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Scientometric Analysis of Contributions to the Journal
College and Research Libraries (1997-2011)

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Abstract:
In this study an attempt is made to investigate the scholarly communications in
College & Research Libraries journal during the period of 1997-2011 and to study the key
dimensions of its publication trends. For the analysis of the study 15 volumes containing 90
issues have been taken up for evaluation. Necessary bibliometric measures are applied to
analyse different publication parameters. It is found that, contributions of articles to each
volume of College & Research Libraries is nearly consistent and on an average 32 articles
have been published every year. Single authored articles are found to be the highest
followed by two and three authored articles. The average degree of collaboration in College
& Research Libraries is 0.57. The average author per article is 1.88 for 479 articles. Lotka’s
law is tested and confers to a value of n=3.22. In all 12893 citations have been appended to
479 articles during the period 1997-2011. Journals (59.95 per cent) are the top form of source
used by authors followed by books (17.32 per cent), webpages (7.44 per cent) and reports
(3.95 per cent). Ranked list of prolific authors and ranked list of journals is prepared and
presented in respective tables. Deborah D Blecic and Stephen E Wiberley have topped the
ranked list of prolific authors with 6 articles each. College & Research Libraries which is also
the source journal of this study has topped the ranked list of journals with 1311 (16.96 per
cent) citations. USA has topped the list of ranking of country productivity with 93.24 per
cent contributions followed by Canada and China.

Keywords:
Scientometrics, Bibliometrics, Authorship Pattern, Lotka’s Law, Author Productivity, Degree
of Collaboration
Introduction:

The term Scientometrics is coined by Vassily V Nalimov and Z M Mulchenko in 1969 which is the Russian equivalent of ‘naukometriya’. According to Tague-Sutcliffe Scientometrics is the study of the quantitative aspects of science as a discipline or economic activity. It is part of sociology of science and has application to science policy-making. It involves quantitative studies of scientific activities, including, among others, publication and so overlaps bibliometrics to some extent. The focus of Scientometrics is the measurement of science and is therefore concerned with the growth, structure, interrelationship and productivity of scientific disciplines (Hood & Wilson, 2001). Scientometrics is also defined as the quantitative study of science, communication in science and science policy.

Source Journal:

College & Research Libraries is the bi-monthly peer reviewed scholarly research journal of the Association of College & Research Libraries, a division of the American Library Association. Founded in 1939, College & Research Libraries is the “premier scholarly journal for the publication of empirical research in academic librarianship.” College & Research Libraries publishes original research on all aspects of academic librarianship, including academic library collections and services, digital libraries, emerging technologies in libraries, library assessment, library leadership, libraries and information technology in higher education, scholarly and professional publishing in library and information science, and library and information science education. Apart from articles, College & Research Libraries also publishes guest editorials and book reviews. It was Quarterly for first 18 years and bi-monthly since 1956. College & Research Libraries became an Open Access publication in 2011. This journal can be accessed from the URL: crl.acrl.org

Objectives of the Study:

- To map year-wise distribution of articles
- To find the average length of articles
- To examine the authorship pattern of the contributions
- To study author productivity
- To test Lotka’s inverse square law of scientific productivity
- To study the range and percentage of references per article
- To determine degree of collaboration among single and multiple authors
- To study type and number of citations
- To analyze the use of various types of documents by the authors
To identify and prepare ranked list of authors
To identify and prepare ranked list of journals

Methodology:

The data required for the study was collected from the electronic version of the journal for the period 1997-2011. The references appended to each article were carefully scanned and tabulated in respective tables using Microsoft Excel. The details regarding number of articles, authorship pattern, author productivity, range of length of articles etc., are collected to fulfill the objectives of the present study. The authorship pattern has been analysed by using K Subramanyam’s degree of collaboration in quantitative terms. Average author per paper and productivity per author have been calculated using formula given by Yoshikane et al.... Required bibliometric measures were employed to carryout this study. Following section discusses the analysis of the data collected and presented under different table headings as per the objectives of the study.

Analysis:

Distribution of Contributions:

Table 1 – Volume-wise distribution of contributions

<table>
<thead>
<tr>
<th>Year</th>
<th>Vol. No.</th>
<th>Issues</th>
<th>Total Publications</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>58</td>
<td>6</td>
<td>34</td>
<td>7.10</td>
</tr>
<tr>
<td>1998</td>
<td>59</td>
<td>6</td>
<td>37</td>
<td>7.72</td>
</tr>
<tr>
<td>1999</td>
<td>60</td>
<td>6</td>
<td>37</td>
<td>7.72</td>
</tr>
<tr>
<td>2000</td>
<td>61</td>
<td>6</td>
<td>36</td>
<td>7.51</td>
</tr>
<tr>
<td>2001</td>
<td>62</td>
<td>6</td>
<td>34</td>
<td>7.10</td>
</tr>
<tr>
<td>2002</td>
<td>63</td>
<td>6</td>
<td>36</td>
<td>7.51</td>
</tr>
<tr>
<td>2003</td>
<td>64</td>
<td>6</td>
<td>26</td>
<td>5.43</td>
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<tr>
<td>2004</td>
<td>65</td>
<td>6</td>
<td>26</td>
<td>5.43</td>
</tr>
<tr>
<td>2005</td>
<td>66</td>
<td>6</td>
<td>28</td>
<td>5.84</td>
</tr>
<tr>
<td>2006</td>
<td>67</td>
<td>6</td>
<td>32</td>
<td>6.68</td>
</tr>
<tr>
<td>2007</td>
<td>68</td>
<td>6</td>
<td>31</td>
<td>6.47</td>
</tr>
<tr>
<td>2008</td>
<td>69</td>
<td>6</td>
<td>29</td>
<td>6.05</td>
</tr>
<tr>
<td>2009</td>
<td>70</td>
<td>6</td>
<td>30</td>
<td>6.26</td>
</tr>
<tr>
<td>2010</td>
<td>71</td>
<td>6</td>
<td>33</td>
<td>6.89</td>
</tr>
<tr>
<td>2011</td>
<td>72</td>
<td>6</td>
<td>30</td>
<td>6.26</td>
</tr>
<tr>
<td>15 years</td>
<td>15 Vols</td>
<td>90 Issues</td>
<td>479 articles</td>
<td></td>
</tr>
</tbody>
</table>
Table 1 depicts the number of research papers published from 1997 to 2011. The study shows that the highest number of 37 papers are published in the years 1998 and 1999 followed by 36 papers in the years 2000 and 2002. The lowest number of 26 papers are published in the years 2003 and 2004 followed by 28 papers in the year 2005. In all, 497 research articles were published during the period 1997-2011. The journal on an average published 5 papers per issue. The number of papers published each year is nearly consistent.

Length of articles:

<table>
<thead>
<tr>
<th>Year</th>
<th>0-5</th>
<th>6-10</th>
<th>11-15</th>
<th>16-20</th>
<th>21-25</th>
<th>&gt;=26</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>1</td>
<td>12</td>
<td>17</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>34</td>
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<tr>
<td>1998</td>
<td>0</td>
<td>19</td>
<td>16</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>37</td>
</tr>
<tr>
<td>1999</td>
<td>1</td>
<td>14</td>
<td>18</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>37</td>
</tr>
<tr>
<td>2000</td>
<td>2</td>
<td>20</td>
<td>13</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>36</td>
</tr>
<tr>
<td>2001</td>
<td>0</td>
<td>15</td>
<td>14</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>34</td>
</tr>
<tr>
<td>2002</td>
<td>0</td>
<td>13</td>
<td>15</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>36</td>
</tr>
<tr>
<td>2003</td>
<td>1</td>
<td>5</td>
<td>9</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td>26</td>
</tr>
<tr>
<td>2004</td>
<td>0</td>
<td>3</td>
<td>13</td>
<td>3</td>
<td>1</td>
<td>6</td>
<td>26</td>
</tr>
<tr>
<td>2005</td>
<td>1</td>
<td>4</td>
<td>10</td>
<td>9</td>
<td>3</td>
<td>1</td>
<td>28</td>
</tr>
<tr>
<td>2006</td>
<td>0</td>
<td>9</td>
<td>11</td>
<td>7</td>
<td>5</td>
<td>0</td>
<td>32</td>
</tr>
<tr>
<td>2007</td>
<td>0</td>
<td>5</td>
<td>15</td>
<td>8</td>
<td>2</td>
<td>1</td>
<td>31</td>
</tr>
<tr>
<td>2008</td>
<td>0</td>
<td>5</td>
<td>12</td>
<td>7</td>
<td>5</td>
<td>0</td>
<td>29</td>
</tr>
<tr>
<td>2009</td>
<td>0</td>
<td>6</td>
<td>12</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>2010</td>
<td>0</td>
<td>6</td>
<td>16</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>33</td>
</tr>
<tr>
<td>2011</td>
<td>0</td>
<td>4</td>
<td>10</td>
<td>10</td>
<td>5</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>140</td>
<td>201</td>
<td>82</td>
<td>36</td>
<td>14</td>
<td>479</td>
</tr>
</tbody>
</table>

The length of articles is shown in Table 2 where it is found that 201 (41.96 per cent) articles had page length in the range of 11-15 pages followed by 140 articles (29.23 per cent) in the page range of 6-10. There are 14 (2.92 per cent) articles having more than or equal to 26 pages.

Authorship pattern:

<table>
<thead>
<tr>
<th>Year</th>
<th>Vol. No.</th>
<th>Single</th>
<th>Two</th>
<th>Three</th>
<th>Four</th>
<th>Five</th>
<th>Six</th>
<th>Seven</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>58</td>
<td>13</td>
<td>14</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>34</td>
</tr>
<tr>
<td>1998</td>
<td>59</td>
<td>19</td>
<td>13</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>37</td>
</tr>
</tbody>
</table>
The authorship pattern was analysed to determine the percentage of single and multiple authors. From above Table 3 it is revealed that single authored contributions have dominated this journal. Single authored contributions accounts for 207 papers (43.21 per cent), two authored papers are 174 (36.32 per cent), three authored papers are 68 (14.20 per cent), four authored papers are 20 (4.18 per cent) and more than four authored papers are 10 (2.09 per cent). In all, multiple authored papers have contributed 272 papers (56.78 per cent) of total publications during the period 1997-2011.

### Author Productivity:

#### Table 4: Author Productivity

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Number of Papers</th>
<th>Total Number of Authors</th>
<th>AAPP</th>
<th>Productivity per author</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>34</td>
<td>64</td>
<td>1.88</td>
<td>0.53</td>
</tr>
<tr>
<td>1998</td>
<td>37</td>
<td>66</td>
<td>1.81</td>
<td>0.56</td>
</tr>
<tr>
<td>1999</td>
<td>37</td>
<td>69</td>
<td>1.86</td>
<td>0.53</td>
</tr>
<tr>
<td>2000</td>
<td>36</td>
<td>61</td>
<td>1.69</td>
<td>0.59</td>
</tr>
<tr>
<td>2001</td>
<td>34</td>
<td>54</td>
<td>1.59</td>
<td>0.63</td>
</tr>
<tr>
<td>2002</td>
<td>36</td>
<td>66</td>
<td>1.83</td>
<td>0.54</td>
</tr>
<tr>
<td>2003</td>
<td>26</td>
<td>44</td>
<td>1.69</td>
<td>0.59</td>
</tr>
<tr>
<td>2004</td>
<td>26</td>
<td>48</td>
<td>1.84</td>
<td>0.54</td>
</tr>
<tr>
<td>2005</td>
<td>28</td>
<td>59</td>
<td>2.11</td>
<td>0.47</td>
</tr>
<tr>
<td>2006</td>
<td>32</td>
<td>66</td>
<td>2.06</td>
<td>0.48</td>
</tr>
<tr>
<td>2007</td>
<td>31</td>
<td>73</td>
<td>2.35</td>
<td>0.42</td>
</tr>
<tr>
<td>2008</td>
<td>29</td>
<td>44</td>
<td>1.52</td>
<td>0.66</td>
</tr>
</tbody>
</table>
Yoshikane et al (2009) in their paper published in Scientometrics journal have given a formula to calculate Average Author Per Paper (AAPP) and Productivity Per Author. The formula is mathematically represented as below:

Average Author Per Paper = No. of Authors/No. of Papers
Productivity Per Author = No. of Papers/No. of Authors

Table 4 depicts the data pertaining to author productivity and average author per paper. It is revealed from Table 4 that the average number of authors per article is 1.88 for 479 articles published between the period 1997-2011. It is also clear from above Table 4 that for the years 2000 & 2003 and 2009 & 2011 equal average number of authors per article is recorded i.e., 1.69 and 2.17 respectively.

The average productivity per author for the period 1997-2011 is 0.53. The years 2000 & 2003, 2002 & 2004 and 2009 & 2011 have recorded equal productivity per author i.e., 0.59, 0.54 and 0.46 respectively.

**Study of Lotka’s Law:**

Lotka’s law describes the frequency of publication by authors in a given field by using the formula:

\[ Y_x = \frac{C}{X^n} \]

Where, \( Y \) is the number of authors credited with \( X \) (1, 2, 3, 4……) papers
\( C \) is the number of authors contributing one paper
And \( n \) is rate (usually \( n=2 \))

In the present study 739 authors have contributed 479 articles published during the publication phase of 1997-2011. There are 634 (85.80%) authors contributing one article, 68 (9.20%) authors contributing two articles, 23 (3.11%) authors contributing 3 articles, 9 (1.22%) authors contributing 4 articles, 3 (0.40%) authors contributing 5 articles and 2 (0.27%) contributing 6 articles.
To study the Lotka’s law to confirm author productivity following table is prepared.

<table>
<thead>
<tr>
<th>No. of Articles, X</th>
<th>No. of Authors (Observed)</th>
<th>Observed %</th>
<th>No. of Authors (Expected)</th>
<th>Expected %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>634</td>
<td>85.80</td>
<td>634</td>
<td>86.61</td>
</tr>
<tr>
<td>2</td>
<td>68</td>
<td>9.20</td>
<td>68</td>
<td>9.30</td>
</tr>
<tr>
<td>3</td>
<td>23</td>
<td>3.11</td>
<td>18</td>
<td>2.46</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
<td>1.22</td>
<td>7</td>
<td>0.95</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>0.40</td>
<td>3</td>
<td>0.41</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>0.27</td>
<td>2</td>
<td>0.27</td>
</tr>
<tr>
<td></td>
<td>739</td>
<td>100.00</td>
<td>732</td>
<td>100.00</td>
</tr>
</tbody>
</table>

To calculate the value of n, data from observed authors is used and is found to be 3.22 i.e. n=3.22

It is clear from Table 5 that the observed and expected authors are nearly same with n=3.22. Author productivity pattern of College and Research Libraries complies with Lotka’s law at a value of n=3.22.

Degree of Collaboration:

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of co-authors publications</th>
<th>%</th>
<th>Degree of collaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>21</td>
<td>61.76</td>
<td>0.62</td>
</tr>
<tr>
<td>1998</td>
<td>18</td>
<td>48.65</td>
<td>0.48</td>
</tr>
<tr>
<td>1999</td>
<td>20</td>
<td>54.05</td>
<td>0.54</td>
</tr>
<tr>
<td>2000</td>
<td>18</td>
<td>50.00</td>
<td>0.50</td>
</tr>
<tr>
<td>2001</td>
<td>16</td>
<td>47.06</td>
<td>0.47</td>
</tr>
<tr>
<td>2002</td>
<td>23</td>
<td>63.90</td>
<td>0.64</td>
</tr>
<tr>
<td>2003</td>
<td>16</td>
<td>61.54</td>
<td>0.61</td>
</tr>
<tr>
<td>2004</td>
<td>15</td>
<td>57.70</td>
<td>0.58</td>
</tr>
<tr>
<td>2005</td>
<td>19</td>
<td>67.86</td>
<td>0.68</td>
</tr>
<tr>
<td>2006</td>
<td>21</td>
<td>65.62</td>
<td>0.65</td>
</tr>
<tr>
<td>2007</td>
<td>18</td>
<td>58.06</td>
<td>0.58</td>
</tr>
<tr>
<td>2008</td>
<td>12</td>
<td>41.40</td>
<td>0.41</td>
</tr>
<tr>
<td>2009</td>
<td>18</td>
<td>60.00</td>
<td>0.60</td>
</tr>
<tr>
<td>2010</td>
<td>26</td>
<td>51.51</td>
<td>0.51</td>
</tr>
<tr>
<td>2011</td>
<td>21</td>
<td>70.00</td>
<td>0.70</td>
</tr>
</tbody>
</table>
The Degree of Collaboration (DC) among authors in College and Research Libraries is presented in Table 6. In order to calculate the Degree of Collaboration (DC) among the authors in College & Research Libraries the formula given by Subramanyam (1983) is used which is expressed mathematically as;

Degree of Collaboration, DC = \( \frac{Nm}{Nm+Ns} \)

Where,
Nm= No. of Multi-author publications during a specific period in a discipline
Ns= No. of single-authored publications in a discipline during a given period of time

Table 6 reveals that the value of the higher Degree of Collaboration (DC) was 0.70 for the year 2011 followed by 0.68 for the year 2005. The Degree of Collaboration is less because of the fact that single authored papers have dominated this journal. It is clear from Table 6 that Degree of Collaboration (DC) among multiple authors was 0.72 maximum for the two author publications.

<table>
<thead>
<tr>
<th>Year</th>
<th>Two-authors publications</th>
<th>Three-authors publications</th>
<th>Four-authors publications</th>
<th>Five or more - authors publications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>0.41</td>
<td>0.15</td>
<td>0.06</td>
<td>-</td>
</tr>
<tr>
<td>1998</td>
<td>0.72</td>
<td>0.08</td>
<td>0.05</td>
<td>-</td>
</tr>
<tr>
<td>1999</td>
<td>0.32</td>
<td>0.13</td>
<td>0.05</td>
<td>0.02</td>
</tr>
<tr>
<td>2000</td>
<td>0.33</td>
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<td>0.03</td>
<td>-</td>
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<td>-</td>
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<tr>
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<td>0.27</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2005</td>
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<td>0.18</td>
<td>0.03</td>
<td>0.03</td>
</tr>
<tr>
<td>2006</td>
<td>0.37</td>
<td>0.15</td>
<td>0.09</td>
<td>0.03</td>
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Year-Wise Appearance of Citations:

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For the period under study (1997-2011), in all 12893 citations were found appended to 479 articles. From Table 8 it is clear that highest number of 1138 citations were appended in the year 2010 (8.83 per cent) followed by 1053 (8.17 per cent) citations for the year 2011. The year 1998 recorded least number of citations i.e., 698 (5.41 per cent). It is worth mentioning here that, though highest number of papers are published in the year 1999, it hasn’t resulted in maximum number of citations. The average number of citations per paper is almost 27 (i.e, 26.92). This also shows that authors have used different types of resources in writing papers.

Distribution of Citations:

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<th>21-25</th>
<th>26-30</th>
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</table>
Table 9 presents data on the range and percentage of references per paper. It is to be noted here that all the 479 articles have cited references. Total 12893 citations were found appended to 479 articles published during the period 1997-2011. The papers having references ranging from >=36 form the largest group i.e. 112 (23.40 per cent) followed by the range 11-15 and 16-20 which accounted to 78 articles (16.28 per cent). It is also interesting to note that the range of 6-10 and 26-30 citations have same number of articles i.e. 44 (9.19 per cent). The average number of citations per article is 26.92. This could be because of the fact that the majority of i.e. 112 articles have references in the range of >=36.

Form-Wise Distribution of Citations:

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Table 10: Form-Wise Distribution of Citations
Table 10 gives the year-wise break-up of various forms of resources used by the authors. Among the cited references, journals (59.95 per cent) are the heavily used resources followed by books (17.32 per cent). Journal articles carry nascent information which could be the reason for the highly preferred source of information among the authors contributed to this journal. Webpages (7.44 per cent) are also increasingly been cited by authors. The remaining resources in the form of reports, personal communications, thesis/dissertations, conference proceedings, standards, reference materials, newsletters, manuals, reprints etc. have least attracted the attention of the authors.

**Ranked List of Prolific Authors:**

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<th>Rank</th>
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<td>3</td>
<td>Gregory A. Crawford</td>
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</tr>
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<td>Mark D. Winston</td>
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<td>5</td>
<td>Peter Hernon</td>
<td>5</td>
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<td>Eileen E. Brady</td>
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Table 11 represents the list of top authors who have contributed at least 3 or more articles during the period of the study. There are 739 authors contributing 479 articles to College and Research Libraries during the period 1997-2011. The most leading authors are Deborah D Blecic and Stephen E Wiberley with 6 articles each followed by Gregory A Crawford, Mark D Winston and Peter Hernon who have contributed 5 articles each. There are 9 authors contributing 4 articles each followed by 23 authors contributing 3 articles each. As many as 68 authors have contributed 2 articles each and 634 authors have contributed 1 article each during the period 1997-2011.

Country-Wise Contribution:

Table 12: Country-wise contribution

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<th>Australia</th>
<th>Spain</th>
<th>Israel</th>
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</table>
An attempt has been made to study the geographical distribution of contributions. It is revealed from Table 12 that majority of contributors are from U.S.A with 841 (93.24 per cent) contributors followed by Canada with 27 (3.00 per cent) and China with 21 (2.33 per cent). Authors from Australia, Spain, Israel and Sweden have also contributed articles to this journal.

### Ranked List of Journals:

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<td>Information Technology and Libraries</td>
<td>86</td>
<td>1.11</td>
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</tr>
<tr>
<td>15</td>
<td>Journal of the American Society for Information Science and Technology</td>
<td>86</td>
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<tr>
<td>16</td>
<td>The Serials Librarian</td>
<td>83</td>
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<td>17</td>
<td>The Chronicle of Higher Education</td>
<td>80</td>
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Table 13 provides the rank list of top 30 journals preferred by the authors during the publication phase of 1997-2011 of College and Research Libraries. The 7730 articles in periodicals were scattered in 928 periodicals. The top 30 journals account for 4622 (59.80 per cent) of the journals cited by the authors. College and Research Libraries which is also the source journal of this study topped the ranked list with 1311 (almost 17.00 per cent) citations followed by Journal of Academic Librarianship 520 (6.73 per cent), Library Journal 175 (2.26 per cent) and Library and Information Science Research 168 (2.17 per cent) citations.

Conclusion:

From the above discussions it can be concluded that the journal has published papers mostly authors from USA. The journal self citation is 16.96 per cent which brings it to the 1st rank in the ranked list of journals preferred by the authors. Authors have mainly depended on journals (59.95 per cent) and books (17.32 per cent) as their preferred choice of information sources. It is observed that the degree of collaboration in College & Research Libraries ranged from 0.41 to 0.70. Lotka’s law is tested and confers to a value of n=3.22. This study has also highlighted the variety of bibliometric measures that can be used to understand the characteristics or portrait of the journal which in turn reflect the characteristics of the literature and the communication behaviour. This study will also be helpful to the library staff in collection
development, weeding out of journals and to the researchers in identifying the core authors and core journals.

References: