

CITATION ANALYSIS OF Ph.D THESES IN CIVIL ENGINEERING SUBMITTED TO SRI VENKATESWARA UNIVERSITY, TIRUPATI, ANDHRA PRADESH

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Abstract

The present research paper attempts a citation analysis of Ph.D theses in Civil Engineering submitted to Sri Venkateswara University Library, Tirupati during the years 1983-2011. The analysis brings significant findings related to various pertinent aspects like different bibliographic forms, authorship pattern, chronological citations of books and journals, rank list of publishers and ranks list of cited journals. Finally conclusions have been drawn from each aspect of analysis.

1. Introduction

In modern age, Civil Engineering is a broad field of engineering that deals with the planning, construction, and maintenance of fixed structures, or public works, as they are related to earth, water, or civilization and their processes. Civil engineering is the broadest of the engineering fields, partly because it is the oldest of all engineering fields. Civil engineering is still an umbrella term, comprised of many related specialties. Civil engineering education first started in the United States of America in 1819.

At present librarians are facing many problems due to increasing the cost of the books and journals for every year, ever increasing demands of the user community for getting latest books and journals and limited budgetary provisions to meet the user needs. It is becoming necessary

for them to identify core documents in different disciplines in order to procure useful documents within the given financial resources for proving effective services to the users in the library.

20th century documentalists applied mathematical and statistical techniques to bibliographical units. In the field of library and information science bibliometric study is the new branch knowledge. In this, citation analysis is one of the areas to identify core journals and books and for knowing the characteristic features of the disciplines such as authorship pattern, scatter of literature in different bibliographic forms, and in different subjects etc. Gross and Gross (1927) used for the first time this citation analysis as a tool for identifying the core journals in a subject based on counting and citation given at the end of each article from a group of a primary journals. Afterwards, a number of such studies were carried out on citations in dissertation / theses, books, primary journals and reviewing journals.

2. Objectives

The specific objectives of the present study

1. To know the various information sources consulted by the researchers in Civil Engineering;
2. To observe the nature of the authorship pattern in the cited literature of Civil Engineering;
3. To find out the range of publication dates;
4. To trace the core book publishers of Civil Engineering; and
5. To examine the core journals of Civil Engineering.

3. Hypotheses

The following hypotheses have been formulated for the present study:

1. Journals are the most common cited source in the field of civil engineering.
2. All the researchers prefer the latest books and journals.
3. Most of the journals used have single authors and most of the books used have double authors in the field of civil engineering.

4. Scope and Methodology

The present data was collected from 31 Ph.D theses in Civil Engineering. These theses were submitted to Sri Venkateswara University, Tirupati, Andhra Pradesh, India, during the years 1983-2011. There are 3468 citations appended in these theses. The average number of

citations per theses is nearly 112. All these citations are entered in MS-Excel work sheet as they are cited in the theses. They are analyzed according to the objectives as stated above.

5. Analysis of data

5.1 Bibliographic forms

Table 1 shows the distribution of cited literature in different bibliographic forms.

Table 1: distribution of cited literature in different bibliographic forms

Sl. No	Bibliographic forms	No. of Citations	Percentage
1	Books	656	18.92
2	Journals	1948	56.17
3	Conference proceedings/ Seminars/ symposiums etc.	442	12.74
4	Theses/ Dissertations	141	4.07
5	Reports	177	5.10
6	Websites	18	0.52
7	Unidentified	86	2.48
	Total	3468	100.00

The literature in any discipline is published in different bibliographic forms such as books, journals, theses/dissertations, reports, monographs, newspapers, websites, conference proceeding etc.

Table 2 shows the distribution of citations among different bibliographic forms in Civil Engineering. It is evident from the table that the journals contributed to the highest number of citations accounting for 56.17 per cent of total citations. Hence, journals appear to be the most preferred source of information for the research scholars in Civil Engineering. Books are the second highest groups accounting for 18.92 per cent of the total citations, and the remaining 24.91 per cent of the total citations are distributed in other bibliographic forms. It can be conclude that research scholars in civil engineering use journals mostly for their research work.

5.2 Authorship Pattern of books and journals

The distribution of citations according to the number of authors in books and journals is shown in Table 2.

Table 2

Distribution of citations according to the number of authors in books and journals

Sl. No	No. of authors	No. of Citations	Percentage
1	Single authors	936	35.94
2	Double authors	916	35.18
3	Three authors	437	16.78
4	More than four authors	315	12.10
	Total	2604	100.00

It is evident from Table 2 that the single authors contribute 35.94 per cent of citations in books and journals. Next to this, the double authors contribute 35.18 per cent of citations. Three authors (16.78%), more than three authors (12.10%), contribute to the remaining citations.

5.3 Authorship pattern of Journals

The distribution of citations of journals in Civil Engineering according to the number of authors is shown in Table 3.

Table 3

Distribution of citations of journals according to the number of authors

Sl. No	No. of authors	No. of Citations	Percentage
1	Single authors	551	28.28
2	Double authors	761	39.07
3	Three authors	392	20.12
5	More than three authors	244	12.53
	Total	1948	100.00

It is evident from Table 3 that the most of the citations in journals (39.07 %) have double authors. Next to this, single authors 28.28 per cent of citations. The remaining citations are contributed by three (20.12%) and more than three (12.53%) authors. Hence, it can be inferred from the data most of the authors in Civil Engineering are writing journal articles in collaboration.

5.4 Authorship pattern of Books

The distribution of citations of books in Civil Engineering according to the number of authors is presented in Table 4.

Table 4

Distribution of citations of books according to the number of authors

Sl. No	No. of authors	No. of citations	Percentage
1	Single authors	385	58.69
2	Double authors	155	23.63
3	Three authors	45	6.86
4	More than three authors	71	10.82
	Total	656	100.00

It can be seen from Table 4 that most of the citations in books (58.69 %) have single authors. The remaining citations are contributed by two (23.63%), three (6.86%), more than four (10.82%) authors. Hence, it can be inferred from data that most of the citations in civil engineering are writing books individually without any collaboration.

5.5 Chronological distribution cited books and journals

The distribution of books and journals cited by Civil Engineering researchers according to the year of publication is shown in Table 5.

Table 5

Distribution of citations of books and journals according to the year of publication

Sl. No	Year of Publishing	No. of Citations	Percentage
1	Before 1950	165	6.34
2	1951 -1960	195	7.49
3	1961 - 1970	382	14.67
4	1971 - 1980	456	17.51
5	1981 – 1990	501	19.24
6	1991 – 2000	589	22.62
7	2001 – 2010	303	11.64
8	Unidentified	13	0.49
	Total	2604	100.00

It is evident from Table 5 that most of the citations (22.62%) are used by the researchers were published during the period of 1991 – 2000. It is also evident from the same that (19.24%)

used citations were published during the period of 1981 – 1990. It is obvious from the table that 11.64 per cent of used books and journals were published during the period of 2001-2010. Hence, it can be concluded that more than half of the books and journals cited were published between 1981 and 2010. This clearly points out that Civil Engineering researchers are more inclined towards recent and latest editions of books and journals.

5.6 Rank list of publishers

The distribution of books cited by Civil Engineering researchers according to the publisher is shown in Table 6.

Table 6

Distribution of cited books according to the publishers wise

Sl. No	Name of the Publisher	Rank	Used		Cumulative	
			No	%	No	%
1	John Wiley & Sons Incorporation	1	64	9.76	64	9.76
2	McGraw – Hill Book Company	2	58	8.84	122	18.60
3	Wiley & Groups	3	27	4.12	149	22.72
4	Elsevier Science Publishing Company	4	26	3.96	175	26.60
5	Academic press	5	23	3.51	198	30.19
6	Prentice Hall of India	6	16	2.44	214	32.63
7	United States of America government	7	15	2.29	229	34.92
8	Tata McGraw – Hill Publishing Company	8	11	1.68	240	36.6
9	Pergomon Press	8	11	1.68	251	38.28
10	Oxford University Press	8	11	1.68	262	39.96
11	Marcel Dekker Inc	8	11	1.68	273	41.64
12	Reinhold Publishing Corporation	8	11	1.68	284	43.32
13	The Macmillan and Company	9	10	1.52	294	44.84
14	American Chemical Society	9	10	1.52	304	46.36
15	Springer Verlag	9	10	1.52	314	47.88
16	Edward Arnold Publishing	9	10	1.52	324	49.40
17	Geotechnical special publishing	10	9	1.37	333	50.77
18	Butter worths publishing	11	8	1.22	341	51.99
19	Government of India	12	7	1.07	348	53.06
20	Addison Wisely Publishers Company	12	7	1.07	355	54.13
21	Ana orber Science Publishing	13	6	0.91	361	55.04
29	8 publishers with 5 citations	14	40	6.10	401	61.14
35	6 publishers with 4 citations	15	24	3.66	425	64.8
44	9 publishers with 3 citations	16	27	4.12	452	68.92
69	25 publishers with 2 citations	17	50	7.62	502	76.54
223	154 publishers with 1 citations	18	154	23.46	656	100.00

It is evident from Table 6 that most of the cited books by Civil Engineering researchers (9.76%) are published by ‘John Wiley and Sons Incorporation’ followed by ‘McGraw Hill International Book Company’ (8.84%), ‘Wiley and Groups Publishing’ (4.12%), ‘Elsevier Science Publishing Company’ (3.96%), and ‘Academic Press’ (3.51%).

The first four publishers cover more than 25% of total cited books. The first seventeen publishers’ covers more than 50% of total cited books. The 69 publishers cover more than 75% total cited books. The remaining 25% of cited books are scattered among 154 other publishers.

5.7 Rank list of Journals

The rank list of cited journals is shown in Table 7.

Table 7

Rank List of Cited journals

Sl. No	Rank	Name of the Journal	Citations		Cumulative	
			No	%	No	%
1	1	Journal of hydraulic division	116	5.95	116	5.95
2	2	Geotechnique	85	4.36	201	10.31
3	3	Water research	54	2.77	255	13.08
4	4	Journal of Water pollution control federation	52	2.67	307	15.75
5	5	Water science and technology	47	2.41	354	18.16
6	6	Journal of hydraulic engineering	40	2.05	394	20.21
7	6	Sewage industrial waste	40	2.05	434	22.26
8	7	Journal of hydrology	32	1.64	466	23.9
9	8	Journal of irrigation and drainage engineering	28	1.44	494	25.34
10	9	Bio resource technology	26	1.34	520	26.67
11	10	Journal of chemical technology and biotechnology	25	1.28	545	27.95
12	11	Journal of geotechnical and geo environmental engineering	24	1.23	569	29.18
13	12	Journal of colloid interface science	20	1.03	589	30.21
14	12	Journal of institution of engineers	20	1.03	609	31.24
15	13	Environmental science and technology	19	0.98	628	32.22
16	14	Journal of Indian society of remote sensing	18	0.92	646	33.14
17	14	Applied environmental microbiology	18	0.92	664	34.06
18	15	Journal of geo technology engineering	16	0.82	680	34.88
19	16	Water resource research	15	0.77	695	35.65
20	16	Canadian geotechnical journal	15	0.77	710	36.42

21	17	American dyestuff reporter	14	0.72	724	37.14
22	17	Journal of society of dyers and colorist	14	0.72	738	37.86
23	17	The Indian concrete journal	14	0.72	752	38.58
24	18	Journal of environmental engineering	13	0.67	765	39.25
25	18	Ground water	13	0.67	778	39.92
26	19	Carbon	12	0.62	790	40.54
27	19	Environmental Pollution	12	0.62	802	41.16
28	19	Indian journal of environmental and health	12	0.62	814	41.78
36	20	8 periodicals with 11 citations	88	4.52	902	46.30
40	21	4 periodicals with 10 citations	40	2.05	942	48.35
45	22	5 periodicals with 9 citations	45	2.31	987	50.66
52	23	7 periodicals with 8 citations	56	2.88	1043	53.54
59	24	7 periodicals with 7 citations	49	2.52	1092	56.06
74	25	15 periodicals with 6 citations	90	4.62	1182	60.68
85	26	11 periodicals with 5 citations	55	2.82	1239	63.50
108	27	23 periodicals with 4 citations	92	4.72	1329	68.22
142	28	34 periodicals with 3 citations	102	5.24	1431	73.46
223	29	81 periodicals with 2 citations	162	8.32	1593	81.78
578	30	355 periodicals with 1 citation	355	18.22	1948	100.00

It can be seen from Table 7 that the cited journal articles are scattered in 578 different journals. Among them '*Journal of Hydraulic Division*' occupies first rank being more number of times with 5.95% of citations, followed by '*Geotechnique*' (4.36%), '*Water Research*' (2.77%), '*Journal of Water Pollution Control Federation*' (2.61%), and '*Water Science and Technology*' (2.41%).

The first nine journals in the rank list contribute more than 25% of total cited journal citations. The first forty five journals covers more than 50% of total cited journal citations. The 142 journals covers nearly 75% total cited journal citations. The remaining 25% of journal citations are scattered among 433 other journals.

6. Conclusions

An analysis of 3468 citations appended to 31 Ph.D theses in Civil Engineering reveals the following conclusions:

1. Journals appear to be the most preferred source of information for research scholars in Civil Engineering since they contributed the highest number of citations (56.17%).

2. Most of the journal articles in Civil Engineering (71.72%) are being published collaboratively by the authors.
3. Most of the authors in Civil Engineering (58.69%) are writing books individually without any collaboration.
4. Most of books and journals were published between 1981 and 2010. This clearly points out that Civil Engineering researchers are more inclined towards recent and latest editions of books and journals. Hence, an endeavor should be made for the acquisition of latest books and journals on the subject.
5. Most of the books cited by the Civil Engineering research scholars belong to 'John Wiley and Sons' and about 54.13% of total books cited by the researcher belong to 20 leading publishers.
6. The journal articles are scattered in 578 different journals. However, most of the citations (50.66%) are found in a few journals. The Journal '*Journal of Hydraulic Division*' gets first rank for being cited more number of times by the researchers, followed by '*Geotechnique*', '*Water Research*', '*Journal of Water Pollution Control Federation*' and '*Water Science and Technology*'.

7. References

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