Citation analysis of Post Graduate Theses submitted to Department of Post Harvest Management of Post Harvest Engineering in Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, and Maharashtra

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Citation analysis of Post Graduate Theses submitted to Department of Post Harvest Management of Post Harvest Engineering in Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra

Abstract:
Citation analysis aids in determining how users seek out content for various purposes. The obsolescence rate can be calculated via citation analysis. The goal of this study is to determine the rate of obsolescence of publications in the field of Post Harvest Management of Post Harvest Engineering. Citation analysis of Master degree theses submitted to the department of Post Harvest Management of Post Harvest Engineering of the Post Graduate Institute of Post Harvest Management, Killa-Roha, Dist. Raigad, a constituent college of Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratagiri, Maharashtra is being carried out. Theses submitted during the years 2018 to 2020 are taken for the study. There are total 14 theses, yielding 2155 citations. Analysis is also done to find out the Forms of the Information sources referred by the researchers in their theses, Chronological distribution of citations and Authorship Pattern

Key Words: Citation Analysis, Obsolescence study, Authorship study

Introduction
The study of citations is a worthy endeavour. "Citation analysis" refers to references in one text to another text, as well as information on where to find that text. Understanding subject relationships, author effectiveness, publication trends, and so on can all be aided by citation analysis. Gross and Gross (1927) were the first to use citation analysis to identify which publications should be subscribed to and which back volumes should be purchased for Pomona College's library. They looked examined the frequency of citations in the references in the Journal of the American Chemical Society (Amudhavalli 1997). Citation analysis allows you to analyse and interpret the citations that articles, authors, institutions, and other indicators of scientific activity have received (Ravichandra Rao 1993). Citation analysis can also help you learn more about your users. Examining the types of sources most typically used and appreciated locally in your faculty's publications or your students' papers reveals the types of sources most commonly used and valued in their specialties (Curtis 2005). Bibliographic references are used, which are an important aspect of scientific communication (Encyclopedia of Library and Information Science, 1998). Citation analysis (Ane's Encyclopedic Dictionary of Library and Information Science, 2006) is a prominent topic of bibliometric research that uses various methods of citation analysis to determine linkages between authors or their work. Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratagiri, Maharashtra was established on 18.05.1972 and Post Graduate Institute of Post Harvest Management, a constituent college was established in the year 2010. Here onwards following abbreviations will be used alternatively:

DBSKKV : Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth
PGIPH : Post Graduate Institute of Post Harvest Management
PHM : Post Harvest Management
PHM of PHE : Post Harvest Management of Post Harvest Engineering
Objectives:

1) To know the research output of Department of Post Harvest Management of Post Harvest Engineering of Post Graduate Institute of Post Harvest Management, Killa-Roha, Dist. Raigad, a constituent college of Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri, Maharashtra.

2) To study various forms of information sources approached by researchers of PHM of PHE, PGIPHM, Killa-Roha, Dist. Raigad of DBSKKV, Dapoli

3) To study age of the sources approached by the researchers of PHM of PHE, PGIPHM, Killa-Roha, Dist. Raigad of DBSKKV, Dapoli

4) To study the authorship pattern of the sources approached by the researchers of PHM of PHE, PGIPHM, Killa-Roha, Dist. Raigad of DBSKKV, Dapoli

5) To study the Obsolescence rate of PHM of PHE Journals and Books.

Scope:
The present study is to derive the obsolescence rate of publications in the field of Post Harvest Management of Post Harvest Engineering. The methodology opted is Citation Analysis of Master degree theses submitted to the Department of Post Harvest Management of Post Harvest Engineering of Post Graduate Institute of Post Harvest Management, Killa-Roha, Dist. Raigad, a constituent college of Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri, Maharashtra. The duration is from 2018 to 2020 and the total number of theses is 14, having 2155 citations.

Methodology:
The data for the study were collected from the theses submitted to M.Sc. (PHM) in Post Harvest Engineering department of Post Graduate Institute of Post Harvest Management, Killa-Roha, Dist. Raigad of Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli. The title page and the references given at the end of the theses were photocopied. The demographic details of M.Sc. graduate students of Graduate Institute of Post Harvest Management, Killa-Roha, Dist. Raigad of Dr. BSKKV, Dapoli were recorded.

The data entered in MS-Excel was analyzed by the structure of the subject, distribution of documents by author characteristics and document characteristics to meet the objectives of the study. The interpretation of data findings of study is recorded.

Results and Analysis:

Research output from Department of Post Harvest Management of Post Harvest Engineering in PGIPHM, Killa-Roha, Dist. Raigad of Dr. BSKKV, Dapoli:
The following Table 1 reveals the rate of Master Degree Awards or research output from Department of Post Harvest Management of Post Harvest Engineering in PGIPHM, Killa-Roha, Dist. Raigad of Dr. BSKKV, Dapoli. The whole time span is from 2018 to 2020. The highest Master degrees are awarded in the year 2018 and 2020 and it is 5 each out of total 14 i.e., 35.71% ranking the first. In the year 2019, 4 Theses are submitted which is 28.57% standing on the 2nd rank.

The table 1 also contains data of number of citations added to the theses and average number of citations per thesis. The average number of citations added in the year 2018 per thesis is 817 / 2155 i.e., 37.91%, the first rank. In the year 2020, average number of citations added is 763 / 2155 i.e., 35.41% posing the 2nd rank. The average number of citations added per thesis in the year 2019 is 575 / 2155 i.e., 26.68%, which is in the 3rd rank.

Form wise distribution of citations:
M.Sc. students of Post Harvest Management of Post Harvest Engineering department approached wide variety of information sources for their research. The various types of resources and number of citations are given in the following Table 2. The data reveals that researchers cited the journal / periodical articles most frequently. There are 1813 journal article citations among 2155 – the 1st rank and 129 Book citations – the 2nd rank and , 45 Manual citations among 2155 citations – the 3rd rank.
Thesis (M.Sc.) | 28 | 1.30 | 5
Conference Proceedings | 20 | 0.93 | 6
Web page | 20 | 0.93 | 6
Database | 15 | 0.70 | 7
Doctoral Dissertation | 10 | 0.46 | 8
Thesis (M.S.) | 7 | 0.32 | 9
Handbook | 5 | 0.23 | 10
Report | 5 | 0.23 | 10
Thesis (Ph.D.) | 4 | 0.19 | 11
Indian Standard | 2 | 0.09 | 12
Market Report | 2 | 0.09 | 12
Patent | 2 | 0.09 | 12
Conference Paper | 1 | 0.05 | 13
Directory Database | 1 | 0.05 | 13
Dissertation (M.Sc.) | 1 | 0.05 | 13
Research Bulletin | 1 | 0.05 | 13
Specifications | 1 | 0.05 | 13
Symposium Article | 1 | 0.05 | 13
Thesis (PGD) | 1 | 0.05 | 13
Workshop Paper | 1 | 0.05 | 13

Total | 2155 | 100.00

**Authorship pattern** is the study of cited publications is prepared by single authored? Or multiple authored? The following Chart 1 shows that the researchers believe in collaboration. Only 17.68% (381/2155) literature cited is single authored, which is third place of ranking. Double authored citations rank first. It shares 25.38% (547/2155). Three authors is in second place of ranking which shares 24.92% (537/2155) of citations. Some publications found authored by more than eight, nine or ten, but they are counted in the ‘More than Seven’ authors category. The publications published by name of institution / organization / company is categorized as ‘Corporate authorship’. There are 4.50% (97/2155) citations ranking 6th in the ‘Corporate authorship’ category.

![Chart 1 Authorship Pattern](image)

**Chronological distribution of citations:**
Chart 2 shows the chronological distribution of citations. The data reveals that the researchers referred recent publications for their research. From the data, the highest citations is 832/2155 i.e., 38.61% of citations are published in the duration 2001-2010. The usage of publications is declined as it becomes old. The publications which are published in the years 1951-1960 are rarely used, and their usage is 6/2155 i.e., 0.28% ranking 8th position.

![Chart 2 Chronological Distribution](image)
Chart 2 Chronological Distribution of Citations

Obsolescence study:
Obsolescence study or Age study of publications is one of the common observation in citation analysis. It describes the decline in usage of publication or citations over a period of time. Table 3 represents the obsolescence of journals and book citations. The complete 1803 Journal Article citations and 129 Book citations are divided into 11 time spans having 10 years of length.

Table 3 Age wise distribution of citations

<table>
<thead>
<tr>
<th>S. N.</th>
<th>Age of</th>
<th>No. of</th>
<th>Journal</th>
<th>Percentage</th>
<th>Books</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
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<td>citations</td>
<td></td>
<td>citations</td>
<td>Articles</td>
<td></td>
<td></td>
</tr>
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<td>814</td>
<td>44.89</td>
<td>12</td>
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</tr>
<tr>
<td>2</td>
<td>10 - 19</td>
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<td>50</td>
<td>38.76</td>
</tr>
<tr>
<td>3</td>
<td>20 - 29</td>
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<td>193</td>
<td>10.64</td>
<td>19</td>
<td>14.72</td>
</tr>
<tr>
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<td>71</td>
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<td>17</td>
<td>13.18</td>
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<td>0.78</td>
</tr>
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<td>10</td>
<td>6</td>
<td>0.34</td>
<td>1</td>
<td>0.78</td>
</tr>
<tr>
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<td>0.06</td>
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<td>0.00</td>
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</tr>
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</table>

Table 3 reveals that recent journals and books are approached by researchers. The citations of age 0 to 9 years are more for Journal Articles, i.e., 804 / 1803 = 44.59% ranking the 1\textsuperscript{st}. The citations of age 10 to 19 are more for Books i.e., 50/129 =38.76%, ranking the 1\textsuperscript{st}.The data gathered shows that 1901/2155 = 88.21% of citations come under the age group 0 to 29. The remaining 11.79% of citations come under the age group 30 to 100+. This proves that there is considerable decline in usage of publication when it gets old.

Ranked List of Journals
Journals are necessary for research but their rising costs necessitate a review of their quality, utility and suitability for specific group of users by librarians. The ranking list is a useful tool for determining which journals are most useful in terms of their coverage of fresh and important work in a given area. The ranked list of journals in the field of Post Harvest Management of Post Harvest Engineering is presented in Table No. 4. Journals cited more than twice appear in the table. Titles are arranged in their decreasing order of citations.
Table 4 Ranking List of Journals

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Journal name</th>
<th>Rank</th>
<th>Citations</th>
<th>Percent</th>
<th>Cumulative Citations</th>
<th>Percent</th>
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<td>221</td>
<td>12.19</td>
</tr>
<tr>
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<td>2</td>
<td>135</td>
<td>7.45</td>
<td>356</td>
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<td>3</td>
<td>Drying Technology</td>
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<td>1.71</td>
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</tr>
<tr>
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</tr>
<tr>
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<td>Journal of Food Processing &amp; Preservation</td>
<td>5</td>
<td>24</td>
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</tr>
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<td>496</td>
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</tr>
<tr>
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<tr>
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</table>
Apart from above 110 journals other 106 Journals have two citations (Separate names not included in this list)  20 106X2=21 2 ((212 X 100)/ 1813 =11.69  1545  85.22

Apart from above 110 + 106 = 216, 268 Journals have one citation (Separate names not included in this list)  21 268X1=26 8 ((268X1 00)/ 1813 = 14.78  1813  100.00

Total no. of journals = 110 + 106 + 268 = 484  1813  100.00

Table 4 reveals that the most cited journal by Post Harvest Engineering scholars is Journal of Food Engineering, which was cited 221 times, more than 12.19% of the total percentage of citations, followed by Journal of food science & technology, at 135 (7.45%). Drying Technology, 31 (1.71%), Food Chemistry, 31 (1.71%), International Journal of Food Science & Technology, 30 (1.65%), Journal of Food Processing & Preservation, 24 (1.32%), Journal of Food Science, 24 (1.32%), Food Research International, 24 (1.32%), Food & Bioproducts Processing, 23 (1.27%), Journal of Agricultural Engineering Research, 20, (1.10%), Journal of Agricultural and Food Chemistry, 20 (1.10%), Journal of Food Process Engineering, 16 (0.88%), LWT-Food Science & Technology, 13 (0.72%), Transactions of the ASAE, 13 (0.72%).

Bradford’s Law of Scattering
Bradford (1934): “If scientific journals are arrange in order of decreasing productivity of articles on a given subject, they may be divided into a nucleus of periodicals more particularly devoted to the subject and several other groups or zones containing the same number of articles as the nucleus when the number of periodicals in the nucleus - and succeeding zones will be as 1: n: n^2, where 1 represents the number of journals in the nucleus and ‘n’ is a multiplier.”

In the present study, 14 journals covered 625 articles, the next 70 journals covered 611 articles, and the next 399 journals covered 577 articles. That is, 7 journals covered one-third of the total citations, the next 70 journals accounted for another one-third, and the final 399 covered the remaining third. Thus, the first zone or ‘nucleus’ contains 14 journals, followed by the second zone with 70, and the third with 399 journals. The zones form an approximately geometric series in the form:

14 : 70 : 399

Here, 70 = 14 X 5 and 350 = 14 X 5 X 5
i.e. 14 : 14 X 5 : 14 X 5 X 5
or 14 : 14 X 5 : 14 X 5^2
Substituting 5 = n
14 : 14 X n : 14 X n^2
i.e. 1 : n : n^2

Where 14 represents the number of journals in the nucleus and n=5 is a multiplier.

Bradford’s Law of Scattering

Geographic Distribution
Citation analysis by country provides data on the countries that are active in a subject field and their respective contribution. Table 5 shows the geographical distribution of ranked journals.
Table 5 Geographic Distribution

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<th>Percentage</th>
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<td>USA</td>
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More than one fifth i.e., 103 (21.28%) journals were from India. The USA ranks first among foreign countries with 102 (21.07%) journals followed by UK 85 (17.56%) and Netherlands 82 (16.56%).
Publisher Distribution
The sort of organization that publishes information can influence the decision to acquire the library materials. To learn more about the publishers cited in Post Harvest Management of Post Harvest Engineering theses, publishers were categorized as commercial, academic, association, societies, individuals, and government. Chart 3 shows the publisher distribution of 1,813 journal article citations.

Chart 3: Publisher Distribution

Other Resources frequently referred by the researchers:

Findings and Conclusion:
Citation Analysis is one of the tools bibliometric / scientometric / informetrics studies. The application of citation analysis in libraries will be used in collection management. The citation counting will help in procuring the books, periodicals and also in weeding process. It is found from the study that
1. Researchers of Post Harvest Management of Post Harvest Engineering cited Journal articles most frequently. The 84.13% of total citation i.e., 1813 / 2155 are the Journal Articles. The Books are ranked the 2nd with 129 / 2155 = 5.98% of citations. And The Manuals are ranked the 3rd with 45 / 2155 = 2.08% of citations. Researchers also cited Manuals, Patents, Standards, Conference Proceedings, Doctoral Dissertations, Master degree, different types of Reports (Annual Report, Commission Report) Theses etc. for their study.
2. From citations cited in PHM of PHE research scholar theses, it’s observed that the studies or literary work is done with collaboration. The 381 / 2155 = 17.68% citations are single authored. While, 97/2155 = 4.50% citations are corporate authored. The remaining 77.82% of citations are multiple authored i.e., two or more number of authors.
3. Obsolescence studies aid in the weeding out of obsolete, outdated materials which makes the place for the new purchases and avoids noise in the information retrieval.

References
4. Selected Bibliometric and Citation Analysis Studies:


   a. [http://digitalcommons.unl.edu/libphilprac/222](http://digitalcommons.unl.edu/libphilprac/222)


   https://digitalcommons.unl.edu/libphilprac/5119