CHAPTER – 1
INTRODUCTION
1. INTRODUCTION

Generally, scientists or researchers refer to the previous related works in their research reports at the time of documenting. These bibliographic references are believed to recognize those former researchers whose perceptions, assumptions, methods, equipments, and so on, encouraged or were used by the author in his/her reported work. This tradition is sometimes said to be as old as science itself (Price, 1963) and the historians of science disagree with one another about the origin of the reference. According to Grafton (1971), the historians of science demand that birth of the modern reference appeared in the twelfth, seventeenth, eighteenth, or nineteenth century. On the other hand, Mustelin (1988) maintains that prior to the sixteenth century, authors reported their works without proper recognition of their predecessors. From the later part of the sixteenth century, authors of scientific works attempted to furnish their reports with greater evidential weight by noting and referring to other sources. Nowadays, open references are supposed to be essential in order to communicate well.

Citation analysis is consequently taken to represent the analysis of bibliographic references which form part of the apparatus of scholarly communication. In evaluative citation analysis, citations are used as indicators or measurements of the level of influence, quality, and importance, performance of individual documents, people, journals, groups, nations or domains i.e. subject area, fields and disciplines (Narin, 1976). Recency of citation is one type of citation analysis which indicates the recency of cited items as well as the articles.
1.1 Statement of Problem

The title of this research study is “Recency Pattern of Citations: An Analytical Study of Citations of Articles Published in Library and Information Science”. It is a citation based analytical study. Reference section of an article contains varieties of citations with their publication years. Generally, publication years of cited items are older than the publication year of that article. Recency is the computation of the ages of citations of an article which determines the recency of that article. This analytical study aims at the development of a tool for measuring recency and finds the recency pattern of citations as well as articles published in Library and Information Science.

1.2 Need for the Study

Citations based studies have been carried out since past years though the use of citations is a critical aspect in the creation and dissemination of information. Citation analysis is the assessment of the regularity, patterns, and graphs of citations in articles and books. It uses citations in scholarly works to establish links to other works. Citations based measures are bibliographic coupling, co-citation analysis, H-index, impact factor, citation impact, citation index, immediacy index and so on. But none of those studies measures the age of cited items directly or indirectly.

The publication years of the cited documents in an article are the most important information in citation analysis. All the cited documents in an article contain their publication years. Those publication years indicate how old the cited items are. Patterns of the publication years of the cited items help to measure the recency of citations of one’s work. It is clear that if the author uses most current citations to frame an article, the article will be the most current one by nature of recency. Massive publications of articles with current citations on a subject indicate
the rapid development of that subject. Therefore, the recency is useful to know the age patterns of citations, recency of articles, authors’ information seeking behaviours, research activities on a topic and to compare the state-of-the-art of the articles on a particular topic and so on.

1.3 Objectives of the Study

This study examines each of the citations of the articles published in four Library and Information Science journals during the period of ten years. A set of objectives is employed for this study. These objectives are given below:

1. To develop a tool for measuring recency values;
2. To identify the various types of cited items of the articles;
3. To find out the recency values of the articles published in the four journals;
4. To uncover the relation, if any, between authorship patterns and recency values;
5. To reveal the patterns of recency values of articles during the period of ten years;
6. To demonstrate the distribution of cited items in each individual journal;
7. To compare the numbers of articles and citations published in four journals;
8. To expose the association, if any, between recency values and article impacts;
9. To illustrate how various types of citations influence the recency values;
10. To show the relationship between article types and recency of articles;
11. To express the variations of average citations of articles in four journals;
12. To state the relation, if any, between the topics of articles and the recency values.
1.4 Scope and Coverage

This research study requires the boundaries in respect of subject, period, journals, articles and citations. All of them are discussed below:

1.4.1 Subject and Place:

The title of this research clears that the recency values of citations are measured for the articles published on Library and Information Science. All the journals are selected from this subject area. Some of the articles published in those journals belong to both, library & information science and computer science. All of those articles are included in this study. The detailed steps of the journal selection procedures are given in Data Collection section. As all of the journals are selected on the basis of SJR ranks, there is no scope to consider place or country.

1.4.2 Language:

All of the articles and citations are collected from various sources for this study. These articles and citations have been published or translated in English language. All the steps of the study are accomplished in English language. Therefore, English is the only as well as main language in this research work.

1.4.3 Period Coverage:

The articles published in the four journals during the period of ten years i.e. from 2001 to 2010 are considered for this study. All the citations have their publication years of 2010 and preceding years. A few numbers of citations are located in the year 2011. All of those citations are excluded from this study. Therefore, the present study covers a period of ten years ranging from 2001 to 2010.
1.4.4 Journal Coverage:

A list of journals of library and information science is available in the website of SCImago Journal and Country Rank. All the journals are arranged according to SJR ranks (details in data collection section). Four top ranking journals are taken for this study. The detailed descriptions of the journals are given below:

Table no.3: Statement showing journals with SJR ranks

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Title</th>
<th>ISSN</th>
<th>SJR</th>
<th>H index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Information Systems Research</td>
<td>15265536</td>
<td>3.023</td>
<td>90</td>
</tr>
<tr>
<td>2</td>
<td>College and Research Libraries</td>
<td>00100870</td>
<td>2.374</td>
<td>28</td>
</tr>
<tr>
<td>3</td>
<td>Library Quarterly</td>
<td>1549652X</td>
<td>1.787</td>
<td>22</td>
</tr>
<tr>
<td>4</td>
<td>Information Processing and Management</td>
<td>18735371</td>
<td>1.764</td>
<td>58</td>
</tr>
</tbody>
</table>

The SJR ranks of the articles are displayed for the year 2010 and all of the data are available in the website of SCImago Journal & Country Rank.

1.4.5 Article Coverage:

A total of 1307 articles published during the period of ten years is taken from four journals. The numbers of articles in Information System Research, College and Research Libraries, Library Quarterly and Information Processing and Management are 252, 255, 163 and 637 respectively. Year wise collected articles are given below:

Table no.4: Statement showing year wise collected articles

<table>
<thead>
<tr>
<th>Year</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Articles</td>
<td>111</td>
<td>108</td>
<td>87</td>
<td>98</td>
<td>156</td>
<td>172</td>
<td>123</td>
<td>175</td>
<td>121</td>
<td>156</td>
<td>1307</td>
</tr>
</tbody>
</table>
1.4.6 Citation Coverage:

All the citations are collected from the above mentioned four journals but a total of 48213 citations is considered for this study. A small number of citations having no attributes for calculations are excluded from this study. The detailed descriptions are given in Data Collection section. The numbers of citations in Information System Research, College and Research Libraries, Library Quarterly and Information Processing and Management are 14466, 5507, 7833 and 20407 respectively. Following table shows the year wise collected citations from the above mentioned four journals:

**Table no.5: Statement showing year wise collected citations**

<table>
<thead>
<tr>
<th>Year</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Citations</td>
<td>4058</td>
<td>4123</td>
<td>2819</td>
<td>3394</td>
<td>5669</td>
<td>5763</td>
<td>4037</td>
<td>6519</td>
<td>5237</td>
<td>6594</td>
<td>48213</td>
</tr>
</tbody>
</table>
1.5 Methodology

A series of steps and processes have been followed from data collections to representations and analyses to findings. All of the steps and methods are described below:

1.5.1 Process of Data Collection:

Various searching and browsing techniques are applied to collect of bibliographical as well as citation data. A paper and pencil methods is followed to track the records collected from various sources. A separate section for the details of data collection is given.

1.5.2 Data Manipulation:

Bibliographical and citation information of an individual article are collected from the website of Scopus database in HTML and RIS format. The downloaded HTML files contain the details of bibliographic information which are compatible to any browser in offline mode. The RIS formatted files are compatible in Reference Manager Software. All the citations are collected in RIS formatted files. The Software ‘Reference Manager Version 12’ is used for the manipulation of collected data at primary stage. The Microsoft Excel 2007 (MS Excel) and Microsoft Access 2007 (MS Access) are used for compilation of data in a single file. For the purpose of data representation, calculation and evaluation, a small software is developed in PHP language with MYSQL database by me. The large volumes of data are exported from Microsoft Access to that software at the final stage of data manipulation.

1.5.3 Methods of Representation:

All the collected data are tabulated and represented by using the above mentioned Software and MS Excel. All the charts in each section of this report are
prepared by using corresponding tables. Different types of charts like bar charts, pie charts, line charts etc. are used for findings the results. In all of the charts, horizontal axis and vertical axis are represented by $x$ and $y$ respectively. Some of the charts have trend line curves. All the trend line curves are straight lines with the equation of $y = mx + c$ where $m$ is the slope of the curve. Therefore, both, the tables and the charts are used for representing numerical data. Textual data are represented in general formats of paragraph styles. The detailed descriptions of arrangement of articles in Main Entry have been given at the beginning of that chapter separately.

1.5.4 Grouping of Citation Information:

To identify the types of citations, all the collected citations are examined exhaustively and exclusively. Then all of the citations are grouped into nine categories. Some of the citations are beyond those nine categories. So the tenth group called ‘Others’ is formed taking all of those different types of citations. Therefore, a total of ten groups is composed for all the citations completely. Each of the groups contains same types of documents except for the group ‘Others’. For example, the group ‘Books’ contains all the published books in print or digital formats but the group ‘Others’ contains different types of documents i.e. patents, letters, notes, Braille documents etc. The following table shows the details of the groups. Groups of citations are arranged alphabetically:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Group of citations</th>
<th>Nature of documents</th>
</tr>
</thead>
</table>

Table no.6: Statement showing different types of citations
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Group of citations</th>
<th>Nature of documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Books</td>
<td>Printed books, digitized books, books available in online etc.</td>
</tr>
<tr>
<td>2</td>
<td>Conference proceedings</td>
<td>Papers presented in conferences, seminars, workshops, papers discussed in World Congress, Lecture notes, conference proceedings published with ISBN etc. are available in print format as well as online digital formats.</td>
</tr>
<tr>
<td>3</td>
<td>Dissertations</td>
<td>Print and digital formats of theses, dissertations, research papers, master’s papers etc.</td>
</tr>
<tr>
<td>4</td>
<td>Journal articles</td>
<td>Articles published in print journals and online journals, bulletin, magazine etc.</td>
</tr>
<tr>
<td>5</td>
<td>Manuscripts</td>
<td>Manuscripts, available in print and digital formats.</td>
</tr>
<tr>
<td>6</td>
<td>Newspapers</td>
<td>Print and online newspapers,</td>
</tr>
<tr>
<td>7</td>
<td>Others</td>
<td>Personal communications, standards, occasional papers, old records, record boxes, course materials, trustee records, war collections, Braille documents, video cassettes, miscellaneous documents, patents, letters and so on.</td>
</tr>
<tr>
<td>8</td>
<td>Reports</td>
<td>Technical reports, business reports, annual reports, government reports, special reports published in book forms etc. are available in both of the formats –</td>
</tr>
<tr>
<td>Sl. No.</td>
<td>Group of citations</td>
<td>Nature of documents</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td></td>
<td>print as well as digital formats.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Web documents</td>
<td>Email documents, blog entries, information taken from any social medias, wiki entries, Comments from online forums etc.</td>
</tr>
<tr>
<td>10</td>
<td>Working papers</td>
<td>Any working papers available in print and digital formats.</td>
</tr>
</tbody>
</table>

All the above groups are abbreviated by single or two letter(s) for suitable and compact representations of each entry in main entry section. A detailed list of abbreviation is given earlier of this chapter.

1.5.5 Representation of Citations:

All the articles with bibliographical information are arranged according to APA style in the chapter ‘Main Entry’. Citations of those articles are arranged alphabetically with their abbreviated groups after their bibliographical information. A number within square brackets after bibliographical information of each article represents total number of citations in that article. Then each of the groups of citations begins with abbreviated letter(s) representing that group. Each group is followed by the abbreviated publication year(s) of the cited items. Two or more citations in same groups having same years of publication are represented within the first brackets under that group. Other square brackets after each group represent the total number of citations for that group. Each of the groups is separated by semicolon. An illustrated sample entry of citations is provided in earlier part of the chapter ‘Main Entry’.
1.5.6 Calculation of Recency Values:

A separate section for detailed descriptions of calculation process of recency values has been given later. A recency value represents the currency of the article. Recency of citations means the age of citations of a published article. The publication years of cited documents indicate how old the cited items are. Pattern of the publication years of the cited items helps to measure the recency of citations of one’s work. All the years of cited items are significant to calculate recency value of the article. Recency value is a statistical measure which is calculated in the next year of published article. The calculating year is called ‘measurement year’ (publication year of article + 1). Recency value of an article is the average value of inverse of difference between measurement year and citation years. This study does not consider the total recency value of an article. So, average recency values of all the collected articles have been calculated. In this study average recency value is called ‘recency value’ in all cases. Average recency value or recency value ranges between the values of 0 and 1. In all of the sections in this research report, each recency value shows four decimal places in number.
1.6 Data Collection:

Data collection is the most significant part in this study. Several steps have been followed for collecting bibliographic and citation data. These steps are discussed below:

1.6.1 Selection of Abstracting Database:

Four bibliographic databases have primarily been compared for data collection. These databases are Google Scholar, PubMed, Scopus and Web of Science. “All databases were practical in use and offered numerous search facilities…. For citation analysis, Scopus offers about 20% more coverage than Web of Science, whereas Google Scholar offers results of inconsistent accuracy. PubMed remains an optimal tool in biomedical electronic research. Scopus covers a wider journal range, of help both in keyword searching and citation analysis” (Falagas et al., 2008). Scopus is easy to navigate and has the ability to search both forward and backward from a particular citation. Therefore, the Scopus database has been selected for collecting data.

1.6.2 Selection of Journals:

A list of journals of Library and Information Science is available in the website of SCImago Journal Rank (in scimagojr.com) for the year 2010. All the journals in this list are ranked by the SJR and H-Index. The SCImago Journal & Country Rank is a portal that includes the journals and country scientific indicators developed from the information contained in the Scopus® database. Ranking parameters of this list are as follows:

- Subject Area: Social Sciences
- Subject Category: Library and Information Sciences
• Country: All  
• Year: 2010  
• Order By: SJR

Four top ranking (according to SJR) journals are selected from the list for the study. These are Information System Research (3.02), College and Research Libraries (2.374), Library Quarterly (1.787) and Information Processing and Management (1.764). A journal titled ‘Journal of Informetrics’ with SJR 2.315 does not cover the study period i.e. 2001 to 2010. First volume of this journal was published in 2007. Therefore, this journal is excluded from this study.

1.6.3 Selection of Articles:

All the articles published in the above selected four journals during the period of ten years (2001 – 2010) are included in this study primarily. Some articles have been rejected for incomplete information in Scopus database. A few of the articles are excluded from the study on the following grounds:

• Articles on book review, editorial, cover design, news, notes, journal news and erratum;
• Articles having incomplete reference information in Scopus database and;
• All the articles having no reference entries;

Therefore, there is a little difference between the collected articles and the total number of published articles in a journal.
1.6.4 Parameters of Data:

Each of the articles has been scanned and collected from the journals. An article contains bibliographic and citation information. Almost all of the parameters of each individual article have been examined. Out of the range of parameters, following bibliographical and citation information have been collected from each individual article:

(i) Name of the Journal;
(ii) Title of the article;
(iii) Author(s) of the article;
(iv) Volume, issue and page number;
(v) Abstract of the article;
(vi) Author keywords and Engineering controlled terms (in the journals IPM and ISR);
(vii) Year of article published;
(viii) Article impact (Number of times cited by other articles);
(ix) Document type and;
(x) All the information in references.

All the articles published in Information System Research and Information Processing and Management contain engineering controlled terms along with author keywords. Both types of terms are collected. Here, article impact (in sl. no. viii) indicates how many times an article is cited in other documents. If the article impact of an article is 10, it denotes that the said article is cited 10 times in other documents during the study period. Document type (in sl. no. ix) specifies the nature of article. All the collected articles have been categorized in three groups i.e. Conference
Proceedings, Original Articles and Review Articles. Complete and exhaustive information in the reference section of an article have been collected.

1.6.5 Notes on Citation Information:

Some citations are excluded from this study for the following reasons:

- The citations having no publishing date (for both print and web information);
- Incomplete citations in Scopus database;
- Citation information is available but not adequate for analysis and;
- Repetition of citations i.e. same document with same year but in different location.

So, there is a small difference between the collected citations and the total number of citations contained in an article. If a citation contains two different publication years (one for primary and other for secondary sources), the earlier date is considered here.

1.7 Reference Style

Citation styles are standardized systems for crediting and citing sources of documents used in the study. The American Psychological Association (APA) citation style is one of many different citation styles. APA citation style (sixth edition in 2010, second printing) is used for references and in-text citations in the study. In the main entry, a tiny modification has been done for data representation conveniently. Publication years and journal names are abbreviated in all entries of the main entry section.
References


