observed from the table that out of the total number of items cited, journals contributed the highest number of citations, accounting for 83.09 percent. This indicates that scientific journals are the most important source of information used by the researchers in Physical Sciences.

General books are the second most cited source accounting for 11.54 percent of the total citations. Conferences are the third most cited source accounting for 2.19 percent of the total citations. Manuals accounts for 0.79 percent, Patents and Reference books accounts for 0.65 percent each.

Dissertations occupy the next position with 262 citations accounting for 0.57 percent of the total citations. Out of these 262 citations, 224 citations are to the dissertations accepted by Indian Universities accounting for 4.39 percent of the total citations, and out of these 224 citations, 198 citations are to the dissertations accepted by Cochin University of Science and Technology, Cochin, in the fields of Physics, Chemistry, Marine Sciences, Geophysics, Life sciences, Engineering and Geography accounting for 3.48 percent of the total citations. This clearly indicates, the inaccessibility of dissertations of other developed countries, to Indian researchers, mainly due to the fact that dissertations are unpublished documents.

Reports account for 0.32 percent of the total citations, followed by Electronic resources (0.14%), Standards (0.02%), Monographs (0.01%), Magazines (0.01%), Patents (0.01%) and unpublished documents (0.01%).

The last category of unidentified items, with 7 citations accounts for 0.01 percent of the total citations. The citations Chemical abstract accounting for 0.005 percent of the total citations. The remaining 0.05 percent of citations is distributed among Physics Abstracts.

Figure 5.1 Bibliographic form-wise distribution of citations in Physical sciences

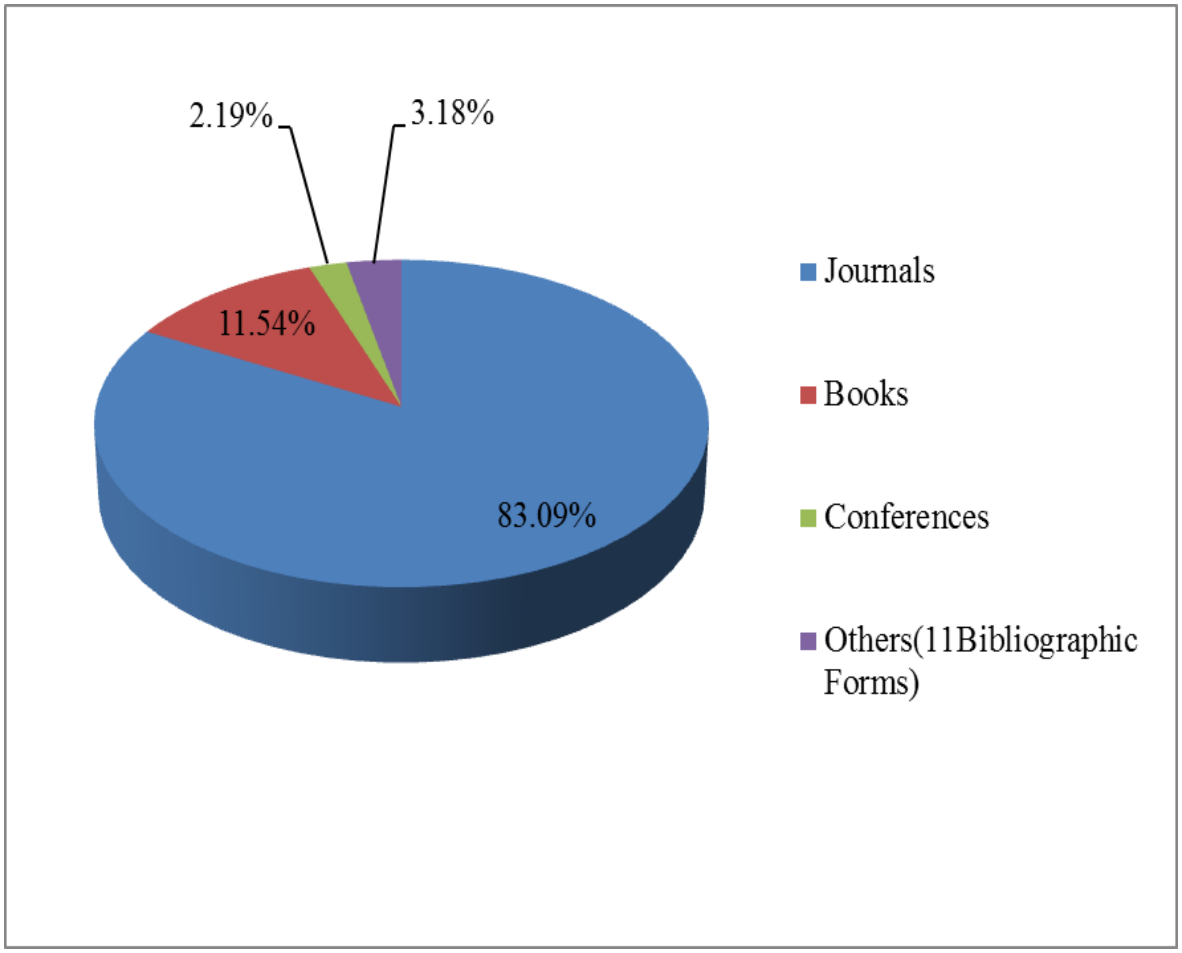


Table 5.5 Bibliographic form-wise distribution of citations in Physics

S.No	Bibliographic Form	Number of Citations	Percentage	Cumulative Number	Cumulative Percentage
1	Journals	15016	78.06	15016	78.06
2	Books	2351	12.22	17367	90.28
3	Conferences	882	4.58	18249	94.86
4	Manuals	360	1.87	18609	96.73
5	Reference Books	287	1.49	18896	98.22
6	Dissertations	185	0.96	19081	99.18
7	Reports	111	0.58	19193	99.76
8	Electronic Resources	17	0.09	19210	99.85

9	Standards	7	0.04	19217	99.89
10	Patents	5	0.03	19222	99.92
11	Monographs	4	0.02	19225	99.94
12	Magazines	1	0.01	19226	99.95
13	Unpublished	6	0.03	19232	99.98
14	Unidentified	5	0.02	19237	100.00

Table 5.5 and is represented graphically in Figure 5.2.

It is observed from the table that out of the total number of items cited, journals contributed the highest number of citations, accounting for 78.06 percent. This indicates that scientific journals are the most important source of information used by the researchers in Physics.

General books are the second most cited source accounting for 12.22 percent of the total citations. Conferences are the third most cited source accounting for 4.58 percent of the total citations. Remaining other bibliographies are 5.14 percent.

Figure 5.2 Bibliographic form-wise distribution of citations in Physics

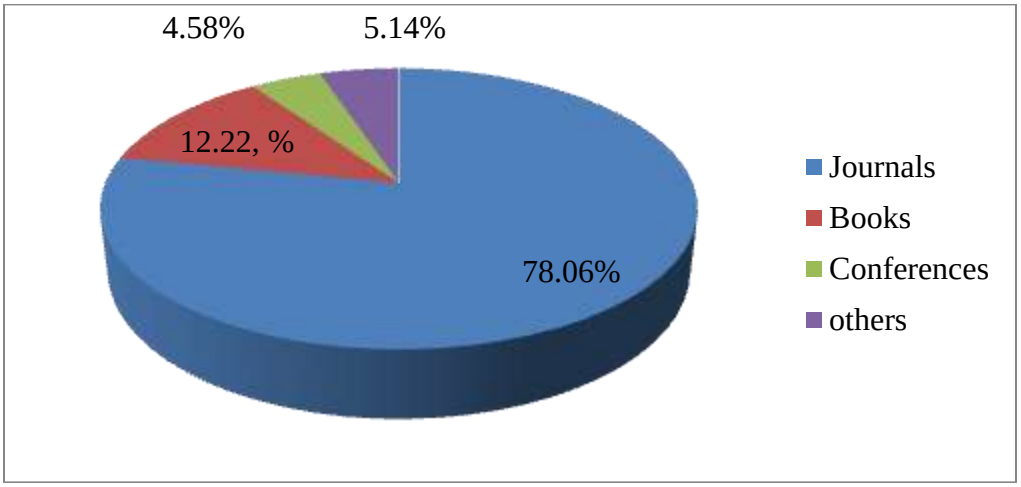


Table 5.6 Bibliographic form-wise distribution of citations in Chemistry

S.No	Bibliographic Form	Number of Citations	Percentage	Cumulative Number	Cumulative Percentage
1	Journals	23042	86.73	23042	86.73
2	Books	2935	11.05	25977	97.78
3	Patents	293	1.10	26270	98.88
4	Conferences	121	0.45	26391	99.33
5	Dissertations	77	0.29	26468	99.62

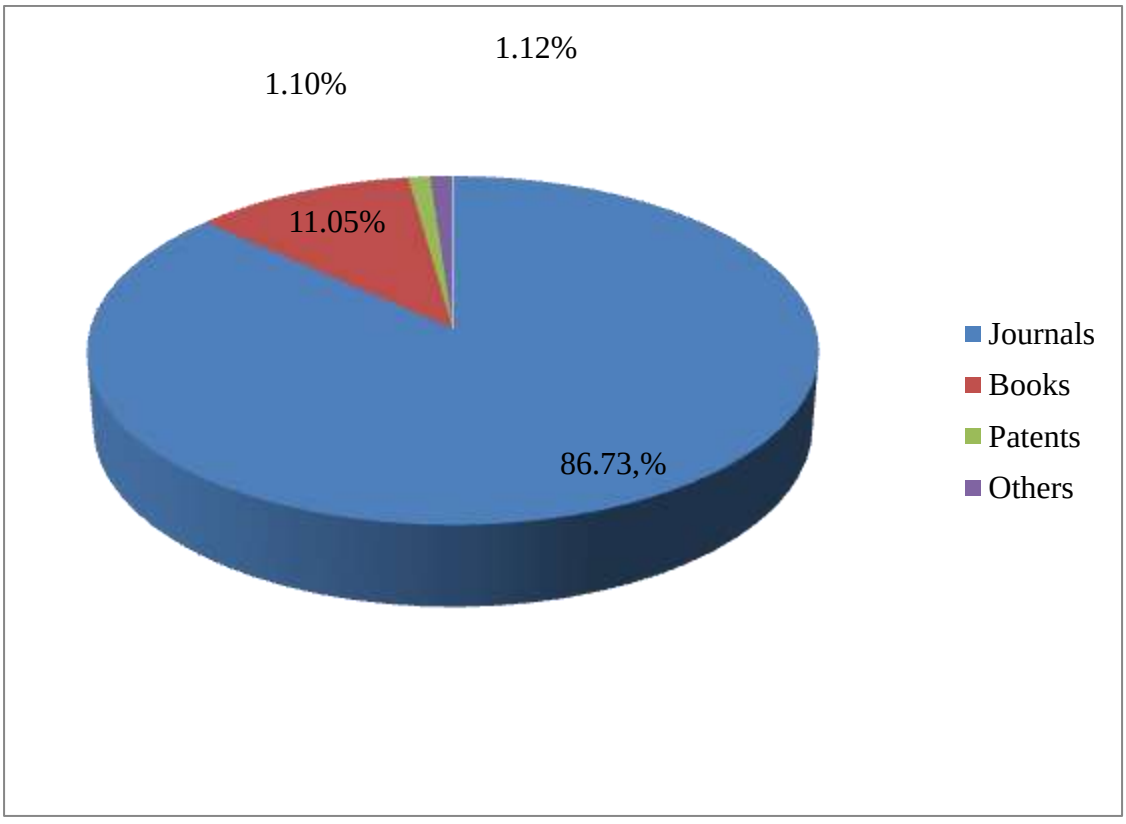
6	Electronic Resources	48	0.18	26517	99.80
7	Reports	36	0.14	26553	99.94
8	Reference Books	9	0.03	26562	99.97
9	Standards	3	0.01	26565	99.98
10	Magazines	2	0.01	26566	99.99
11	Unidentified	2	0.01	26568	100.00

Table 5.6 and is represented graphically in Figure 5.3.

It is observed from the table that out of the total number of items cited, journals contributed the highest number of citations, accounting for 86.73 percent. This indicates that scientific journals are the most important source of information used by the researchers in Physics.

General books are the second most cited source accounting for 11.05 percent of the total citations; patents are the third most cited source accounting for 1.10 percent of the total citations. Remaining other bibliographies are 1.12 percent.

Figure 5.3 Bibliographic form-wise distribution of citations in Chemistry



6.0 Finding and conclusion

This investigation brought out the following point from the 171 theses. Table 5.1 shows that out of 171 theses in Physics, the highest numbers of theses (22) were awarded in the year 2008,

followed by 13 theses in2009 and 2010, the lowest number of theses (2) was awarded in the year 1994 and 2005.

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General books are the second most cited source accounting for 11.05 percent of the total citations; patents are the third most cited source accounting for 1.10 percent of the total citations. Remaining other bibliographies accounted 1.12 percent.

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