

Obsolescence Study of Literature in LIS PhD Theses: A Bibliometric Method

Vijay G. Wardikar*, Vaishali P. Gudadhe**

Abstract

Obsolescence studies are one of the main areas of bibliometrics and One of the important and useful methods in bibliometrics is obsolescence study which is a vital aspect of scientific output or literature. The method of obsolescence study is useful for the citation analysis of journal articles. The present study attempts to discover the obsolescence rate of Library and Information Science (LIS) literature cited in the doctoral theses awarded from 1982 to 2010, at nine universities in the Maharashtra State of India. In the present study, the source publications, i.e. 138 theses of nine universities in Maharashtra does not share the common publication year. The study focuses on the citations included in doctoral theses awarded in LIS. The citations of journals and books were analyzed to study obsolescence of literature in the LIS discipline and its sub-disciplines. The obsolescence periods for the journals and books were calculated separately. Obsolescence periods were measured in terms of the half-life period. In the present study, obsolescence rate differs from one subject to another and also from one bibliographic form to another one. It is noticed that the half-life period is longer for books than for journals.

Keywords: Bibliometrics, Citations, Half-Life, Journal Literature, Quarter Life

Introduction

Bibliometrics consists in a method or set of plans, which can be employed to evaluate research. One of the important and useful methods in bibliometrics is obsolescence study which is a vital aspect of scientific output or literature. The term obsolescence frequently occurs in the literature of bibliometrics and citation analysis studies. Analysis of citations by the age of cited documents indicates the useful life of documents. Obsolescence is defined as the “decline overtime in validity or utility of information” (Line & Sandison, 1974).

The method of obsolescence study is useful for the citation analysis of journal articles. It is beneficial for librarians, researchers and pioneers in a scientific discipline to know how far they must go back to meet their information requirements.

Scope

The citations given in doctoral theses, which were awarded at nine universities in Maharashtra state from 1982 to 2010, were taken into consideration for the present study to discover the obsolescence rate of Library and Information Science (LIS) literature.

Objectives

The allied objectives of the present study are:

- Age-wise distribution citations to journal.
- Age-wise distribution of citations to books.
- Determine the half-life and obsolescence of the journal literature.
- Determine half-life of books citations.

Method & Techniques

In the present study, the source publications, i.e. 138 theses of nine universities in Maharashtra does not share the common publication year. We have to opt for multi-synchronous approach instead of synchronous where the source documents will have the same year of publication. The citation age is computed by comparing the date publication of source document with the date of publication of the document cited by the author of the source publication in the present study. The citation age is

* Librarian, Mahila Mahavidyalaya, Amravati, Maharashtra, India. Email: vijaywardikar123@rediffmail.com

** Associate Professor & Head, Department of Library & Information Science, Sant Gadge Baba Amravati University, Maharashtra, India. Email: vgudadhe020@gmail.com

calculated by comparing the publication date of each cited document with the year of submission of citing theses.

The data were analyzed using Microsoft Excel and the Statistical Package for the Social Sciences (SPSS).

Review of Literature

As per the research methodology, the author has expected to know the previous work done in the field and it is also expected that the work already done by various authors should not be repeated by the researcher. Keeping in view the past studies, the author conducted a literature search by scanning the available resources, books, dissertations, conference and seminar paper, articles appeared in different journals, etc.

Anis Khurshid (1996) emerged as the most prolific author with 22 contributions. Journal literature, which represented 90.4 percent of the citations, was published in 43 periodicals, mostly from the United States, while more than half of the journal literature was published in one national journal. The most productive period was 1987-1989, and the least productive period was 1972-1974. The most popular subject topic was "LIS education and manpower."

B. S. Biradar & B. T. Sampath Kumar's (2003) study examines the obsolescence of literature, Annual Aging Factor, Mean Life and Utility Factor of periodicals in the field of chemistry. Obsolescence of literature was studied and half-life of literature was found to be 11.8 years.

J. Arora & S. P. Kaur (1994), in their study, reveal a very high concentration of literature in a few scientific periodicals, the half-life and citations peak for periodicals in immunology were calculated.

K. N. Wadej (2008), in his M.Phil. Dissertation, attempts to describe the authorship pattern, author productivity and prominent contributors, citation pattern, language-wise and year-wise distribution of citations. Obsolescence of literature and half-life of literature was studied.

Narendra Kumar (1985) studied the pattern of information use of the faculty of management studies by analyzing the citations given in the PhD theses submitted to the University of Delhi during 1965-1987. He concluded that the research scholars of the discipline of business management mostly depend on the books; there is not a

high obsolescence factor in business management as the scholars use even 36 years old material.

P. K. Barooah, D. Begum & N. N. Sharma's (1999) study calculated the half-life of literature in the field of organic chemistry.

V. V. Suryanarayan (2008), in his study, reports the results of the bibliometric study of doctoral theses in LIS awarded by different universities in Andhra Pradesh. The study is made of the PhD theses submitted to different universities during 1982-2004. This study identifies the different forms of literature used by LIS researchers and half-life and obsolescence of the journal literature.

Obsolescence Study of Literature

To carry out obsolescence analysis, age-wise distribution table of citation of journal articles was prepared which is shown by the following tables. For obtaining the age-wise distribution of citation of journals and books, the time period under study was divided into 12 class intervals having a width of 10 years and corresponding frequency was calculated. For journals, the maximum frequency was 2513 for the interval 1 to 10 years. Same is the case for books. The maximum frequency was 5553 for the interval 1 to 10 years. The frequency graph for journals and books is given Tables 1-6. All the graphs are smooth and unimodal.

Table 1: Age-Wise Distribution of Citation to Journal Articles

Sr. No.	Age of Citation	Journal Citations	C.F.	Percentage
1	Less than one Year	37	37	0.68
2	1 to 10 Years	2543	2550	46.51
3	11 to 20 Years	1525	4057	27.89
4	21 to 30 Years	744	4792	13.60
5	31 to 40 Years	376	5163	6.87
6	41 to 50 Years	163	5324	2.98
7	51 to 60 Years	29	5353	0.54
8	61 to 70 Years	15	5368	0.28
9	71 to 80 Years	19	5387	0.35
10	81 to 90 Years	10	5397	0.19
11	91 to 100 Years	4	5401	0.07
12	More than 100 Years	2	5403	0.04
	Total	5467		100.00

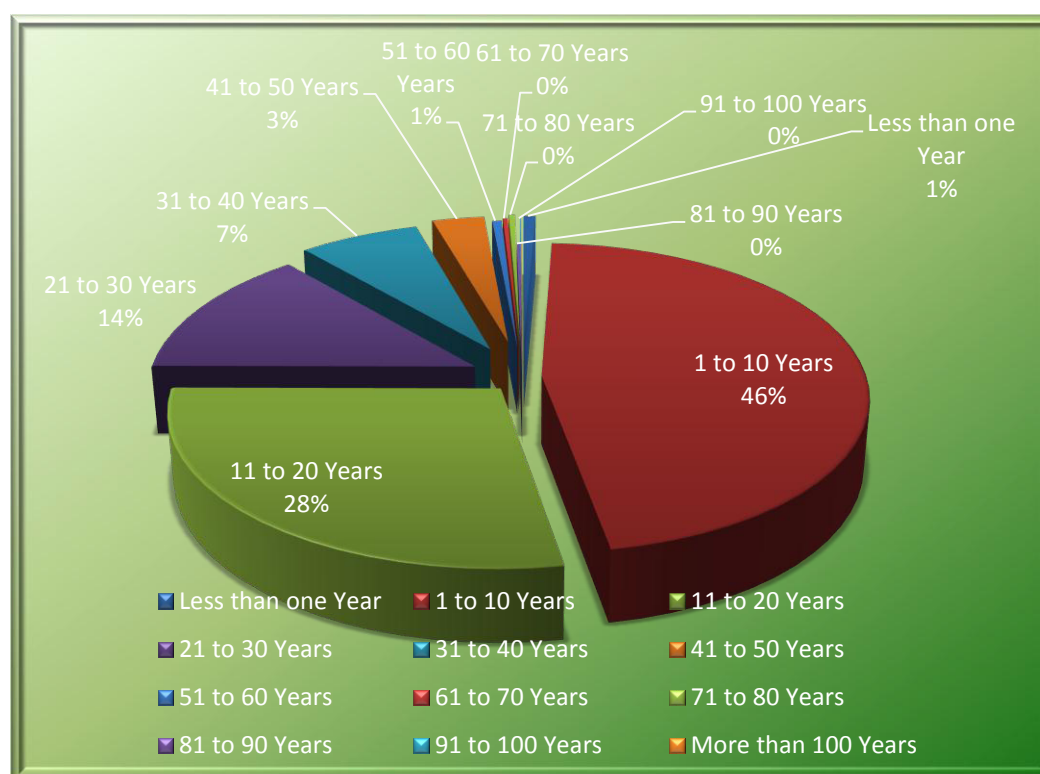


Fig. 1: Age-Wise Distribution of Citation to Journal Articles

Table 2: Citation Frequency of Journal

Year	Frequency	Percent	Valid Percent	Cumulative Percent
0	38	.3	.7	.7
1	159	1.3	2.9	3.6
2	241	1.9	4.4	8.0
3	372	3.0	6.8	14.8
4	279	2.2	5.1	20.0
5	252	2.0	4.6	24.6
6	279	2.2	5.1	29.6
7	246	2.0	4.5	34.2
8	246	2.0	4.5	38.7
9	230	1.8	4.2	42.8
10	236	1.9	4.3	47.2
11	203	1.6	3.7	50.9
12	159	1.2	2.9	53.8
13	175	1.4	3.2	57.0
14	175	1.4	3.2	60.2
15	164	1.3	3.0	63.2
16	175	1.4	3.2	66.4
17	126	1.0	2.3	68.6
18	109	.9	2.0	70.6

<i>Year</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
19	115	.9	2.1	72.7
20	131	1.0	2.4	75.1
21	93	.7	1.7	76.8
22	98	.8	1.8	78.6
23	93	.7	1.7	80.2
24	82	.6	1.5	81.7
25	72	.6	1.3	83.0
26	76	.6	1.4	84.4
27	59	.5	1.1	85.5
28	77	.6	1.4	86.9
29	49	.4	.9	87.8
30	47	.4	.9	88.7
31	51	.4	.9	89.6
32	43	.3	.8	90.4
33	39	.3	.7	91.2
34	41	.3	.8	91.9
35	31	.3	.6	92.5
36	41	.3	.8	93.2
37	31	.3	.6	93.8
38	27	.2	.5	94.3
39	43	.3	.8	95.1
40	24	.2	.4	95.6
41	27	.2	.5	96.1
42	38	.3	.7	96.8
43	22	.2	.4	97.2
44	26	.2	.5	97.6
45	12	.1	.2	97.9
46	8	.1	.1	98.0
47	8	.1	.1	98.2
48	4	.0	.1	98.2
49	8	.1	.1	98.4
50	8	.1	.1	98.5
52	7	.1	.1	98.7
53	4	.0	.1	98.7
54	2	.0	.0	98.8
55	4	.0	.1	98.9
56	1	.0	.0	98.9
57	3	.0	.1	98.9
58	3	.0	.1	99.0
59	2	.0	.0	99.0
60	3	.0	.1	99.1
61	3	.0	.1	99.1
62	1	.0	.0	99.1
63	4	.0	.1	99.2

<i>Year</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
64	3	.0	.1	99.3
66	1	.0	.0	99.3
67	1	.0	.0	99.3
68	1	.0	.0	99.3
69	1	.0	.0	99.4
71	1	.0	.0	99.4
72	3	.0	.1	99.4
73	2	.0	.0	99.5
74	2	.0	.0	99.5
77	3	.0	.1	99.6
78	2	.0	.0	99.6
79	3	.0	.1	99.6
80	3	.0	.1	99.7
81	1	.0	.0	99.7
82	1	.0	.0	99.7
83	1	.0	.0	99.8
84	1	.0	.0	99.8
85	2	.0	.0	99.8
86	2	.0	.0	99.9
88	1	.0	.0	99.9
89	1	.0	.0	99.9
91	4	.0	.1	100.0
102	1	.0	.0	100.0
125	1	.0	.0	100.0
Total	5467	43.7	100.0	

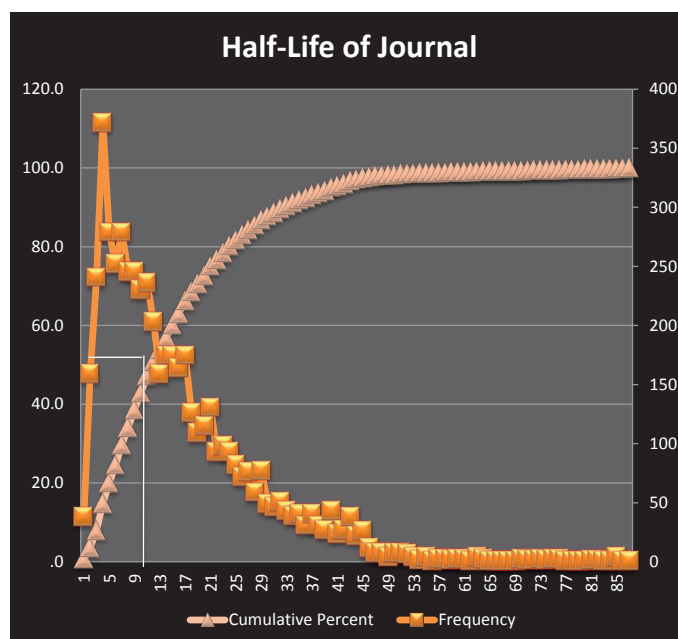


Fig. 2: Half-Life of Journal

Table 3: Half-Life of Journal Literature

<i>Journals</i>	
Half-Life	11.00531
Q1	6.22881
Q3	20.96848

Table 4: Age-Wise Distribution of Citation to Book

<i>Sr. No.</i>	<i>Age of Citation</i>	<i>Books Citations</i>	<i>C.F.</i>	<i>Percentage</i>
1	Less than one Year	18	17	0.52
2	1 to 10 Years	1111	1081	32.32
3	11 to 20 Years	969	2009	28.20
4	21 to 30 Years	604	2586	17.57
5	31 to 40 Years	391	2961	11.38
6	41 to 50 Years	199	3152	5.79
7	51 to 60 Years	70	3219	2.04
8	61 to 70 Years	23	3241	0.67
9	71 to 80 Years	21	3261	0.61
10	81 to 90 Years	11	3271	0.32
11	91 to 100 Years	10	3281	0.29
12	More than 100 Years	10	3291	0.29
	Total	3437		100.00

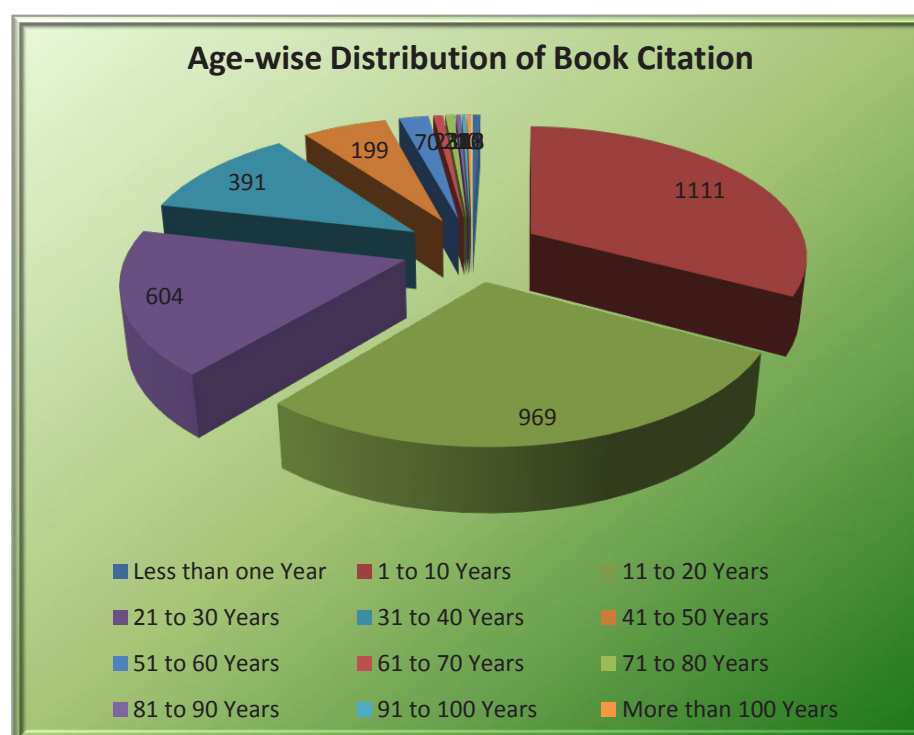
**Fig. 3: Age-Wise Distribution of Citation to Book**

Table 5: Citation Frequency of Books

<i>Year</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
0	17	.1	.5	.5
1	62	.5	1.8	2.3
2	100	.8	2.9	5.2
3	125	1.0	3.6	8.8
4	114	.9	3.3	12.1
5	138	1.1	4.0	16.1
6	138	1.1	4.0	20.1
7	124	.9	3.6	23.7
8	114	.9	3.3	26.9
9	96	.7	2.8	29.7
10	108	.8	3.2	32.8
11	103	.8	3.0	35.9
12	103	.8	3.0	38.8
13	86	.7	2.5	41.3
14	124	1.0	3.6	44.9
15	96	.7	2.8	47.7
16	100	.8	2.9	50.6
17	100	.8	2.9	53.6
18	103	.8	3.0	56.6
19	79	.6	2.3	58.9
20	76	.6	2.2	61.0
21	69	.5	2.0	63.1
22	72	.6	2.1	65.2
23	65	.5	1.9	67.1
24	52	.4	1.5	68.6
25	65	.5	1.9	70.5
26	65	.5	1.9	72.5
27	69	.5	2.0	74.4
28	58	.5	1.7	76.2
29	41	.3	1.2	77.4
30	41	.3	1.2	78.6
31	45	.4	1.3	79.9
32	41	.3	1.2	81.1
33	45	.3	1.3	82.4
34	34	.3	1.0	83.4
35	45	.4	1.3	84.8
36	41	.3	1.2	85.9
37	48	.4	1.4	87.3
38	31	.2	.9	88.2
39	34	.3	1.0	89.2
40	27	.2	.8	90.0
41	31	.2	.9	90.9

<i>Year</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
42	34	.3	1.0	91.9
43	24	.2	.7	92.6
44	14	.1	.4	93.0
45	14	.1	.4	93.3
46	24	.2	.7	94.0
47	21	.2	.6	94.7
48	17	.1	.5	95.2
49	10	.1	.3	95.5
50	10	.1	.3	95.8
51	14	.1	.4	96.2
52	7	.0	.2	96.4
53	4	.0	.1	96.5
54	11	.1	.3	96.8
55	7	.1	.2	97.0
56	7	.1	.2	97.2
57	10	.1	.3	97.5
58	8	.1	.2	97.8
59	3	.0	.1	97.8
63	3	.0	.1	97.9
64	3	.0	.1	98.0
65	4	.0	.1	98.1
66	4	.0	.1	98.2
67	3	.0	.1	98.3
69	1	.0	.0	98.3
70	5	.0	.2	98.5
71	3	.0	.1	98.6
72	6	.0	.2	98.8
73	3	.0	.1	98.8
75	2	.0	.1	98.9
76	3	.0	.1	99.0
77	1	.0	.0	99.0
79	1	.0	.0	99.1
80	1	.0	.0	99.1
81	1	.0	.0	99.1
82	4	.0	.1	99.2
83	2	.0	.1	99.3
87	1	.0	.0	99.3
90	2	.0	.1	99.4
92	1	.0	.0	99.4
96	1	.0	.0	99.5
97	3	.0	.1	99.5
98	2	.0	.1	99.6
99	2	.0	.1	99.7
100	1	.0	.0	99.7

Year	Frequency	Percent	Valid Percent	Cumulative Percent
101	1	.0	.0	99.7
102	1	.0	.0	99.8
104	1	.0	.0	99.8
105	2	.0	.1	99.8
108	1	.0	.0	99.9
110	1	.0	.0	99.9
114	1	.0	.0	99.9
132	1	.0	.0	100.0
148	1	.0	.0	100.0
Total	3437	26.6	100.0	

Table 6: Half-Life of Books

Books	
Half-Life	16.08297
Q1	8.575188
Q3	28.95927

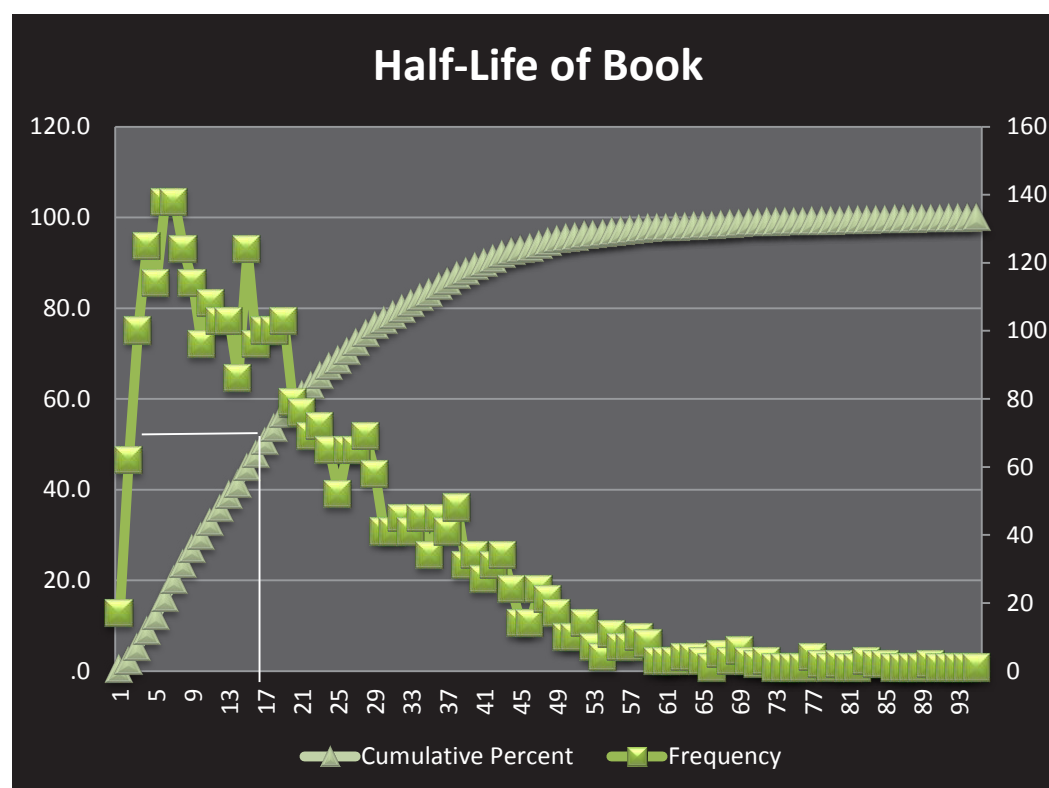


Fig. 4: Half-Life of Book

Results and Discussion

The obsolescence periods for the journals and books were calculated separately. Obsolescence periods were measured in terms of the half-life period. Quarter-life period and three-quarter period were also calculated. They are tabulated in Table 3 (for journals) to Table 6 (for books). The half-life period for journals was calculated 11 years and for that book, it was obtained 16 years. For journals, the three life periods were almost equally separated, whereas for books three-quarter period were slightly elongated. These observations should be correlated with the total life of both journals and books, which is 100 years. It can be concluded that the obsolescence of journals found more rapid than the obsolescence of books.

A graph is plotted taking the age of citations (in years) on X-axis and cumulative percentage of citations on Y-axis to find out the half-life of citations. A line parallel to the X-axis is drawn from a point say "A" representing the half of the citations to meet the curve say "B". Then, perpendicular to X-axis (BC) is drawn from point B to meet the X-axis at C. "C" represents the half-life period of citations.

The half-life value obtained by Brown (1980) for chemical literature is 9.3 years. Vimala (1997) obtained a half-life value of 16.22 years for biological sciences. Aruna Prasad Reddy (1999) obtained a half-life value of 17.84 years for chemistry and Mahapatra & Bhagavan Das (2000) obtained a half-life value of 17 years for geography. In general literature relating to descriptive aspects like properties of matter, basic methodology, etc., basic laws and basic concepts decline more slowly compared to empirical matter.

Findings and Conclusions

The citations of journals and books were analyzed to study obsolescence of literature in the LIS discipline and its sub-disciplines. The age-wise distribution of citations to journals and books revealed that nearly one-fourth of the total citations were 07 years old, more than half are 15 years old and nearly three-fourths were 23 years old.

The age-wise distribution of journal citations reflects a similar pattern. More than 25 percent of the journal citations were 5 years old, 50 percent of the journal

citations were 11 years old and 75 percent were 20 years old.

The age-wise distribution of book citations in LIS were also presented in the study. More than 25 percent of book citations were of 8 years old, 50 percent of citations were 16 years old and 75 percent were 27 years old.

The age-wise distribution of journals and books citations combines and individually indicate that most researchers in LIS referred 25 years old back literature to meet their information requirements.

The maximum age of journals in the present study was found 129 years, whereas in the case of books, it was found 148 years old literature. The title of the oldest cited journals was "Library Journal". The oldest cited book is "First Part of the Catalogue of English Printed Books" (1858).

The results in the present study indicate that the half-life of the period (median citation age) for journal literature was 11 years. The half-life period (median citation age) for books was found to be 16 years.

In the present study, obsolescence rate differs from one subject to another and also from one bibliographic form to another one. It is noticed that the half-life period is longer for books than for journals.

References

- Arora, J., & Kaur, S. P. (1994). Bibliometric analysis of core journals of immunology. *Annals of Library Science and Documentation*, 41(3), 84-94.
- Barooah, P. K., Begum, D., & Sharma, N. N. (1994). Bibliometric study of doctoral dissertations in organic chemistry submitted by S&T workers of RRL, Jorhat to evaluate the utility factor of the library. *Annals of Library Science and Documentation*, 46(1), 1-8.
- Biradar, B. S., & Sampath Kumar, B. T. (2003). Chemical technology literature: An obsolescence study. *Annals of Library and Information Studies*, 50(4), 156-162.
- Brown, P. (1980). The half-life of the chemical literature. *Journal of the American Society for Information Science*, 31, 61-65.
- Khurshid, A. (1996). Library education at graduate level in Pakistan, issues and practices. In S. U. Rehman, A. S. Chaudhry, & A. H. Qarshi (Eds.), *Library Education in Pakistan: Past, Present and Future* (pp. 11-28). Lahore: PULSAA.

- Kumar, N. (1985). *Citation analysis* (Ph.D. theses). Faculty of Management Studies', M.L.I.Sc. Project Report, University of Delhi.
- Line, M. B., & Sandison, A. (1974). An obsolescence and changes in the use of literature with time. *Journal of Documentation*, 30, 283-325.
- Mahapatra, M., & Das, B. (2000). Impact of research collaboration on growth literature in geology: A bibliometric study. *SRELS Journals of Information Management*, 37, 95-105.
- Suryanarayana, V. V. (2008). *Bibliometric study* (Doctoral theses). Library and Information Science awarded by Different Universities in Andhra Pradesh.
- Wadej, K. N. (2008). *Bibliometric study* (Doctoral dissertations). Science Faculty Awarded by SRTMU Nanded, M.Phil Dissertation, YCMOU, Nashik.