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CITATION PATTERN IN Ph.D. THESES IN THE FIELD OF PHILOSOPHY: A STUDY OF PANJAB UNIVERSITY, CHANDIGARH

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Abstract

The present study is based on the 8223 citations appended in the 26 doctoral theses of Philosophy submitted to Panjab University, Chandigarh, for the award of doctoral degree during 2002-2012. The main purpose of this study was to investigate authorship pattern of the citations, type and form of literature cited, and to compile a ranked list of journals in Philosophy. The study revealed that books were the most preferred sources of information used by the researchers in the field of Philosophy accounting for 40.67% of total citations, followed by journals with 17.99% citations. Badford's law of scattering was used to identify the core journals in the field of Philosophy.

Keywords: Citation Analysis; Authorship Pattern; Journals Ranking; Bibliographic Form; Ph.D. Theses; Panjab University; Philosophy.

1. Introduction

A citation is a bibliographical entry in a footnote, reference list or bibliography of a section or full document that contains information to verify the original documents for purpose of acknowledging the relevance of work of others. Analysis of citation is common in all the disciplines of knowledge - Sciences, Social Sciences as well as Humanities. Citation studies have been carried out to gain insight into approaches to citations, citation patterns and citation behavior for mapping of disciplines. Diodato (1994) defined citation analysis as "a wide-ranging area of bibliometrics that studies the citations to and from documents. Such studies may focus on

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the documents themselves or on such matters as: their authors; the journals (if the documents are journal articles) in which the articles appear; the organizations or countries in which the documents are produced; the purpose of the citations”. According to Ravichandra Rao (1983), “the main objectives of 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”.

1.1. Significance of Citation analysis

Citation analysis leads the readers to further studies in their field. It helps in studying the usage pattern of different types of documents, study the use of literature from different countries, study the scattering of subjects, decide the obsolescence rate of documents in different subjects, determine the interdependence and lineage of subjects, prepare ranked list of periodicals, study the rate of collaborative research and analyse the scientific journals. Citation analysis enables researchers to learn more about a field or a topic by identifying significant works in that area. Moreover, it finds out the impact of a particular author within his/her own discipline and other disciplines by analyzing the total number of citations in his own discipline and in other disciplines. The present study analyses the citations appended in the doctoral theses submitted to the Department of Philosophy at Panjab University (Chandigarh).

1.2. Department of Philosophy (Panjab University, Chandigarh)

As per Handbook of Information (2015), the Department of Philosophy has been providing a university base to the cultural, social and religious heritage of Indian civilization to humanize and enrich the modern notion of progress and to enable it to promote, rather than to supplant, Indian cultural and philosophical identity. To respond to the challenges of our global times, the department has initiated the need for a process of convergent research. This has come from the faculty as they generate a philosophical insight in facing the deepest human aspirations and problems. Accordingly, the department has been successfully organizing national and regional seminars pertaining to community values, intercultural cooperation, and the philosophy of consciousness during the past years. Currently, the Department of Philosophy is having four full time faculty members and offers M.A., M. Phil. and Ph.D. courses. More than 80 research scholars have already been awarded the doctoral degree since the inception of the department

and 28 research scholars are currently pursuing their research work for the award of doctoral degree.

2. Review of Literature

Sangam and Mogali (2013) in their study entitled ‘Obsolescence of literature in the field of Social Sciences’ examined 1271 citations from 283 articles in three journals namely ‘The Journal of Social & Economic Development’, ‘The Journal of Polity and Society’ and ‘The Journal of Social Change’. The result of their study show that half-life of literature was 9.04, annual ageing factor was 0.9262, utility factor was 13.55 and corrected obsolescence was 0.9482. **Rayudu and Babu (2014)** in their study entitled ‘Citation analysis of Ph.D. theses in Philosophy submitted to University of Hyderabad’ analyzed 7,444 citations from 43 Ph.D. theses submitted during 1986-2012. They found that book was the most preferred bibliographic form of information (80.62%) used by the researchers, followed by journals, web resources, seminar and conference proceedings. They also revealed that majority of the citations were authored by single authors. Their study also revealed that UK was the largest producer of cited literature in the field of Philosophy, followed by U.S.A. and India. **Iroaganachi, Itsekor, and Osinulu (2014)** in their paper entitled ‘Citation analysis of social science research: A case study of bachelor degree research project reports of a Nigerian University 2009-2013’ revealed that the authors cited more from textbooks than the journals and Internet / electronic resources. The average of 39 citations per report was discovered. Geographical distribution of authors showed that the researchers generally cited more foreign authors than the local African authors. Their study also revealed that Marketing had the highest mean score of citation per project report with 50 citations, followed by accounting with 48 citations, Business Administration and International Relations with 46 citations each. The least average citation per report was that of Political science (27 citations).

3. Objectives of the study

The objectives of the present study included:

1. To observe the nature of authorship pattern in literature of Philosophy.
2. To examine the half-life of books and journals in Philosophy.

3. To observe the chronological distribution of citations in Philosophy.
4. To determine the national and international coverage of citations in the Philosophy discipline.
5. To study the distribution of citations of different information sources and their formats.
6. To determine the ranking of most cited journals in Ph.D. theses in Philosophy.

4. Research questions

The present study sought answers to the following questions:

1. What is the trend of authorship pattern in the Philosophy discipline?
2. What is the half-life of literature used in Philosophy discipline?
3. What is the average age of cited material in the Ph.D. theses submitted in Philosophy discipline at Panjab University, Chandigarh?
4. Which are the top cited journals in Philosophy discipline at Panjab University?
5. Which type of reading material is preferred by the Philosophy research scholars at Panjab University?
6. What are the most cited items in the Ph.D. theses submitted in Philosophy at Panjab University?

5. Research methodology

Keeping in view the objectives of the study, data was collected from 26 Ph.D. theses submitted during 2002-2012 in the Department of Philosophy at Panjab University (Chandigarh). The first step of this study was to select the theses (i.e., the source document) from which the data was collected. Citation/Bibliography of each thesis was recorded manually on a standardized card and then empirically analyzed. MS-Excel was also used wherever appropriate to store and analyse the data. The collected data was tabulated in terms of ranked list of journals, authorship pattern of books and journals, chronological pattern of cited sources, geographical pattern of cited sources, etc. The data was analysed by applying appropriate techniques and bibliometric laws. The simple counting citation technique and Bradford's Law was applied to

determine the core journals in the field of Philosophy. Further, half-life period of books and journal citations were also calculated.

6. Data analysis and interpretation

A total of 26 Ph.D. theses were submitted in the Department of Philosophy during 2002-2012, in which 8223 sources were cited by the researchers. The following section analyses the citations of such theses on the basis of various dimensions like year of submission, form of cited documents, authorship pattern, etc.

6.1. Year-wise submission of Ph.D. theses

Table 1 shows the year wise submission of Ph.D. theses in the Department of Philosophy at Panjab University during 2002- 2012.

Year of submission	No. of Ph.D. theses submitted	%
2002	1	3.85
2003	1	3.85
2004	2	7.69
2005	2	7.69
2006	4	15.39
2007	4	15.39
2008	2	7.69
2009	4	15.39
2010	2	7.69
2011	--	0
2012	4	15.38
Total	26	100

Table 1: Year-wise submission of Ph.D. theses submitted in the Department of Philosophy

The table depicts that the highest number of theses in Philosophy were submitted in 2006, 2007, 2009 and 2012 (4, 15.39%), whereas the least number of theses (1, 3.85%) were submitted in 2002 and 2003. It also shows that no thesis was submitted in the Department of Philosophy during 2011.

6.2. Form of cited documents

Table 2 and figure 1 below present the number of citations pertaining to different types of publications like journals, books, reports, Internet sources, conference proceedings, newspaper, etc.

Sr. no.	Form of cited documents	Count	Cumulative count	%	% of cumulative count
1	Books	3344	3344	40.67	40.67
2	Journals	1479	4823	17.99	58.66
3	Manuscripts	1300	6123	15.81	74.47
4	Reports	287	6410	3.49	77.96
5	Websites/Internet sources	672	7082	8.17	86.13
6	Government documents	207	7289	2.52	88.65
7	Theses/Dissertations	169	7458	2.05	90.07
8	Newspapers	168	7626	2.04	92.74
9	Survey reports	345	7971	4.2	96.94
10	Conference proceedings	195	8166	2.37	99.31
11	Unidentified sources	57	8223	0.69	100

Table 2: Form of cited documents in the Ph.D. theses in Philosophy

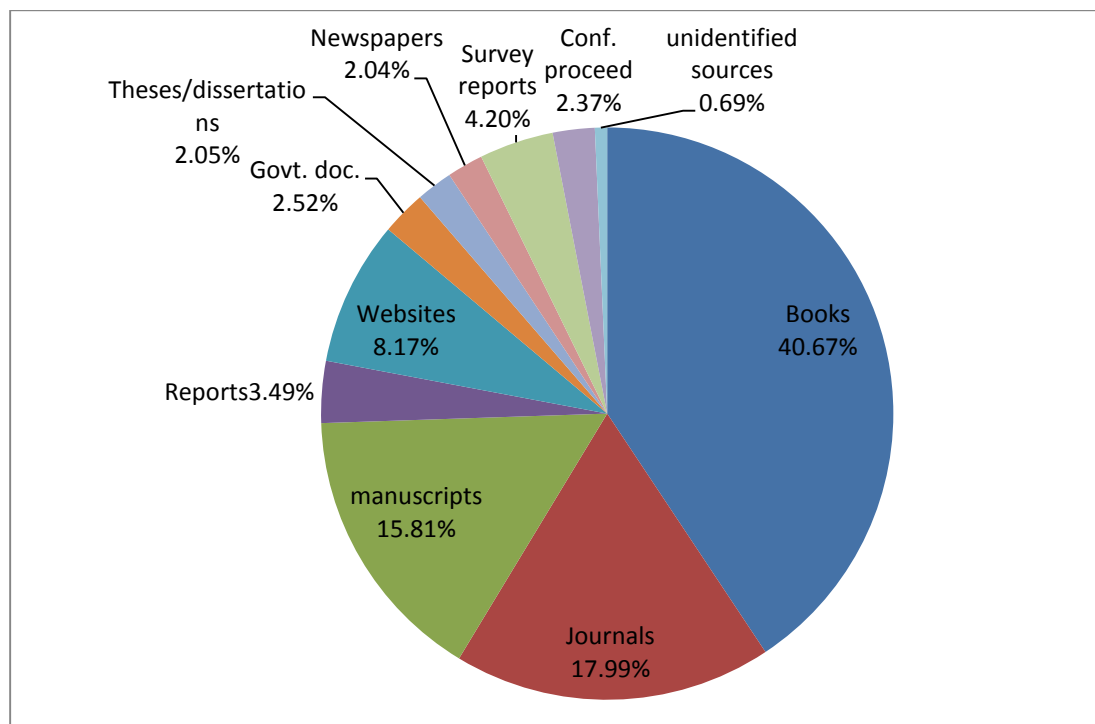


Figure 1: Form of cited documents in Philosophy

Table 2 and figure 1 reveal that out of 8223 citations cited in the Ph.D. theses submitted in the Department of Philosophy, books comprised the highest citations (3344, 40.67%), followed by journals' citations (1479, 17.99%), manuscripts (1300, 15.81%), reports (287, 3.49%), Websites/Internet sources (672, 8.17%), government documents (207, 2.52%), theses/dissertations (169, 2.05%), newspapers (168, 2.04%), survey reports (345, 4.2%) and conference proceedings (195, 2.37%). It also depicts that book citation is the most preferred source of information as compared to the other sources.

6.3. Authorship pattern in citations

Table 3 below shows the authorship pattern of citations in the Ph.D. theses submitted in the Department of Philosophy.

A total of 4823 citations to books and journals were analysed to ascertain the authorship pattern in the Ph.D. theses submitted to the Department of Philosophy, Panjab University (Chandigarh). Table 3 reflects the authorship pattern of the cited books and journals. Out of the total citations, books accounted for 3344 citations (69.33%), while journals accounted for 1479 citations (30.67%).

Authorship Pattern	Books				Journals					
	Citations	Cumulative citations	%	Cumulative %	Citations	Cumulative citations	%	Cumulative %	Total citations	% of total citations
Single	2994	2994	89.53	89.53	1268	1268	85.73	85.73	4262	88.37
Two	290	3284	8.67	98.20	167	1435	11.29	97.02	457	9.48
Three	49	3333	1.46	99.67	26	1461	1.76	98.78	75	1.56
More than three	11	3344	0.33	100	18	1479	1.22	100	29	0.60
Total	3344		100.00	--	1479		100.00	--	4823	100.00

Table 3: Authorship pattern of citations in Philosophy

It is clear from the above table that citation to single authorship is higher in books (2994, 89.53 %) as well as journals (1268, 85.73%). Two authors accounted for 290 citations (8.67%) to books and 167 citations (11.29%) to journals, followed by three authors with 49 citations

(1.46%) to books and 26 citations (1.76%) to journals. Citations to more than three authors were the least in books (11, 0.33%) and journals (18, 1.22%).

In order to find out the degree of research collaboration, a formula proposed by Subramanyam (1983) was applied to the data. The degree of collaboration of books was calculated as 0.10 (Appendix 1-a) and the degree of collaboration of authors in cited journal articles were calculated as 0.14 (Appendix 1-b). Collaborative index, which is the number of authors per paper, was calculated using the formula given by Lawani (1986). Collaborative Index for books was calculated as 1.12 (Appendix 1-c) and Collaborative Index for journals was calculated as 1.19 (Appendix 1-d). Collaborative coefficient was calculated as per the formula given by Ajiferuke (1983). Collaborative Coefficient of authors of books was calculated as 0.06 (Appendix 1-e) and collaborative coefficient of authors of journal articles was calculated as 0.07 (Appendix 1-f).

6.4. Obsolescence of cited literature

‘Half-life’ or ‘Obsolescence rate’ of the cited documents in the theses submitted in the Department of Philosophy were also calculated by analyzing the age of the cited documents. The obsolescence of journals and books cited in the theses is shown below:

6.4.1. Obsolescence of cited journals

Table 4 shows the obsolescence of journals as cited in 26 Ph.D. theses submitted in the Department of Philosophy at Panjab University (Chandigarh) during 2002-2012:

Age in years	No. of Citations	Cumulative Citations	%	% of Cumulative citations
1	10	10	0.68	0.68
2	5	15	0.34	1.02
3	19	34	1.28	2.30
4	21	55	1.42	3.72
5	30	85	2.03	5.75
6	12	97	0.81	6.56
7	23	120	1.56	8.12
8	52	172	3.52	11.63
9	28	200	1.89	13.53
10	53	253	3.58	17.11
11	56	309	3.79	20.90

12	37	346	2.50	23.40
13	34	380	2.30	25.70
14	53	433	3.58	29.28
15	58	491	3.92	33.20
16	29	520	1.96	35.16
17	44	564	2.97	38.14
18	47	611	3.18	41.32
19	30	641	2.03	43.34
20	40	681	2.70	46.05
21	23	704	1.56	47.60
22	56	760	3.79	51.39
23	37	797	2.50	53.89
24	29	826	1.96	55.85
25	31	857	2.10	57.95
26	20	877	1.35	59.30
27	41	918	2.77	62.07
28	27	945	1.83	63.90
29	29	974	1.96	65.86
30	18	992	1.22	67.08
>30 <110	487	1479	32.93	100.00

Table 4: Half-life of journal articles cited in the Ph.D. theses submitted in the Department of Philosophy

Table 4 presents the number of citations and their respective ages. It indicates that 85 journal citations (5.75%) are just 5 years old, 253 citations (17.11%) are 10 years old and 491 citations (33.20%) are 15 years old. The maximum age of the citations was found to be 110 years. This shows that the researchers in the Department of Philosophy cite journal articles published even 100 years back. The table also shows that half-life of 51.39% journal citations are 22 years. Figure 4.7 shows the half-life of journals for cumulative frequency of citations.

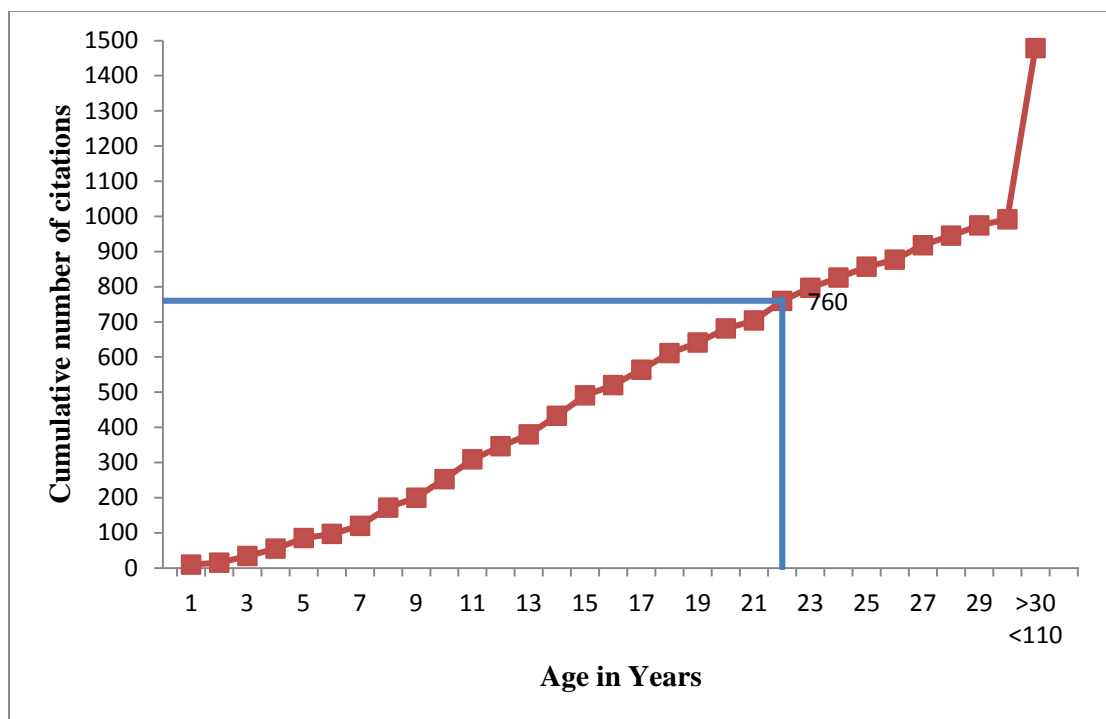


Figure 2: Bar graph showing half-life of journals for cumulative frequency of citations in Philosophy

The graph above shows that the time taken to cite 1479 citations was 110 years. It can be seen that the x-coordinate for 760 cumulative citations (half of the total citations) is 22 years. Thus, 22 years was found to be the half-life of journals cited in the theses submitted in Department of Philosophy at Panjab University (Chandigarh).

6.4.2. Obsolescence of cited books

Table 5 shows the obsolescence of books as cited in 26 Ph.D. theses submitted in the Department of Philosophy at Panjab University (Chandigarh) during 2002-2012:

Age in years	No. of Citations	Cumulative Citations	%	% of Cumulative citations
1	16	16	0.48	0.48
2	21	37	0.63	1.11
3	52	89	1.56	2.66
4	65	154	1.94	4.61
5	40	194	1.20	5.80
6	85	279	2.54	8.34
7	91	370	2.72	11.07

8	112	482	3.35	14.42
9	97	579	2.90	17.32
10	120	699	3.59	20.90
11	148	847	4.43	25.33
12	136	983	4.07	29.40
13	109	1092	3.26	32.66
14	81	1173	2.42	35.08
15	81	1254	2.42	37.50
16	51	1305	1.53	39.03
17	85	1390	2.54	41.57
18	51	1441	1.53	43.09
19	70	1511	2.09	45.19
20	53	1564	1.58	46.77
21	52	1616	1.56	48.33
22	40	1656	1.20	49.52
23	63	1719	1.88	51.41
24	32	1751	0.96	52.36
25	66	1817	1.97	54.34
26	29	1846	0.87	55.20
27	52	1898	1.56	56.76
28	57	1955	1.70	58.46
29	58	2013	1.73	60.20
30	42	2055	1.26	61.45
>30 < 112	1289	3344	38.55	100.00

Table 5: Half-life of books cited in the Ph.D. theses submitted in the Department of Philosophy

Table 5 depicts the number of citations and their respective ages. It indicates that 194 book citations (5.80%) are 5 years old, 699 citations (20.90%) are 10 years old and 1254 citations (37.50%) are 15 years old. The maximum age of the citations were found to be 112 years. This shows that the researchers in the Department of Philosophy use books published even 100 or more years back as well. The table also shows that more than half (51.41%) of the total citations are just 23 years old which indicates that half-life period of citations to books is 23 years. Figure 4.18 shows the half-life of books for cumulative frequency of citations:

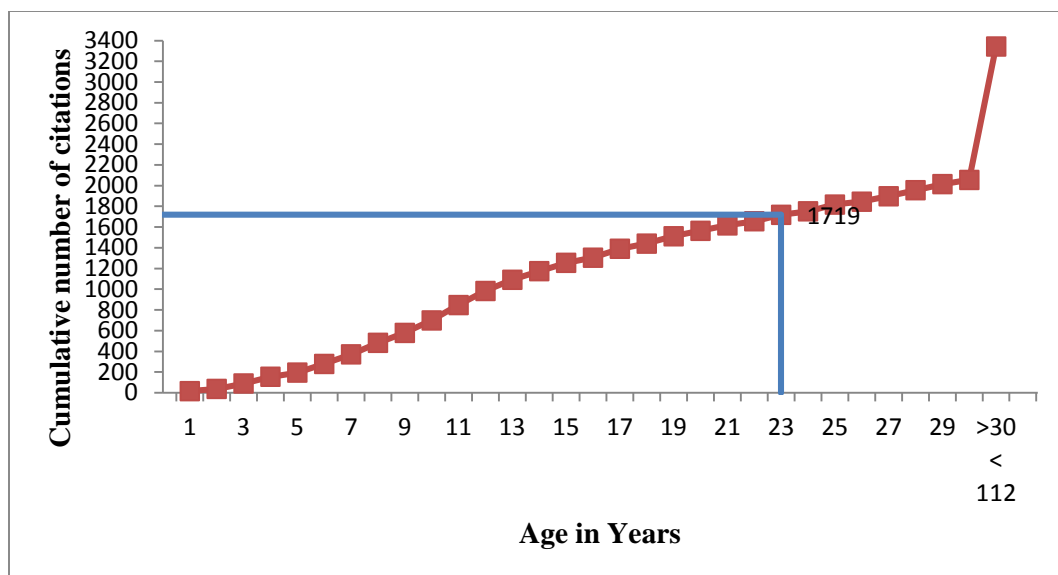


Figure 3: Bar graph showing half-life of books for cumulative frequency of citations in Philosophy

Figure 3 shows that the time taken to cite 3344 citations was 112 years. It can be seen that the x-coordinate for 1719 cumulative citations (half of the total citations) is 23 years. Thus, 23 years was found to be the half-life of books cited in the Ph.D. theses submitted in the Department of Philosophy at Panjab University (Chandigarh) during 2002-2012.

6.5. Chronological distribution of citations

Chronological distribution of citations in the Ph.D. theses in a particular field indicates whether the research carried out is up to date with the latest research taking place in that area or not. The citations analysed in the present study were distributed into groups of ten years each to know their chronological distribution.

6.5.1. Chronological distribution of citations to journals

Table 6 and figure 4 below show the decade-wise distribution of journal citations used in the Ph.D. theses submitted in the Department of Philosophy at Panjab University (Chandigarh):

Sr. no.	Period	Frequency of occurrence	Cumulative frequency	% frequency of frequency	% cumulative of frequency
1	Before1925	0	0	0	0
2	1926-1935	12	12	0.81	0.81

3	1936-1945	14	26	0.95	1.76
4	1946-1955	47	73	3.18	4.94
5	1956-1965	82	155	5.54	10.48
6	1966-1975	191	346	12.91	23.39
7	1976-1985	256	602	17.31	40.7
8	1986-1995	357	959	24.14	64.84
9	1996-2005	423	1382	28.6	93.44
10	2006-2012	97	1479	6.56	100

Table 6: Chronological distribution of citations to journals in Philosophy

Table 6 above clearly indicates that the highest number of journal citations belong to publications published during 1996-2005 (423, 28.6%), followed by 357 citations (24.14%) to journals that were published during 1986-1995, 256 citations (17.31%) to journals citations published during 1976-1985, 191 citations (12.91%) to journals published during 1966-1975, 97 citations (6.56%) to journals published during 2006-2012, 82 citations (5.54%) to journals published during 1956-1965, 47 citations (3.18%) to journals published during 1946-1955, 14 citations (0.95%) to journals published during 1936-1945 and 12 citations (0.81%) are to journals published during 1926-1935.

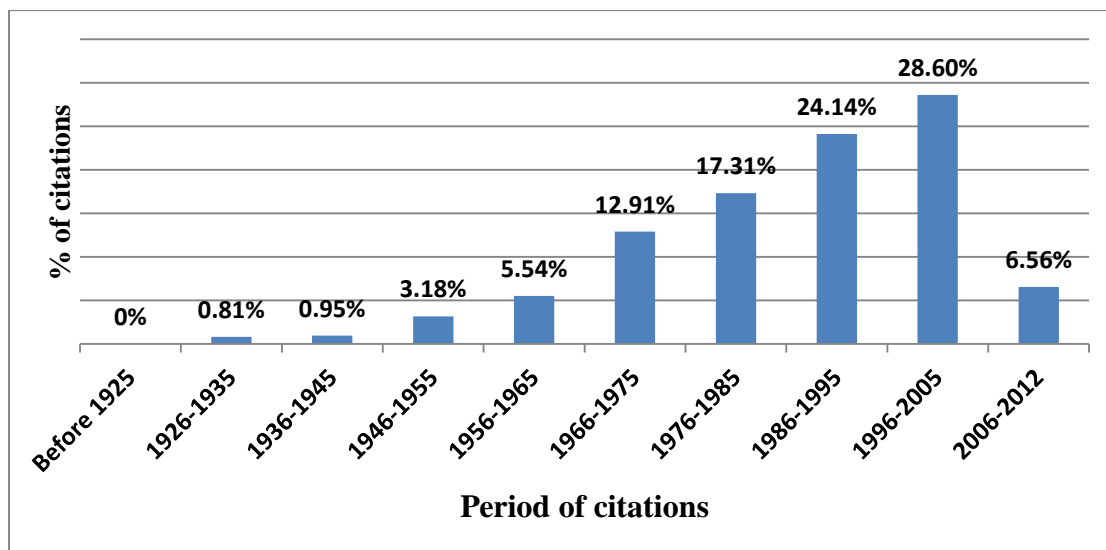


Figure 4: Chronological distribution of citations to journals in Philosophy

Figure 4 gives a pictorial representation of the chronological distribution of the citations to journal articles cited in the Ph.D. theses submitted in the Department of Philosophy at Panjab University (Chandigarh). It shows that the highest citations were gained by the journal articles published during 1996-2005. The figure also shows that there has been a steady growth in citations till the time period of 1986-1995. It can be also seen from the figure that there has been a steep decline in citations to journal articles from 1996-2005 to 2006-2012.

6.5.2. Chronological distribution of citations to books

Table 7 and figure 5 shows the decade-wise distribution of book citations used in the Ph.D. theses submitted in the Department of Philosophy at Panjab University (Chandigarh):

Sr. no.	Period	Frequency of occurrence	Cumulative frequency	% of frequency	% of cumulative frequency
1	Before 1925	4	4	0.12	0.12
2	1926-1935	17	21	0.51	0.63
3	1936-1945	35	56	1.05	1.68
4	1946-1955	92	148	2.75	4.43
5	1956-1965	169	317	5.05	9.48
6	1966-1975	421	738	12.59	22.07
7	1976-1985	789	1527	23.59	45.66
8	1986-1995	563	2090	16.84	62.5
9	1996-2005	1060	3150	31.7	94.2
10	2006-2012	194	3344	5.8	100

Table 7: Chronological distribution of citations to books in Philosophy

Table 7 above clearly indicates that the highest number of book citations belong to books published during 1996-2005 (1060, 31.7%), followed by 789 citations (23.59%) to books published during 1976-1985, 563 citations (16.84%) to books published during 1986-1995, 421

citations (12.59%) to books published during 1966-1975, 194 citations (5.8%) to books published during 2006-2012, 169 citations (5.05%) to books published during 1956-1965, 92 citations (2.75%) to books published during 1946-1955, 35 citations (1.05%) to books published during 1936-1945, 17 citations (0.51%) to books published during 1926-1935 and only 4 citations (0.12%) were to books published before 1925.

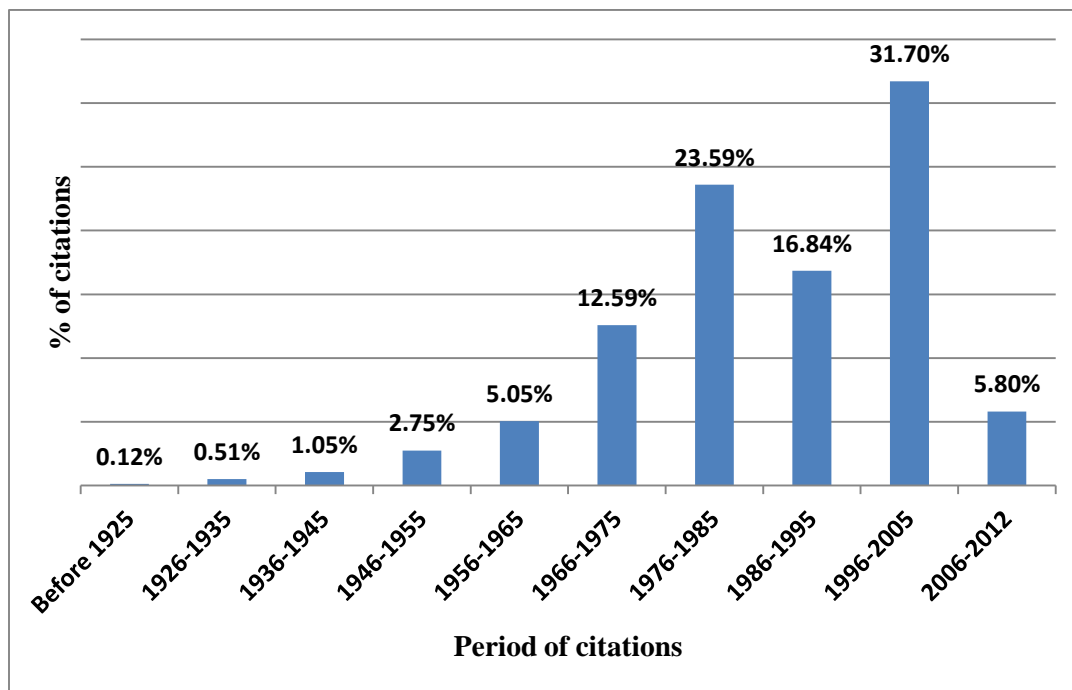


Figure 5: Chronological distributions of citations to books in Philosophy

Figure 5 above shows the chronological distribution of the citations to books cited in the Ph.D. theses submitted in the Department of Philosophy at Panjab University (Chandigarh). It shows that there has been a steady growth in citations during 1986-1995. It can be also seen from the figure that there has been a steep decline in citations to books from 1996-2005 to 2006-2012.

6.6. Geographical distribution of citations

Table 8 shows the geographical distribution of books and journals' citations used in the Ph.D. theses submitted in the Department of Philosophy at Panjab University (Chandigarh).

Country	Books				Journals			
	Counts	Cumulative counts	%	Cum %	Counts	Cumulative counts	%	Cum %
India	2523	2523	75.45	75.45	1253	1253	84.72	84.72
UK	468	2991	14.00	89.45	84	1337	5.68	90.40
USA	334	3325	9.99	99.43	124	1461	8.38	98.78
Canada	--	--	--	--	14	1475	0.95	99.73
Pakistan	17	3342	0.51	99.94	1	1476	0.07	99.80
France	2	3344	0.06	100.00	2	1478	0.14	99.93
South Africa	--	--	--	--	1	1479	0.07	100.00

Table 8: Geographical distribution of citations in Philosophy

Table 8 reveals that majority of the citations to books (2523, 75.45%) and journals (1253, 84.72%) are Indian publications, followed by publications from UK (468, 14% for books and 84, 5.68% for journals) and USA (334, 9.99% for books and 124, 8.38% for journals). It also shows that least number of citations (1, 0.07%) to journals publications was from Pakistan and South Africa. It is clear from the table that there are no citations of books published from Canada, and South Africa, whereas citations to journals were seen from such countries.

6.7. Ranking of cited journals

To determine the core journals in the field of Philosophy, a rank frequency distribution of all cited journal articles was undertaken. The title of the journal was recorded against each journal article in the work sheet. The distribution was ranked in order of journals that are most frequently cited. Ranking of the cited journals was prepared on the basis of the total citation frequency received by each journal. The titles have been arranged in a decreasing order of the number of citations. Table 9 shows their rank and percentage of citations.

Sr. no.	Title	Citations	Cumulative citations	%	Cumulative %	Rank
1	Indian Journal of the History of Medicine	43	43	2.91	2.91	1
2	Philosophy	40	83	2.70	5.61	2
3	Indian Journal of History of Science	26	109	1.76	7.37	3
4	Economic & Political Weekly	23	132	1.56	8.93	4
5	Journal of Visual Impairment and Blindness	20	152	1.35	10.28	5
6	Ethics	17	169	1.15	11.43	6
7	American Philosophical Quarterly	16	185	1.08	12.51	7
8	Journal of American Medical Association	16	201	1.08	13.59	7
9	The journal of Philosophy	16	217	1.08	14.67	7
10	Canadian Journal of Philosophy	13	230	0.88	15.55	8
11	The Journal of Religion	13	243	0.88	16.43	8
12	Philosophy and Phenomenological Research	13	256	0.88	17.31	8
13	Journal of Management Studies	13	269	0.88	18.19	8
14	European Journal of Philosophy	12	281	0.81	19.00	9
15	Croatian Journal of Philosophy	12	293	0.81	19.81	9
16	Political Psychology	12	305	0.81	20.62	9
17	Graduate Faculty Philosophy Journal	12	317	0.81	21.44	9
18	Journal for the Theory of Social Behavior	11	328	0.74	22.18	10
19	Journal of Economic Psychology	11	339	0.74	22.92	10
20	The Journal for Social Action in Counseling and Psychology	11	350	0.74	23.67	10
21	Social Indicators Research	11	361	0.74	24.41	10
22	Indian Heart Journal	11	372	0.74	25.15	10
23	Journal of Psychiatric Research	11	383	0.74	25.90	10
24	Philosophical Perspectives	11	394	0.74	26.64	10
25	The Howard Journal of Criminal Justice	10	404	0.68	27.32	11
26	British Journal for the Philosophy of Science	10	414	0.68	27.99	11
27	The Harvard Review of Philosophy	10	424	0.68	28.67	11
28	Preventive Medicine	10	434	0.68	29.35	11
29	The Economic Journal	10	444	0.68	30.02	11
30	The Journal of Value Enquiry	10	454	0.68	30.70	11

Table 9: Ranked list of highly cited journals in Philosophy

Table 9 shows that out of a total of 385 journal cited in the theses submitted during the study period ‘Indian Journal of History of Medicine’ was the most highly cited journal (43, 2.91%), followed by ‘Philosophy’ (40, 2.70%), ‘Indian Journal of History of Science’ (26, 1.76%), ‘Economic & Political Weekly’ (23, 1.56%), ‘Journal of Visual Impairment and Blindness’ (20, 1.35%) and ‘Ethics’ 17 (17, 1.15%). It also indicates that journals mentioned above covers the 30.70% the total citations and remaining 355 journals accounted for the rest of the citations (69.30%).

6.7.1. Application of Bradford’s law to cited journals

Table 10 below indicates the verbal formulation of the Bradford's law of scattering as applied to the citations in the theses submitted in the Department of Philosophy considered in the present study:

Number of Zone	Number of Journals	Number of Citations	Bradford’s constant (k)
Core zone	17	317	---
Zone 1	70	421	4.246
Zone 2	298	741	4.246
Total	385	1479	

Table 10: Dispersion of journals in Philosophy

Table 10 shows the distribution of journals into three zones. It is evident from the ratio (17:70:298) that the number of journals in the three zones is in geometric progression. Hence, it can be concluded that the dispersion of journals in the field of Philosophy satisfy the Bradford's law of scattering. The mathematical formulation was also applied to check the validity of the verbal formulation using of Egghe (1986, 1990) where k was calculated as:

$$k = (1.781 \times 43)^{1/3}$$

$$k = 4.246$$

Using the value of k calculated above, Bradford groups (zones) were also calculated. The nucleus zone r_0 was calculated as: $r_0 = \frac{385(4.246-1)}{(4.246^3-1)}$

$$r_0 = \frac{1250.095}{75.603}$$

$$= 16.537$$

With r_0 and k, different Bradford zones were calculated as below:

Nucleus zone $r_0 = r_0 * 1 =$

$$16.537 * 1 = 16.537$$

First zone

$$r_1 = r_0 * k = 16.537 * 4.246 = 70.228$$

Second zone

$$r_2 = r_0 * k^2 = 16.537 * 4.246^2 = 298.234$$

The above theoretical distribution of Bradford's law enabled the testing of the exact fit of Bradford's law to the data in the present study. Using this distribution, the number of citations for each Bradford's zones were calculated as shown in table 10. The exact number of journals in each Bradford's zones were calculated using the value of k and r_0, r_1 and r_2 . By dividing r_2 by r_1 and r_1 by r_0 , the value of 4.246 and 4.246 respectively were calculated which equivalent to the value of k is as calculated using the formula of Egghe (1986. 1990). This shows that in the present study, the journals cited in the theses submitted in the Department of Philosophy are in accordance with the Bradford's distribution.

7. Findings of the study

To study the citation analysis of Ph.D. theses in the field of Philosophy, 8223 citations from 26 Ph.D. theses submitted in the Department of Philosophy during 2001-2012 were analysed. The major findings of their analysis show:

- I. The highest number of theses in Philosophy were submitted in 2006, 2007, 2009 and 2012 (15.39%).
- II. The researchers in the discipline of Philosophy use books and journals more than other form of documents for their research work. Book citations accounted for 40.67% and journal citations accounted for 17.99%.

- III. Citations to single authorship were dominant than joint authorship in both books (89.53%) and journals (85.73%).
- IV. The degree of collaboration of books was calculated as 0.10 and degree of collaboration of journals was calculated as 0.14.
- V. Collaborative index of books was calculated as 1.12 and collaborated index of journals was calculated as 1.19.
- VI. Collaborative coefficient for books was calculated as 0.06 and collaborated coefficient for journals was calculated as 0.07.
- VII. The half life period of journals citations was found to be 22 years and the half life period of book citations was found to be 23 years.
- VIII. Maximum number of citations to journals (28.60%) and books (31.70%) belong to publications published during 1996-2005.
- IX. Majority of citations to books (75.45%) and journals (84.72%) were of Indian origin, followed by U.K. and U.S.A.
- X. Out of 385 journals cited in the Ph.D. theses, Indian Journal of History of Medicine was found to be the most cited journal.
- XI. The dispersion of journals in the field of Philosophy satisfy the formulation of Bradford's law of scattering.

8. Conclusion

The study focused on the citation analysis of 26 doctoral dissertations submitted in the Department of Philosophy, Panjab University, Chandigarh during 2002 to 2012. It reveals the accumulating data on what research materials are used by doctoral researchers within a discipline. Majority of the citations were to publications authored by single authored, followed by two authors, three authors and more than three authors in the discipline of Philosophy. Citations to books were observed more in the field of Philosophy. The Bradford's law of scattering was found to be fit as far as the dispersion of journals is concerned in the discipline of Philosophy. This indicates that the journals used by the researchers in Philosophy are also the core journals in Philosophy. The study provides useful information for the university librarian in devising the list of core journals in Philosophy.

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Appendix-1

1. Degree of collaboration, collaborative index and collaborative coefficient in the discipline of Philosophy

1-a) Degree of collaboration of authorship (books)

$$N_m = 350$$

$$N_s = 2994$$

$$C = \frac{350}{350 + 2994} = \mathbf{0.10}$$

1-b) Degree of collaboration of authorship (journals)

$$N_m = 211$$

$$N_s = 1268$$

$$C = \frac{211}{211 + 1268} = \mathbf{0.14}$$

1-c) Collaborative index for books

$$CI = \frac{(2994 + 2 \times 290 + 3 \times 49 + 5 \times 11)}{3344}$$

$$\mathbf{CI=1.12}$$

1 -d) Collaborative index for journals

$$CI = \frac{(1268 + 2 \times 167 + 3 \times 26 + 5 \times 18)}{1479}$$

$$\mathbf{CI=1.19}$$

1-e) Collaborative coefficient (books)

$$CC = 1 - \frac{\left(2954 + \frac{1}{2}290 + \frac{1}{3}49 + \frac{1}{5}11\right)}{3344}$$

$$1 - \frac{46763}{15} * \frac{1}{3344}$$

$$CC = 1 - \frac{46763}{50160}$$

$$\mathbf{CC=0.06}$$

1-f) Collaborative coefficient (journals)

$$CC = 1 - \frac{\left(1268 + \frac{1}{2}167 + \frac{1}{3}26 + \frac{1}{5}18\right)}{1479}$$

$$1 - \frac{40913}{30} * \frac{1}{1479}$$

$$CC = 1 - \frac{40913}{44370}$$

$$\mathbf{CC=0.07}$$