

Citation Analysis of Information Management Graduates' MPhil and PhD Theses in University of the Punjab, Lahore-Pakistan

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This study aims to explore the citation patterns of information management graduates' MPhil and Ph.D. theses submitted at the University of the Punjab, Lahore-Pakistan. It examined their core cited information sources in terms of gender, class, year-wise distribution of citations, the average number of citations, and authorship patterns in their citations. It identified the list of core cited information sources with several citations used by research graduates.

Citation analysis technique was used to determine the core cited information sources in 71 theses (60 MPhil and 11 Ph.D.) submitted to the Institute of Information Management (IIM), University of the Punjab (PU), Lahore, during the period of one decade 2008-2017. All 7013 identified references were examined and categorized in journals, books and books chapters, web-pages, theses, conference proceedings, reports, and newspapers.

Findings showed that both male and female MPhil/Ph.D. graduates frequently consulted and cited periodical literature i.e. journals (58.71%) followed by books and book chapters (20.72%). On an average MPhil graduates cited 80.85 sources and Ph.D. graduates cited 196.55 sources in writing up their theses. The authorship pattern of the citations showed the highest number of citations from single-authored work. Data revealed that information behavior was the favorite area among research graduates. Bradford's law of dispersion was applied to determine the list of most-cited journals and books. This study would be helpful for information professionals to understand the information needs of their patrons and to make informed decisions for building demand-driven collections. The findings of the study may apply to other LIS schools in the developing world with similar contexts.

Keywords: Citation analysis; MPhil & Ph.D. theses; Library science; Information management; Bradford's law; Authorship patterns; Journals.



INTRODUCTION

Citation analysis is a part of a bibliometric study and a valuable tool to study and examine the references given in scholarly communications (Meho, 2007). Referencing or citing a source or an author is an important part of academic writing. It allows the writer to acknowledge the ideas or work of others used in his/her work and to avoid plagiarism. Proper citation allows others to locate the materials used.

The basic element of citation analysis is 'Citation' defined as "a bibliographical entry in footnotes, reference list or bibliography that contains enough information, for example, author, title, publisher or journal-title to verify the original item" (Leiding, 2005, p. 418). Citations illustrate a link between two pieces of work, the citing and the cited (Cronin, 1984). This relationship between one document and another provides both a network of connections to related documents and access to original ideas (Davies & Cohen, 2001). Citation analysis provides an opportunity to scholars to find out the most important information source/s in the field. It is an examination of the frequency, patterns, number of times an article is cited by other works to measure the impact of a publication or author, graphs of citations in documents, etc.

The pioneering study of citation analysis to define the value of a journal was conducted by Gross and Gross in 1927. Since then it has been used most frequently to understand researchers' information needs, evaluate the importance of journal titles/scientific work in a particular discipline, generate the list of core cited information sources, investigate and assess library collection, etc. (Becker & Chiwar, 2015; Buttler, 1999; Chikata & Patil, 2008; Finlay et al., 2012; Gao et al., 2009; Sugimoto et al., 2011; Yang, 2011).

Application of Citation Analysis

Many citation analyses studies have been conducted based on particular disciplines such as biology (Admadieh, 2016; Brown, 2005; Miller, 2011; Nabe & Imre, 2008; Walcott, 1994), engineering, (Becker & Chiware, 2015; Eckel, 2009; Edwards, 1999; Williams & Fletcher, 2006; Yu *et al.*, 2006) and political science (Admadieh, 2016; Buchanan and Herubel, 1994; Knapp, 2013). Some papers contain comparative data from various disciplines (Feyereisen & Spoiden, 2009; Fransen, 2012; Kayongo & Helm, 2011; Leiding, 2005; Wilson & Tenopir, 2008). It has also been used by numerous researchers for the evaluation of theses and dissertations in different disciplines such as Art, Philosophy, Education, Classics, Religion, History,



Linguistics, Literature, Music and Political Science, etc. (Buchanan & Herubel, 1994; Haycock, 2004; Knapp, 2013; Knievel & Kellsey, 2005).

A number of citation analysis studies based on *specific user groups* have also been conducted such as graduate (Miller, 2011; Nabe & Imre, 2008; Walcott, 1994); undergraduate (Abeyrathne, 2015; Knight-Davis & Sung, 2008; Kohn & Gordon, 2014; Leiding, 2005) and faculty members (Currie & Monroe-Gulick, 2013; LaBonte, 2005; Salisbury & Smith, 2010; Wilson & Tenopir, 2008).

Institute of Information Management (IIM)

University of the Punjab (PU) found in 1882 located in Lahore-Pakistan. The University has five campuses, 17 faculties, 10 constituent colleges, over 85 departments, centers, institutes, schools, and 614 affiliated colleges. The Library and Information Science education was started by Asa Don Dickenson (an American Librarian) in 1915 in PU to offer a certificate course in librarianship. In 1959, it started a diploma in Library Science and a two-year Master's program was introduced in 1974. However, the research-oriented programs (MPhil and Ph.D.) were introduced in 2005 (Ameen & Warraich, 2014). The nomenclature was changed from Library and Information Science to Information Management in June 2014. Institute of Information Management (IIM) is privileged to have entire PhD faculty members and more research publications as compared to other LIS schools in the country (Warraich, Malik & Ameen, 2016). A total of 71 (i.e. 60 MPhil and 11 Ph.D.) degrees were awarded by IIM, PU during the period of the last decade 2008-2017.

Research Problem

Theses and dissertations are expected to be an original piece of research, acknowledging all sources of relevant knowledge used in its preparation (Peritz & Sor, 1990). Analysis of citations, cited in theses and dissertations has been a valuable tool to examine the researchers' information needs and how well the libraries address those needs. Hoffmann and Doucette (2012) argued that "citation analysis is a relatively straightforward tool for librarians to better understand the needs of their users and to analyze their collections (p. 326)."

Literature established the different aspects of citation analysis such as making lists of core-cited material, assessing the collection of library, and understanding the needs of a specific users' group; graduate or undergraduate students, etc. (Aksnes, Langfeldt & Wouters, 2019). Therefore, in the Pakistani context, until now it is one of the least explored areas of research and no study has



been conducted on this topic, so there is a need to conduct a study that explores the research graduates' core cited information sources with their weight through Bradford's law of dispersion. This citation analysis of information management researchers' theses leads to a better understanding of their information needs.

Objectives of the Study

1. To analyze the citation pattern of core cited information sources among research graduates in terms of their gender, program, and the average number of citations.
2. To identify research graduates' core cited information sources with their weight through Bradford's law of dispersion
3. To determine the core area of research and authorship patterns in citation

LITERATURE REVIEW

Literature established that a number of studies have used citation analysis of dissertation to identify the core cited information sources. Edward (1999) stated that graduate students are more frequent users of library sources, so their theses should have preferred sample material to determine what type of information sources they preferred for their academic writings. Dissertations are relatively easy to access and students prefer to choose and use the sources that are easily available and accessible to them. (Sherriff, 2010; Ahmadiéh, Nalbandian & Noubani, 2016). Das and Deka (2020) analyzed 2,725 citations in 27 LIS doctoral theses submitted to Manipur University during 1989-2017. The number of factors such as core cited journals, authorship pattern, chronological-wise distribution, the applicability of Bradford's law, and rank-wise list were examined. The result of the study indicated that journal articles were the most cited source followed by the books. The work of a single author was dominant in both journals and books. The study also discovered that LIS scholar prefers to use more primary sources of information than secondary and tertiary sources. Rieycraft and Whiteman (2020) analyzed 6570 citations in 78 master's theses submitted in environmental science at Florida Gulf Coast University during the period 2006 to 2016. They investigated many factors such as the format of cited sources, age, library holdings, etc. The study revealed that journal articles, books, and reports were the most commonly cited format. The finding showed that the average age of news articles was the most current, as compared to other information sources.

Flynn (2020) conducted a study to investigate the theses and dissertation submitted during a decade from 2009-2019 in the Mathematics and statistics

department at the University of Albany to examine the source format, age of citation, dispersion of journal title, etc. The study showed that the students preferred to cite journals 57% more than any other sources and universities provide access to most of the cited journal. Moreover, incomplete and incorrect citations of graduate students showed that they should understand the importance of citation management in their research work.

Timms (2018) analyzed serial citations in 72 marine biology masters' theses. From 1,035 unique serials, 123 primary titles were identified and examined for access. The result of the study showed the average citation age is 13.5 years. The study found the dispersion of cited serials is higher than that described by the 80/20 Rule and Bradford's Law. The result showed that 25% of cited serials need to account for 80% of citations. This study has identified the most cited serials among marine biology graduate students in their theses. Ahmadiéh, Nalbandian and Noubani (2016) conducted a comparative citation analysis study and analyzed 23316 citations of all 247 master theses of Biology, Mechanical Engineering, and Political Science disciplines submitted at the American University of Beirut (AUB), Lebanon during the span of ten years i.e. 2004-2013. The study showed that theses in biology accounted for the highest number of citations 57.74% (13463). The study indicated that students of biology and mechanical engineering prefer to cite periodical literature i.e. journals with 95.14 % and 61.03 % citations respectively whereas Monographs were cited mostly (39.90%) in the field of Political Science. The study listed the 15 most frequently cited journals of said fields.

Condic (2015) analyzed 11,082 citations compiled from 75 Ph.D. theses and 63 publications of faculty members span of 32 years 1983-2014. The study determined that faculty members preferred to cite periodical literature (52%) than Ph.D. graduates (45%) and overall citations to periodical literature were 47.04%. The study indicates that faculty members tend to cite more current sources (9.6-year-old) than the sources cited by the Ph.D. graduates (12.4 years). The study showed that Ph.D. graduates cite more books (40%) than the faculty members (36%). Citation ranges of Ph.D. theses fall between 41-280, and in faculty publication, it falls within 3-239 citations. An average number of 108 citations were found by Ph.D. graduates and 47 by faculty members' publications. Mahajan and Kumar (2016) analyzed 7490 citations from 60 Ph.D. theses in Public Administration discipline accepted and submitted at Panjabi University, Chandigarh, covering the period of one decade i.e. 2002-2012. The result of the study indicated that the highest number of citations was 3197 followed by journals with 2049 citations. The



work of a single author was dominant in both journals and books. Rosenberg (2015) examined 4904 citations gathered from 32 theses submitted in the Department of Sociology and Anthropology at Hebrew University of Jerusalem from 2010 to 2013 to determine the type of cited material, their format, language, year/age, and availability of cited resources in library holding. The study revealed that researchers preferred to cite monographs than journals and on average 70 citations in master theses and 331 were in Ph.D. dissertations.

Abeyrathne in 2015 conducted a study and analyzed 8224 citations from 204 undergraduate students' dissertations, submitted at the faculty of Agriculture, University of the Peradeniya, Sri Lanka. The study revealed that more than half (56.71%) of the citations belong to journals (4,664). Books are the second highly cited information source with 1699 (20.66%) citations. Veerabasavaiah and Padmavathi (2014) examined 6688 citations gathered from 42 doctoral theses submitted at Bangalore University, Bangalore, in the field of education between the periods 2003-2012. The results of the study showed that journals got 39.43% highest number of citations, followed by theses/dissertations (37.93%), reports (9.20%) and websites (5.05%). Currie and Monroe (2013) analyzed 14511 citations were compiled from all faculty publications published from 2012 to 2013. The study revealed that overall journals were cited more than books (66% to 28%). The study identified that books were cited more frequently than journals by faculty members of humanities and social sciences disciplines. The study concluded that researchers in sciences and social sciences disciplines prefer to cite the material in their relative subject areas whereas scholars in the field of humanities often prefer to cite the material from non-humanities disciplines.

Sharif and Mahmood (2004) conducted a citation analysis of two leading economic journals i.e. Pakistan Development Review (PDR) and the Pakistan Economic and Social Review (PESR) to find the citing pattern/format of their scholarly communication. Overall, eight volumes of each journal were selected to cover the period of the last forty (40) years from 1969 to 2000. A total of 5,414 references were analyzed (4,113 citations from PDR and 1,298 from PESR) from 303 articles. Data showed that the work of single authors was dominant in both journals. The study revealed that monographs were cited more frequently and authors prefer to cite foreign books and journals. In the local context, a bibliographic analysis of '*Pakistan Journal of Information Management and Libraries*' formally known as '*Pakistan Journal of Library and Information Science (PJLIS)*' was conducted. A total of 111 publications from 11 issues of PJLIS were



published from 1995 to 2010. It has outstanding contribution in the dissemination of LIS research on the national and international level and it used different parameters including author productivity, authors' collaboration and institutional affiliation, type of publication, the language of papers, and a number of citations used per article (Warriach & Ahmad, 2011).

The literature of citation analysis covered a wide range of subject areas including science, medicine or health, social science, and engineering. Only a few of them were conducted in the area of LIS or information Management with research graduates, master students and faculty. The types of publications examined were journal articles, theses or dissertations, and student papers. Some studies examined two or more types of publication, subject area, and user group.

METHODOLOGY

A quantitative research design based on citation analysis of reference list/s of information management research graduates' theses was used to meet the objective of the study. The references given at the end of each thesis were photocopied and a total of 7013 references were examined. All the references are categorized according to format or genre, such as journals, books and books chapters, web pages, theses, conference papers/proceedings, reports, and newspapers were identified. For every thesis, bibliographic information (such as title, author, year of publication, document type) was gathered for each citation in the reference list/s.

The sources whose format was not identified such as PowerPoint presentations, lecture notes, audio-visual material, microfilm, chips, government publications, etc. put under the "other" category. Two separate MS-Excel worksheets were used to store and analyze the data gathered from reference list/s. One worksheet was used to compile the bibliographic information (title, author, year of publication, document type) gathered for each reference list/s. The second worksheet was used to determine the list of core cited journals/ periodicals, monographs, etc. in the field of information management. Bradford's law of scattering (1934) was applied to find out the core list of journals, monographs. Waugh and Ruppel (2014) stated that presenting the result of citations analysis in the form of the highest to lowest number of books/journals would be misleading. So, to present the result of citation analysis more accurately, the authors applied the following weighted Index formula to rank the sources (books or journals, etc.).

Formula: Weight Index= (Number of Student Cited / Total Number of Students) x Number of times Cited

FINDINGS AND DISCUSSION

A total of 71 theses (60 MPhil and 11 Ph.D.) were gathered and analyzed and a total of 7013 references were examined. The findings showed that 71 theses were submitted in the IIM during the period of 2008-2017. Thirty-three (46.47%) male graduates and 38 (53.52%) female graduates submitted their theses in one decade (Figure 1).

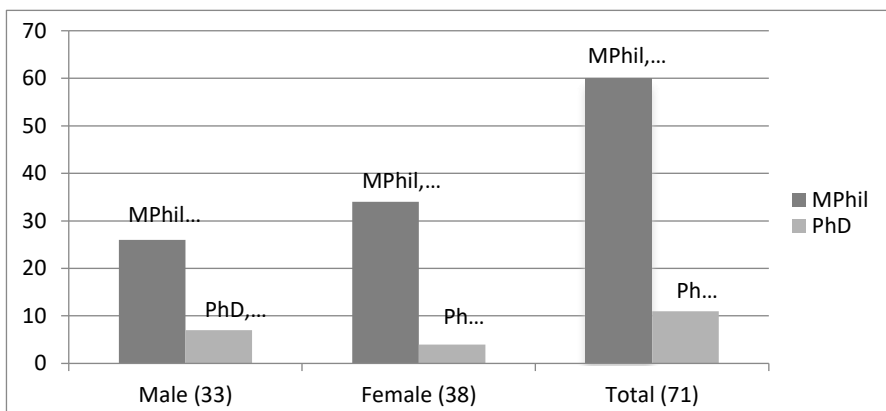


Figure 1. Gender Wise dispersion of Theses

Among 33 theses of male graduates, 26 (79%) were submitted by MPhil graduates and 7 (21%) by Ph.D. graduates. Whereas out of 38 theses of female graduates, 34 (89%) were submitted by MPhil and only 4 (11%) theses were submitted by Ph.D. graduates during 2008-2017. Data also indicated that 60 (85%) theses were submitted by MPhil graduates and 11 (15%) by Ph.D. graduates from 2008-2017.

Table 1 illustrated period (year) wise dispersion of theses submitted by the MPhil and Ph.D. graduates. The data showed that in the year 2017 highest number of theses i.e. 15 were submitted, followed by 14 in the year 2011 and 13 in the year 2016 respectively. Data also showed that no Ph.D. thesis was submitted in the year 2008-2010, 2013 and 2014. The highest numbers of MPhil theses (13) were submitted in the year 2017, and the highest numbers of PhD theses (3) were submitted in the year 2011 and 2016.

Table 1

Year-wise detail of Theses submitted to IIM



Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
	3	2	2	11	4	1	7	7	10	13	60
MPhil	0	0	0	3	2	0	0	1	3	2	11
PhD											
Total	3	2	2	14	6	1	7	8	13	15	71

The results of the study showed that submission of MPhil and PhD theses was gradually increasing from 2008 to 2017.

Core Cited Information Sources among Research Graduates

Table 2 indicated that a variety of information sources were cited by MPhil and Ph.D. graduates. The most frequently cited information source was journals with 4117(58.71%) citations and mean value 58.01 followed by books with 1453 (20.72%) citations, and 20.45 mean value.

Seventy-one theses cited 7013 sources. Findings showed that 60 MPhil graduates cited 4851 sources in writing up their theses. The range of citations fell between 39 to 274 citations and the average number of citations in MPhil theses was 80.85. While 11 Ph.D. graduates cited 2162 sources in preparing their theses. The range of citations was from 132 to 478 citations. The average number of citations in Ph.D. theses is 196.55. The overall average number of citations in both MPhil and Ph.D. theses was 98.77 and the range of citations fell between 39 to 478 (Table 2). The results of the study revealed that both male and female MPhil and Ph.D. graduates preferred to cite journal articles (4117 citations) than any other format. There were a number of possible reasons to cite the journal articles as mentioned by Olatokun and Makinde (2009) such as ease of access, currentness of articles, quality and trustworthiness of research, proper peer reviews. The findings of the current study were in line with the findings of previous studies that confirm the most frequent use of periodical literature (Buttler, 1999; Fransen, 2012; Gao et al., 2009; Kelsey & Dimond, 2003; Waugh & Ruppel, 2004).

Table 2

Information sources cited by MPhil & PhD Graduates (N=71)

Items	MPhil (60)	Ph.D. (11)	Citations	%	M	SD
Journal	1179	2938	4117	58.71	58.01	34.12
Books & book chapters	976	477	1453	20.72	20.45	23.30
Webpages	332	249	581	8.28	8.18	13.56
Theses	251	137	388	5.53	5.46	7.72
Conference Papers	73	189	262	3.71	3.69	4.07
Reports	40	32	72	1.03	1.01	1.05
Others	107	6	113	1.54	1.58	1.90
Newspaper	18	9	27	0.38	0.38	1.81
Total	4851(69.16%)	2162(30.84%)	7013	100		
Minimum	39	132				
Maximum	274	478				
Average	80.85	196.55				

Newspapers were the least preferred source and got only 27 citations. This meant that MPhil and Ph.D. graduates do not prefer to cite newspapers.

Books and book chapters were the second highly cited source that made up 20.72 % of the total citations.

Table 3

Gender wise Citation Analysis of Information sources cited by Graduates (N=71)

Gender	Theses	Percent	Citations				
			Total	Percent	Avg.	Min	Max
Female	38	53.52	3534	50.39	93.00	40	478
Male	33	46.47	3479	49.61	105.42	39	274
Total	71	100.00	7013	100	98.77	39	478

Table 3 shows gender-wise analysis of citation by MPhil and Ph.D. graduates. It showed that 33 male and 38 female graduates submitted their theses during 2008-17. This finding was consistent with the gender ratio of the IIM. Male

graduates cited 3479 sources in writing up their theses. The range of citations fell between 39 to 274 citations. The average number of citations in the theses of male graduates was 105.42.

Female researchers cited 3534 sources in preparing their theses. The range of citations fell between 40 to 478 citations. The average number of citations in these female graduates was 93.00. The overall average number of citations was 98.77 and the range of citations fell between 39 to 478.

Table 4

Chronological dispersion of Citations of all cited sources

Sr. #	Year	Age of Distribution	No. of Citations	Cumulative Citation	Cumulative %age
20	2017	1	20	20	0.32
19	2016	2	66	86	1.36
18	2015	3	120	206	3.26
17	2014	4	165	371	5.87
16	2013	5	213	584	9.24
15	2012	6	215	799	12.64
14	2011	7	288	1087	17.19
13	2010	8	296	1383	21.87
12	2009	9	335	1718	27.17
11	2008	10	323	2041	32.28
10	2007	11	368	2409	38.10
9	2006	12	323	2732	43.21
8	2001-2005	13-17	1454	4186	66.20
7	1996-2000	18-22	879	5065	80.10
6	1991-1995	23-27	466	5531	87.47
5	1986-1990	28-32	252	5783	91.46
4	1981-1985	33-37	175	5958	94.23
3	1976-1980	38-42	139	6097	96.43
2	1971-1975	43-47	84	6181	97.75
1	before-1970	before-48	142	6323	100.00

Table 4 showed the chronological dispersion of citations. It indicated the relevance and current-ness of information sources being used by the researchers to

write up their theses. Results show a total of 2732 citations aged between 1-12 years old. It indicated that LIS graduates preferred to cite the most recent information sources relevant to their topic. The finding of the current study was similar to the finding of Keat and Kaur (2008) who indicated that graduates preferred to cite the information sources aged between 6-10 years old. There are also 142 citations as old as 48 years still being used. Generally, it can be assumed that MPhil and Ph.D. graduates preferred to cite more recent information sources relevant to their topic.

Core Cited Journals and Books

A total number of 1132 journal titles contributed 4117 citations and 1045 books titles contributed 1453 citations in the current study from 2008 to 2017. The details of journals and books titles with the number of times they cited is presented in Table 5:

Table 5

Distribution of Journals and Books with a Number of Citations

Number of Journals	Times cited	%age	Number of Books	Times cited	%
709	1time	62.63	891	1 time	85.26
319	2 to 5 times	28.18	138	2 to 7 times	13.20
82	6 to 34 times	7.24	16	8 or more times	1.53
22	35 or more times	1.94			

Data showed that 22 journal titles were cited 35 or more times, followed by 82 journal titles that were cited 6-34 times and 319 journal titles were cited two to five times. While the majority of journal titles (709) were cited only once.

Table 5 also revealed the distribution of citations to the number of books. It showed that 16 books titles were cited eight or more times, followed by 138 books titles that were cited two to seven times. While the majority of book titles (891) were cited only once.

Top-Ranked Journals by their Weight

Table 6 showed a list of the top 20 high-ranked journals that comprised 1404 citations and it was 34.10% of total citations. The findings of the study showed that 'The Journal of Academic Librarianship' was top on the list, 36 students cited it 137 times and its weight was 69.46%. Moreover, 'Library Philosophy and Practice' had

106 citations, ranked at number two in the list, 43 students cited it and its weight was 64.20%. 'Library Review' was ranked at number three in the list and 40 students cited it 100 times and its weight was 56.34%.

Table 6

List of 20 Top-ranked Journals along with Weight by graduates (N=71)

Ranked	Title	No. of students			Times cited	Weighted index
		MPhil	Ph.D.	Total		
1	The Journal of Academic Librarianship	26	10	36	137	69.46
2	Library Philosophy and Practice	34	9	43	106	64.20
3	Library Review	32	8	40	100	56.34
4	Library & Information Science Research	27	8	35	95	46.83
5	Library Management	26	5	31	107	46.72
6	Pakistan Library & Information Science Journal	29	8	37	85	44.30
7	College & Research Libraries	26	6	32	88	39.66
8	Pakistan Journal of Information Management & Libraries (PJIM&L)	30	8	38	56	29.97
9	Journal of Documentation	19	6	25	82	28.87
10	Library Trends	27	7	34	59	28.25
11	The International Information & Library Review	18	10	28	68	26.82
12	Information Research: An International Electronic Journal	16	5	21	69	20.41
13	The Electronic Library	15	9	24	58	19.61
14	Malaysian Journal of Library & Information Science	19	6	25	48	16.90
15	Journal of the Medical Library Association	18	1	19	56	14.99
16	Libri	18	6	24	34	11.49



Ranked	Title	No. of students			Times cited	Weighted index
		MPhil	Ph.D.	Total		
17	Information Development	12	8	20	39	10.99
18	New Library World	14	6	20	38	10.70
19	Journal of Information Science	12	5	17	42	10.06
20	Journal of Library Administration	15	3	18	37	9.38

Among core Pakistani LIS journals, data showed that MPhil and PhD graduates preferred to cite '*Pakistan Library & Information Science Journal*' (PLISJ) with 85 citations and ranked at number seven in the list. Moreover, 37 students cited PLISJ and its weight was 44.30%. Thirty-eight students cited '*Pakistan Journal of Information Management & Libraries*' (PJIM&L) with 56 citations ranked at number eight in the list, and its weight was 29.97%.

Table 7

List of 7 top Ranked Books with Weight by MPhil and Ph.D. graduates (N=71)

Ranke d	Title	No. of students			Times cited	Weighted index
		MPhi l	Ph.D .	Total		
1	Basic Research Methods for Librarians	13	7	20	23	6.48
2	Research design: Qualitative, quantitative and mixed methods approaches	13	4	17	23	5.51
3	Research methods for Business: A skill building approach	8	1	9	13	1.65
4	Encyclopedia of Library and information Science	5	3	8	14	1.58
5	Library education in Pakistan: past, present and future	5	2	7	16	1.58
6	Looking for information: A survey of research on information seeking, needs and	9	1	10	10	1.41

behavior						
Ranked	Title	No. of students			Times cited	Weighted index
		MPhil	Ph.D.	Total		
7	Qualitative research for the information professional: A practical handbook	8	2	10	10	1.41
8	International Encyclopedia of Information and Library Science	6	2	8	11	1.24
9	Seeking meaning: A process approach to library and information services	6	2	8	11	1.24
10	Harrod's librarians' glossary and reference book	4	4	8	9	1.01

Table 7 shows the list of the top seven high-ranked books that were cited by both MPhil and Ph.D. graduates from 2008 through 2017. These seven high-ranked books enlisted 10 titles of books that accounted for 140 citations, which was 9.64% of total citations. Data showed that the most cited book was *'Basic Research Methods for Librarians'* with 23 citations, and 20 research graduates cited it and its weight was 6.48%. Likewise, 17 students cited *'Research design: Qualitative, quantitative and mixed methods approaches'* 23 times and its weight was 5.51%. *'Research methods for Business: A skill building approach'* was cited by nine students thirteen times and its weight was 1.65 %.

Table 8 indicated the list of 15 core areas of research for MPhil and Ph.D. graduates. Data showed that *'Information Needs, Use, Seeking Behavior'* was the preferred area of research for 17 MPhil and Ph.D. graduates for their theses. The second most preferred area of research was *'Library Services and Sources'* and eight research graduates did their theses on this area. Furthermore, the use of information technology/websites/social media was chosen by 7 research graduates for their dissertations. Information literacy skills, and job satisfaction and motivation stood at number four and five respectively in order of preference.

These five areas accounted for 60.56 percent of theses submitted between 2008 and 2017.

Core Area of Research

Table 8

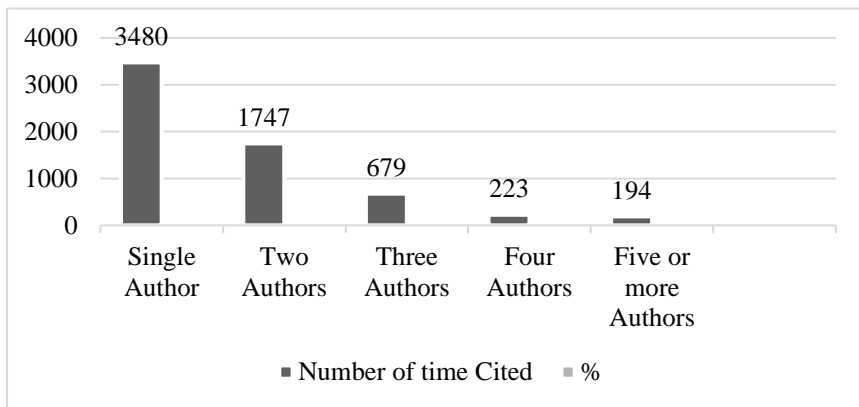
Areas of Research for MPhil and Ph.D. graduates (N=71)

Sr. #	Area of Research	Frequency	%age	Cumulative Frequency	Cumulative %age
1	Information Behavior	17	23.94	17	23.94
2	Library Services and Sources	8	11.27	25	35.21
3	Use of Information Technology/Websites/social media	7	9.86	32	45.07
4	Information Literacy Skills	6	8.45	38	53.52
5	Job satisfaction & Motivation	5	7.04	43	60.56
6	Reading Habits	4	5.63	47	66.20
7	Leadership	4	5.63	51	71.83
8	Information Management	4	5.63	55	77.46
9	Academic Libraries	3	4.23	58	81.69
10	Bibliometric Studies	3	4.23	61	85.92
11	Library Automation/Digitization	3	4.23	64	90.14
12	Knowledge Sharing	2	2.82	66	92.96
13	Training Needs and Evaluation	2	2.82	68	95.77
14	Library Management	2	2.82	70	98.59
15	Green Work Practices	1	1.41	71	100

The remaining 39.44% are from other areas of research as mentioned in the list from serial numbers 6-15. Overall, 32 (45%) graduates preferred to conduct their research work in the following three areas: Information Behavior, Library Services and Sources, and Use of Information Technology/ Websites/social media. Now it is time for LIS graduates of the IIM, University of the Punjab, to explore and

widen their research area. Figure 2 showed the authorship pattern of all cited sources. There were 7013 citations identified in the analysis. However, total of 6323 citations were examined to ascertain the authorship pattern of cited sources by MPhil and Ph.D. graduates. Authorship of some of the cited documents such as websites, government/ institutional publications were not identified, labeled as other (690) not included in this analysis.

Authorship Patten



More than half of the citations, 3480 (55.04%), were belong to single author and were cited only once by the MPhil and Ph.D. graduates. The remaining 2843 (45.96 %) citations were cited by two or more authors.

The finding of the study indicated that the majority of citations 3480(55.04%) by MPhil and Ph.D. graduates were from a single author followed by two authors with 1747(27.63%) citations. It showed that single authorship was dominant than joint authorship in all cited sources, it may be due to the single authors number of information sources and piece of literature.

The finding of the current study was in line with the finding of earlier studies (Hart, 2007; Mahajan & Kuman, 2016; Tiew, 2006) who also indicated that the single authorship pattern was the most dominant.

Limitation of the Study

Current study is limited to all 71 theses submitted by the MPhil and Ph.D. graduates from 2008-2017 in the Institute of Information Management, University of the Punjab, Lahore. The further study may also be conducted taking the sample

of theses submitted by research graduates in the other social sciences departments of University of the Punjab, Lahore

Inaccuracies in Reference List/s

Researchers noted different inaccuracies in the bibliographic format of reference list/s such as typographical/errors, the main source of articles, year of publication, volume number, etc. were missing or omitted and different citation style were followed. It was evident that more help and guidance was needed in creating an accurate reference list by following a proper citation style.

CONCLUSION

The current study examined 7013 citations in all 71 theses submitted by the MPhil and Ph.D. graduates in the Institute of Information Management, PU, Lahore, from 2008 to 2017. The study applied the bibliometric approach (citation analysis) to analyze the citation patterns of graduates. The study identified that both male and female MPhil/Ph.D. graduates frequently consulted journals followed by books and book chapters than any other format in writing up their theses. Overall, Ph.D. graduates cited more information sources (196.54) as compared to MPhil graduates (80.85). However, male graduates cited 105.42 sources whereas; female graduates cited 93.00 sources in their dissertations.

Both MPhil and Ph.D. graduates preferred to cite the most recent sources relevant to their topic. Information behavior is the most preferred area of research for them. Authorship pattern showed a higher weightage to single-authored works, a list of core cited journals and books was prepared by applying Bradford's law of scattering.

The study is unique in that it shows a pattern that how MPhil and Ph.D. graduates cite information sources in their academic writings and it serves as a baseline indicator of resources used by information management graduates. It also implies the age of the digital era where information is available in multiple channels, how well the libraries utilize their limited financial resources to meet the demand-driven information needs of their patrons and to make informed decisions to develop their collection. Further, research may also be conducted from MPhil and Ph.D. theses of other Public and Private sector LIS schools to compare the findings of the current study for a broader understanding of information used in the discipline along with the differences and similarities that exist.

Based on the findings of the study, information professionals may organize more information literacy sessions and training workshops to make researchers

more aware of the available information sources along with citation management tools such as Mendeley, Endnote, Zotero, etc. This study could be followed up with masters' students at PU to illuminate how sources are chosen, accessed, and used during their academic writings.

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