The production, collaboration, and citations of high quality publications on Urban Sprawl

Santha kumar Ramiah
University of Madras, santham74@gmail.com

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The production, collaboration, and citations of high quality publications on Urban Sprawl

Dr. R. Santha kumar
Young Professional II
ICAR- Central Institute of Brackishwater Aquaculture
Chennai - 600 028, Tamil Nadu
Email: santham74@gmail.com

Dr.K.Kaliyaperumal
University Librarian i/c
Madras University Library
University of Madras
Chennai – 600 005
kkperumal3@gmail.com

Abstract

The present study explores the characteristics of the literature on urban sprawl published during the last three decades, based on the Web of Science database and its implications by using scientometric techniques. The results of this study show that the urban sprawl has grown exponentially during this period reaching 3272 papers in total. The United States was the largest contributor in global urban sprawl research, as the USA produced most independent and collaborative papers. University of California System, USA is the largest institutional contributor publishing 3.39% of the papers. Salvati, L (Council for Agricultural Research & Economics, Italy) is the most productive author with 77 publications and 903 citations. Landscape and Urban Planning is the most publishing journals whilst, Environmental Sciences and Ecology are the most published subject areas. The total number of citations are of 62,211, with a ratio for the average citations per publication as 19.01 and “H-index” as 112. The number of cited papers is 38284 and the proportion of cited papers to the total is 1.17. This study provides researchers and practitioners with an extensive understanding of the salient research themes, trends and pattern of urban sprawl research worldwide.

Keywords: Urban sprawl, production, collaboration

1 Introduction

Urban sprawl research is very important and significant in any country especially in developing countries in the world. Urban sprawl expansion is becoming a serious problem in many urban areas in the world. Due to lack of infra-structure and basic facilities like water supply, electricity, sanitation services, excessive traffic congestion, pollution, fragmentation of housing with low density areas and increase in energy consumption that causes social segregation and environmental degradation.

The sprawl also creates serious issues like crimes, high taxes, deficiency of infrastructures and other social evil which makes many of the cities of the world are not suitable for human livings. The sprawl as of now non stoppable and much research have
also been carried out to control as well as eradications of evils of the urban sprawl. The research output on this subject is the main considerations of this research.

Thus, the purpose of the present study is to analyze the status and trends of urban sprawl research output for the last three decades (1989-2017) in order to help the researchers to understand the panorama of global urban sprawl research, and predict the dynamic directions of it.

2 Review of Literature

Scientometric applications are gaining momentum as of now but very few scientometric studies are made on the subject viz., urban sprawl, as such two are reviewed here along with few more studies which are applied scientometric applications on different disciplines:

Zeng Chen et al., (2014) carried out a bibliometric analysis on urban sprawl research from 1991 to 2011. The general publication output, the global geographical distribution of the authors, the funding and institutions involved, the research areas, and the source titles are analyzed and discussed. It was found that Scholars in the United States and China have produced most of the documents in urban sprawl and these two countries are also the largest contributors in terms of funding and institutions. Haijun Wanga et al., (2012) performed a bibliometric analysis of published urbanization research from 1991 to 2009, based on SCI and SSCI databases. This study reveals scientific outputs, subject categories and major journals, international collaboration and geographic distribution, and temporal trends in keywords usage in urbanization studies and further, discusses the relationships between urbanization papers and urbanization rate and offer a substitute demonstration of research advancements. Santha kumar, R and Kaliyaperumal, K (2015) examined the growth and development of mobile technology research in global as revealed by the publications indexed in Web of Science (WoS) for a period of 14 years from 2000 to 2013. During 2000–2013 a total of 10,638 publications were published in the field. Output of total publications, 9037 were produced by multiple authors and 1601 by single authors. Authors from USA have contributed maximum number of publications compared to the other countries and India stood 16th ranking in terms of productivity in this study period. Santha kumar and Kaliyaperumal (2014) made a scientometric study on mobile technology publications covered in the Engineering Index database during the period of 2003–2012, a total of 144,567 publications were published in the field. Authors from China have contributed maximum number of publications compared to the other countries and India stood 7th in terms of productivity in this period. Satish S Munnolli & Shamprasad M Pujar (2017) analysed the prominent institutes contributing to cancer research in India, major publication channels used and impact of highly cited papers on social media. Scopus citation database was used to extract the bibliographic data for the period 2003 to 2012.
3 Objectives of the study

The main objective of present analysis is to determine the following bibliometric indicators from quantum of publications of global researchers in the field of urban sprawl:

- Annual growth of literature output and citation impact
- Most productivity authors
- Most productive institutions
- Most productivity profile of the world’s top 10 countries
- Media of communication in most productive journals
- Subject wise distribution of publications, and
- Characteristics of highly cited papers

4 Materials and Methods

For this purpose of the study, the Web of Science database of the Thomson Reuters, USA (available at http://www.isiknowledge.com) was used because it is a major source for bibliographic, citations, and other academic impact information of scientific publications in various branches of science. A total of 3272 records were downloaded and analysed by using the spreadsheet application as per the objectives of this study. The bibliographic details for each record such as year of publications and citations, document type, authors affiliations, source titles where it was published, publication details and subjects. The citations received to the publications were retrieved on 28th June, 2018 for a period of 29 years (1989 to 2017).

5 Results and Discussions

5.1 Growth of Publications and Citations

<table>
<thead>
<tr>
<th>Year</th>
<th>TP</th>
<th>Percentage</th>
<th>TC</th>
<th>Percentage</th>
<th>ACPP</th>
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<td>4</td>
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<td>1992</td>
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<td>1.2</td>
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<tr>
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<td>0.82</td>
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<tr>
<td>1996</td>
<td>22</td>
<td>0.67</td>
<td>18</td>
<td>0.03</td>
<td>0.82</td>
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<tr>
<td>1997</td>
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<td>31</td>
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<td>1.41</td>
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<tr>
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<td>0.49</td>
<td>56</td>
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<td>3.5</td>
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<tr>
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<td>66</td>
<td>0.11</td>
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<tr>
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<td>105</td>
<td>0.17</td>
<td>2.92</td>
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<tr>
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<td>153</td>
<td>0.25</td>
<td>2.55</td>
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<tr>
<td>2002</td>
<td>47</td>
<td>1.44</td>
<td>243</td>
<td>0.39</td>
<td>5.17</td>
</tr>
<tr>
<td>Year</td>
<td>Publications</td>
<td>Mean Citations</td>
<td>Total Citations</td>
<td>Average Citation</td>
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<td>--------------</td>
<td>----------------</td>
<td>-----------------</td>
<td>------------------</td>
<td></td>
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<td>2003</td>
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<td>2.78</td>
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<td>985</td>
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<td>2007</td>
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<td>3.82</td>
<td>1446</td>
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<td>2008</td>
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<td>1826</td>
<td>2.94</td>
<td></td>
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<tr>
<td>2009</td>
<td>163</td>
<td>4.98</td>
<td>2715</td>
<td>4.36</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>184</td>
<td>5.62</td>
<td>3301</td>
<td>5.31</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>191</td>
<td>5.84</td>
<td>3928</td>
<td>6.31</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>211</td>
<td>6.45</td>
<td>4696</td>
<td>7.55</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>247</td>
<td>7.55</td>
<td>5559</td>
<td>8.94</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>258</td>
<td>7.89</td>
<td>7322</td>
<td>11.77</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>362</td>
<td>11.06</td>
<td>8082</td>
<td>12.99</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>400</td>
<td>12.22</td>
<td>9321</td>
<td>14.98</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>402</td>
<td>12.29</td>
<td>10790</td>
<td>17.34</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3272</td>
<td>99.99</td>
<td>62211</td>
<td>99.99</td>
<td></td>
</tr>
</tbody>
</table>

TP - Total Publications, TC - Total Citations, ACPP – Average Citations per Publications

The table 1 shows that the global research output of urban sprawl consists of 3272 papers during 1989–2017, which has increased from 3 papers in 1989 to 402 papers in 2017. The highest number of publications 402 was produced in 2017, and these publications have received highest citations in 24923. The yearly output is present in Table 1 which indicates that in the initial stages the output was very less and it started increasing slowly from 1995. From 2006 onwards the publication output increased steadily and reached the peak in the year 2017. A total of 3272 publications have received 62211 citations during this period. The average citation per year was 2145. The highest number of citations (10790) was in 2017. There is an increasing trend of citations in urban sprawl research in the world during 1993-2017. The average number of publications per year was 81.79 and the number of citations per publication during the period was 19.01. The growth of article outputs has exploded since 1994, along with an increasing references and citations.

**Figure 1 Growth rate of publications**
5.2 Types of publications

Urban sprawl literature in world has been published in different forms of publications. Out of the 3272 published papers, 2947 (90.07%) were journal articles with 50936 citations followed by 108 (3.30%) Conference proceedings, 84 (2.57%) Reviews, 61 (1.86%) Book review and remaining 2.2% publications are of other forms.

Figure 2 Types of Publications

5.3 Most Prolific Authors - Contributions and their H-Index

Table 2 Most Prolific Authors
<table>
<thead>
<tr>
<th>S.No.</th>
<th>Author</th>
<th>Affiliations</th>
<th>TP</th>
<th>TC</th>
<th>ACPP</th>
<th>H-Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Salvati L</td>
<td>Council for Agricultural Research &amp; Economics, Italy</td>
<td>77</td>
<td>903</td>
<td>11.73</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>Ewing R</td>
<td>University of Utah, USA</td>
<td>29</td>
<td>2837</td>
<td>97.83</td>
<td>17</td>
</tr>
<tr>
<td>3</td>
<td>Haase D</td>
<td>Humboldt University of Berlin, Germany</td>
<td>27</td>
<td>1119</td>
<td>41.44</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>Song Y</td>
<td>University of North Carolina at Chapel Hill, USA</td>
<td>21</td>
<td>658</td>
<td>31.33</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>Zhao PJ</td>
<td>Peking University, USA</td>
<td>20</td>
<td>316</td>
<td>15.80</td>
<td>21</td>
</tr>
<tr>
<td>6</td>
<td>Liu Y</td>
<td>Tianjin University, China</td>
<td>18</td>
<td>290</td>
<td>16.11</td>
<td>25</td>
</tr>
<tr>
<td>7</td>
<td>Carlucci M</td>
<td>Sapienza University of Rome, Italy</td>
<td>17</td>
<td>99</td>
<td>5.82</td>
<td>22</td>
</tr>
<tr>
<td>8</td>
<td>Carruthers JI</td>
<td>George Washington University, USA</td>
<td>13</td>
<td>569</td>
<td>43.77</td>
<td>17</td>
</tr>
<tr>
<td>9</td>
<td>Cho SI</td>
<td>University of Tennessee, USA</td>
<td>12</td>
<td>99</td>
<td>8.25</td>
<td>23</td>
</tr>
<tr>
<td>10</td>
<td>Brown DG</td>
<td>University of Michigan, USA</td>
<td>11</td>
<td>534</td>
<td>48.55</td>
<td>20</td>
</tr>
</tbody>
</table>

During 1989-2017, a total of 7075 authors contributed 3272 articles with an average of 2.16 authors per article. The 10 most prolific authors have together contributed a total of 245 papers, constituting 7.49% share of the total output of global research output on urban sprawl and registering an average productivity per author of 24.5. The 245 publications contributed by the top 10 authors have received 7424 citations, registering a citation impact per paper of 30.30 (varying from 5.82 to 97.83). Table 2 also indicates the list of top 10 authors who have contributed at least 11 articles along with their affiliations, h-index. Salvati, L (Council for Agricultural Research & Economics, Italy) is the most productive author with 77 publications and 903 citations followed by Ewing, R (University of Utah, USA) with 29 publications and 2837 citations, Haase, D (Humboldt University of Berlin, Germany) with 27 publications and 1119 citations, and Song, Y (University of North Carolina at Chapel Hill, USA) with 21 publications and 658 citations.

Figure 3 Most prolific authors
However, it was interesting to note that the listing of these 10 most productive authors when ranked on the basis of average citation per publication would differ substantially Ewing R. (University of Utah, USA) leads the top with first rank in ACPP and Liu, Y (Tianjin University, China) leads the top with first rank in h-index. The top 10 most productive authors have registered an average h-index of 19.1 (varying from 11 to 25). Six authors have registered higher value of h-index than the average value of h-index of all authors.

5.4 Most Productive Organizations

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Organizations</th>
<th>Country</th>
<th>TP</th>
<th>TC</th>
<th>ACPP</th>
<th>H Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>University of California System</td>
<td>USA</td>
<td>111</td>
<td>4716</td>
<td>42.49</td>
<td>33</td>
</tr>
<tr>
<td>2</td>
<td>Chinese Academy of Sciences</td>
<td>China</td>
<td>109</td>
<td>2463</td>
<td>22.6</td>
<td>23</td>
</tr>
<tr>
<td>3</td>
<td>University of North Carolina</td>
<td>USA</td>
<td>88</td>
<td>2679</td>
<td>30.44</td>
<td>25</td>
</tr>
<tr>
<td>4</td>
<td>University System of Maryland</td>
<td>USA</td>
<td>69</td>
<td>3769</td>
<td>54.62</td>
<td>25</td>
</tr>
<tr>
<td>5</td>
<td>Consiglio per la Ricerca in Agricoltura E L Analisi Dell Economia Agraria Crea</td>
<td>Italy</td>
<td>64</td>
<td>473</td>
<td>7.39</td>
<td>13</td>
</tr>
<tr>
<td>6</td>
<td>University of Illinois System</td>
<td>USA</td>
<td>56</td>
<td>1685</td>
<td>30.09</td>
<td>22</td>
</tr>
<tr>
<td>7</td>
<td>University of Maryland College Park</td>
<td>USA</td>
<td>54</td>
<td>3229</td>
<td>59.8</td>
<td>23</td>
</tr>
<tr>
<td>8</td>
<td>University System of Georgia</td>
<td>USA</td>
<td>54</td>
<td>1348</td>
<td>24.96</td>
<td>19</td>
</tr>
<tr>
<td>9</td>
<td>State University System of Florida</td>
<td>USA</td>
<td>53</td>
<td>1191</td>
<td>22.47</td>
<td>14</td>
</tr>
</tbody>
</table>
The top 10 most productive organizations have published from 51 to 111 papers and together contributed 21.67\% (709 papers) share in the cumulative global publications output in urban sprawl during 1989-2017. The publications profile of these 10 organizations along with their research output, citations received and h-index values are presented in table 3. There were 3257 institutions involved in the urban sprawl research.

University of California System, USA topped the list with 111 publications with 42.49 average citations per publication followed by Chinese Academy of Sciences, China with 109 publications and 22.6 average citations per publication, University of North Carolina, USA with 88 publications and average citations per publication and University System of Maryland, USA with 69 publications and 54.62 average citations per publication. Average citation per publication varied from 7.39 to 59.8, with average citation impact is 30.36. Four organizations have registered more than the average citation impact of all 10 organizations. The h-index of 10 most productive organizations in urban sprawl research varied from 12 to 33, with average h-index of 20.9 during 1989-2017. Six organizations have registered more than the average h-index of all organizations.

**5.5 Most Productive Countries**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Total Publications</th>
<th>Total Citations</th>
<th>CPP</th>
<th>RCI</th>
<th>H-Index</th>
<th>PEI</th>
</tr>
</thead>
<tbody>
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<td>1</td>
<td>USA</td>
<td>1321</td>
<td>40735</td>
<td>30.84</td>
<td>1.62</td>
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<td>2</td>
<td>China</td>
<td>393</td>
<td>7283</td>
<td>18.53</td>
<td>0.97</td>
<td>43</td>
<td>97.47</td>
</tr>
<tr>
<td>3</td>
<td>Italy</td>
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<td>3084</td>
<td>14.62</td>
<td>0.77</td>
<td>28</td>
<td>76.87</td>
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<tr>
<td>4</td>
<td>Canada</td>
<td>201</td>
<td>3646</td>
<td>18.14</td>
<td>0.95</td>
<td>31</td>
<td>95.40</td>
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<tr>
<td>5</td>
<td>Spain</td>
<td>166</td>
<td>2514</td>
<td>15.14</td>
<td>0.80</td>
<td>27</td>
<td>79.65</td>
</tr>
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<td>6</td>
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<td>24.40</td>
<td>1.28</td>
<td>37</td>
<td>128.34</td>
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<td>France</td>
<td>142</td>
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<td>15.25</td>
<td>0.80</td>
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<td>3181</td>
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<td>1991</td>
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<td>0.99</td>
<td>25</td>
<td>98.79</td>
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<td>10</td>
<td>Netherlands</td>
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<td>2025</td>
<td>25.00</td>
<td>1.32</td>
<td>26</td>
<td>131.49</td>
</tr>
</tbody>
</table>

CPP – Citation per Publication, RCI – Relative Citation Impact, PEI – Publication Efficiency Index

The list of countries is quite long as a total of 91 countries published 3272 articles during the study period. During analysis it is observed that most of the articles are
contributed by USA authors. The country with the greatest output in terms of urban sprawl is the USA (55.69%), followed by China (12.01%), Italy (6.45%), Canada (6.14%) share of publications respectively. Subsequent positions are occupied by Spain (5.07%), Germany (4.64%), France (4.34%), England (3.61%), Australia (3.24%) and Netherlands (2.47%), the remaining countries publishing a total of 891 publications between them accounting for 11.64% of the total output. Table 4 provides distribution of publications, citations and h-index of top ten highly productive countries.

Research performance in USA has increased appreciably during the study period, both in regard to relative output of publications and in their citations impact on the international research productivity. Research on urban sprawl in China, Italy, Canada, Spain, Germany and France started quite late but secured positions among the top ten countries. USA again occupied the first rank with global citation share of 30.84%, followed by England (26.96%), Netherland (25%) and Germany (24.40%).

5.5.1 Relative Citation Impact

Quality and impact of research publications are being measured with two relative indicators such as Citations per Publication (CPP) and Relative Citation Impact (RCI). Citations per publication was to access the impact of a publication of years, authors, institutes and countries and relative citation impact is more robust than other indicators in the sense that it measures of research activity, irrespective of the level of evaluation either author or institutes or countries. RCI is calculating with the following formula,

\[
\text{RCI} = \frac{\text{A country’s share of total citations}}{\text{A country’s share of total publications}}
\]

RCI = 1 indicates that the country’s citation value is equal to average citation rate, RCI>1 indicates that the country’s citation value is higher than the average citation rate and also implies high impact of research in that country and RCI<1 indicates that the
country’s citation value is lower than the average citation value and also implies that the research efforts are higher than its impact.

The relative citation impact (RCI) of top 10 most countries varied from 0.77 to 1.62 and the average value of RCI was 1.09. Four countries have scored higher value of RCI than the average value of all 10 countries. In terms of RCI, the first rank was occupied by USA with relative citation impact of 1.62, followed by England (1.42), Netherlands (1.32) and Germany (1.28).

5.5.2 Publication Efficiency Index

Publication Efficiency Index was used by Guan and Ma (2007) in their studies as a measure of research quality. It indicates whether the impact of publications in a country in a research field is compatible with the research efforts. The value of PEI > 100 for a country indicates that the impact of publications is more than the research effort devoted to it for that particular country and vice versa.

\[
PEI = \frac{TNC_i / TNC_t}{TNP_i / TNP_t}
\]

Where,

TNC_i – denotes the total number of citations of country i
TNC_t - denotes the total number of citations of all countries
TNP_i - denotes the total number of papers of country i
TNP_t - denotes the total number of papers of all countries

USA had the highest Publication Efficiency Index (162.19%) followed by England with (141.78%), Netherlands with (131.49%), Germany with (128.34%), Australia with (98.79%) and China with (97.47%).

5.6 Research communication in high productive journals

<table>
<thead>
<tr>
<th>Table 5 High productive journals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Journal</strong></td>
</tr>
<tr>
<td>Landscape and Urban Planning</td>
</tr>
<tr>
<td>Land Use Policy</td>
</tr>
<tr>
<td>Cities</td>
</tr>
<tr>
<td>Habitat International</td>
</tr>
<tr>
<td>Sustainability</td>
</tr>
<tr>
<td>Urban Studies</td>
</tr>
<tr>
<td>Environment and Planning B Planning</td>
</tr>
</tbody>
</table>
The scientific literature on urban sprawl is spread over 933 different Web of Science source journals. The scientific journals and conference proceedings publications are the most important medium of communications in scientific field. The top 10 most productive journals publishing global research papers together contributed 682 papers in urban sprawl, which accounted for 20.84% of the total output of the study period. Landscape and Urban Planning is the highly productivity journals with 140 publications with 5585 citations and impact factor is 4.563 followed by Land Use Policy with 107 publications, 2332 citations and impact factor is 3.194, Cities with 71 publications, 1764 citations and impact factor is 1.127 and Habitat International with 63 publications, 345 citations and impact factor is 3. More than 20% of the top ten publications were published in the journals with impact factors ranging from 1.127 to 3.194. This indicates that the publication behavior of researchers who preferred to publish their publications in high impact factor journals. The distribution of journals publications along with their impact factors range and h-index is presented in table 5.

### 5.7 High Productivity Subject Areas

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Subject</th>
<th>Total Articles</th>
<th>Total Citations</th>
<th>Citation per Publication</th>
<th>H - Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Environmental sciences ecology</td>
<td>1405</td>
<td>31988</td>
<td>22.77</td>
<td>83</td>
</tr>
<tr>
<td>2</td>
<td>Urban studies</td>
<td>792</td>
<td>20626</td>
<td>26.04</td>
<td>72</td>
</tr>
<tr>
<td>3</td>
<td>Geography</td>
<td>650</td>
<td>13040</td>
<td>20.06</td>
<td>59</td>
</tr>
<tr>
<td>4</td>
<td>Business economics</td>
<td>341</td>
<td>6845</td>
<td>20.07</td>
<td>45</td>
</tr>
<tr>
<td>5</td>
<td>Public administration</td>
<td>332</td>
<td>9107</td>
<td>27.43</td>
<td>47</td>
</tr>
<tr>
<td>6</td>
<td>Physical geography</td>
<td>248</td>
<td>7547</td>
<td>30.43</td>
<td>47</td>
</tr>
<tr>
<td>7</td>
<td>Engineering</td>
<td>218</td>
<td>3697</td>
<td>16.96</td>
<td>32</td>
</tr>
<tr>
<td>8</td>
<td>Public environmental occupational health</td>
<td>172</td>
<td>8547</td>
<td>49.69</td>
<td>43</td>
</tr>
<tr>
<td>9</td>
<td>Science technology</td>
<td>171</td>
<td>3370</td>
<td>19.71</td>
<td>21</td>
</tr>
<tr>
<td>10</td>
<td>Remote sensing</td>
<td>155</td>
<td>3396</td>
<td>21.91</td>
<td>31</td>
</tr>
</tbody>
</table>

Table 6 shows high productivity subjects which are contributing more than 100 articles. Among subjects, the highly productive subjects are: Environmental sciences ecology accounts for the largest share (42.94%, 1405 papers) of publications in the total worldwide output which received 31988 citations with 22.77 citations per publication,
followed by Urban studies (24.21%, 792 papers) and 20626 citations with 26.04 citations per publication, Geography (19.87%, 650 papers) with 20.06 citations per publication and Business economics (10.42%, 341 papers) and 6845 citations with 20.07 citations per publication respectively.

5.8 Highly cited papers

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Publications</th>
<th>Total citations</th>
<th>Document Type</th>
<th>Country</th>
</tr>
</thead>
</table>
The highly cited urban sprawl publications (which have got at least 300 citations) published by the global researchers are listed in table 7. The most frequently cited one was “Patz, JA et al., Impact of regional climate change on human health, Nature, 2005, Vol. 438 (7066), pp. 310.317 with 966 citations. Out of 10 highly cited publications 8 are journal articles each one is review and communication. Among the highly cited papers all were written by USA authors.

6 Summary and Conclusions

A comprehensive statistical analysis on urban sprawl research was conducted via a scientometric approach. Based on statistical analysis of the 3272 publications which were related to the topic of urban sprawl, it was found that articles are the dominating form of publications which accounted for 90.07% of the total. The Publications on urban sprawl are spread over 13 languages and the most predominant language used for communication was English. A constant increase was observed in the number of publications and citations. Specifically, from 2001 to 2017, over 3000 articles and 61000 citations were published on urban sprawl, indicating researchers great interest in this topic. Also, these articles were spread across 900 different journals, 91 countries and 2357 research institutes, revealing the importance of urban sprawl as well as the broad research interest in this field. USA institutions played a dominant role in the production, collaboration, and citation of high quality publications. As most of the major organizations are speeding up in a setting research atmosphere all over the world it is obvious, based on fact of globalization of research and also need to improve the number of publications in order to measure global research in urban sprawl. These findings will provide evidence of the current status and trends in urban sprawl all over the world and also would be helpful for researchers to conduct better researches that eventually could lead to more publications in this field.
References


