



MAPPING OF GREEN ECONOMICS: A BIBLIOMETRIC ANALYSIS

Srinivasa* Dr. Dorairajan M**

*Research Scholar, Bharathidasan University, Tiruchirappalli .

** Librarian, St. Joseph's College, Tiruchirappalli.

"Green economics" is loosely defined as any theory of economics by which an economy is considered to be component of the ecosystem in which it resides. A holistic approach to the subject is typical, such that economic ideas are commingled with any number of other subjects, depending on the particular theorist. Proponents of feminism, postmodernism, the ecology movement, peace movement, Green politics, green anarchism and anti-globalization movement have used the term to describe very different ideas, all external to some equally ill-defined "mainstream" economics.

UNEP's Working Definition of a Green Economy A system of economic activities related to the production, distribution and consumption of goods and services that result in improved human wellbeing over the long term, while not exposing future generations to significant environmental risks and ecological scarcities.

Bibliometrics

Bibliometrics as a technique has extensive applications in identifying the research trends in a subject, trends in a authorship and collaboration in research, core periodicals, obsolescence and dispersion of scientific literature useful in estimating the comprehensiveness of secondary periodicals, studying publications by scientists, citation studies and so on. Further, bibliometrics could be used in the identification of emerging research areas. The popularity in the adoption of bibliometric techniques in various disciplines stimulated stupendous growth of literature on bibliometrics and its relates areas. The techniques are now being vigorously pursued and with the result, it has been found that one fourth of all the articles published in a Library and Information Science periodicals also carry a large number of articles on bibliometrics. These techniques are being used for a variety of purpose like determination of various scientific indicators, evaluation of scientific output, selection of journals for libraries and even forecasting potential Nobel Laureates.

Statement of the Problem

Scientific productivity are assessed by the method of measuring the metric analysis. It is called as Scientometrics. It is the study of the disciplines by its literature published. To identify the emerging areas of scientific research, examining the development of research over time or geographic and organizational distribution of research. The present study and analyse the research productivity, citation count and literature growth of "Green Economics" by applying scientometric parameters to published literature.

Review of Literature

Vasishtha undertook a study, based on data extracted from scopus, of the 177 papers of PEC (Punjab Engineering College) University of Technology, Chandigarh published between 1996 and 2009 to examine the research productivity, publication trend, collaboration trend, etc. The study reported that though there was steady growth in research publications, there was a need to improve the publication output substantially when comparison was made to the publication output of other engineering colleges.

Koganuramath et al., analysed 663 papers published during 1990-2000 and authored by the scientists of TISS (Tata Institute of Social Sciences) to identify author productivity, areas of specialization and publication pattern. The study also revealed the collaboration patterns, most prolific authors and list of preferred journals for publishing by the scientists of TISS.

Exploring the research output in terms of the papers published by researchers of the University of Mysore, **Kumbar, Gupta & Dhawan**, extracted 15-18 papers from Scopus in different disciplines of science and technology and published between 1996 and 2006. The study identified the strong and weak areas of research in terms of number of papers published at the university, annual growth rate of publications, impact generated in terms of average citations received, the collaboration pattern in different subjects and collaboration pattern with authors from other countries. The study found that the number research publications at the university were increasing at an average rate of 23 % per annum in terms of the papers being published.



Objectives of the Study

The study was carried out with the following objectives:

- To calculate the publication productivity of Green Economics
- To identify the prolific authors in the literature of Green Economics
- To identify the authors' productivity.
- To examine the source journals which contribute the Green Economics literature

Methodology

The study was carried out using Web of Science (WOS), an international database searched for all records of papers contributed from various countries and organisations of the world. In order to fulfill the objectives, the related database was visited and the search term "Green Economics" within quotes was entered in the search box with the time limit up to the year 2014. The collected data were copied in the Histcite software for further results.

Analysis of Data

1. Year wise distribution of Publication productivity of Green Economics

Publication Year	Recs	Percent	TLCS	TGCS
1989	3	0.8	0	9
1990	7	1.9	0	26
1991	6	1.6	0	1
1992	2	0.5	0	1
1993	10	2.7	0	2
1994	11	3.0	0	73
1995	11	3.0	0	17
1996	13	3.5	0	0
1997	8	2.2	0	0
1998	4	1.1	0	38
1999	2	0.5	0	7
2000	5	1.3	0	39
2001	5	1.3	0	53
2003	4	1.1	0	23
2004	3	0.8	0	19
2005	5	1.3	0	22
2006	10	2.7	0	138
2007	6	1.6	0	18
2008	18	4.9	0	365
2009	17	4.6	0	15
2010	11	3.0	2	47
2011	67	18.1	12	185
2012	54	14.6	23	210
2013	42	11.3	7	150
2014	47	12.7	8	86

Table 1 reveals the highest 18.1 percentage of papers (67) have been published in the year 2011 and 14.6 percentage (54) in the year 2012. The citation scores of TLCS and TGCS were 12 and 185 during 2011 and 23 and 210 respectively during the year 2012. The highest TGCS was 365 for 18 records published during the year 2008.

2. Authorwise Distribution of Records

Author	Recs	%	TLCS	TLCSx	TGCS	TGCS/t	TLCR
[Anonymous]	5	1.3	0	0	0	0.00	0
Ahmed N	3	0.8	2	0	16	5.33	2
Jackson T	3	0.8	4	3	11	3.42	1
Bailey I	2	0.5	2	1	7	7.00	11
Borel-Saladin JM	2	0.5	0	0	6	3.00	3
Brent AC	2	0.5	0	0	3	3.00	4



Davies AR	<u>2</u>	0.5	5	4	26	8.25	5
Fava F	<u>2</u>	0.5	0	0	0	0.00	0
Hogue C	<u>2</u>	0.5	0	0	0	0.00	0
Hurni H	<u>2</u>	0.5	0	0	1	1.00	2
Jagirdar BR	<u>2</u>	0.5	1	0	20	5.20	1
Musango JK	<u>2</u>	0.5	0	0	3	3.00	4
Sanyal U	<u>2</u>	0.5	1	0	20	5.20	1
Sonnenfeld DA	<u>2</u>	0.5	0	0	0	0.00	0
Stalley P	<u>2</u>	0.5	0	0	4	0.67	0

It is found from the above table that 3 records each was produced by Ahmed N and Jackson T respectively on Green Economics. The maximum of 5 records were published anonymously. The TGCS for Davies A R with 2 records is having the maximum of 26 and TLCS is 5

3. Journalwise Distribution of Records

#	Journal	Recs	Percent	TLCS	TLCS/t	TGCS	TGCS/t	TLCR
1	NATURAL RESOURCES FORUM	<u>34</u>	9.2	1	0.25	25	6.50	0
2	ENERGY POLICY	<u>10</u>	2.7	1	1.00	89	16.74	0
3	ECOLOGICAL ECONOMICS	<u>7</u>	1.9	2	0.67	13	3.92	1
4	REVIEW OF POLICY RESEARCH	<u>7</u>	1.9	2	0.50	18	4.50	0
5	NEW SCIENTIST	<u>6</u>	1.6	0	0.00	0	0.00	0
6	SUSTAINABILITY	<u>6</u>	1.6	0	0.00	8	8.00	4
7	ENVIRONMENTAL POLITICS	<u>5</u>	1.3	0	0.00	27	4.65	1
8	ABSTRACTS OF PAPERS OF THE AMERICAN CHEMICAL SOCIETY	<u>4</u>	1.1	0	0.00	0	0.00	0
9	DEVELOPMENT SOUTHERN AFRICA	<u>4</u>	1.1	0	0.00	0	0.00	7
10	ENERGY ECONOMICS	<u>4</u>	1.1	0	0.00	37	20.67	0

The ranking list of journals will help the information professionals in prioritising the journal collection development, to build document retrieval profiles and scientists have to know such data when deciding the most efficient place to publish their articles. This part of the analysis will provide rank list of the journals with the number of records published. The journal, “Natural resources forum” published 34 records (9.2 percent) and next to this, “Energy Policy” with 10 articles(2.7 percent) which is having the TGCS of 89 points.

4. Occurring of Words in the Distribution of Records

#	Word	Recs	Percent	TLCS	TGCS
1	GREEN	<u>349</u>	94.1	49	1438
2	ECONOMY	<u>273</u>	73.6	49	1296
3	ECONOMICS	<u>87</u>	23.5	1	175
4	SUSTAINABLE	<u>58</u>	15.6	12	127
5	DEVELOPMENT	<u>56</u>	15.1	12	99
6	POLICY	<u>44</u>	11.9	2	51
7	POLITICAL	<u>37</u>	10.0	2	284
8	GLOBAL	<u>35</u>	9.4	3	29
9	CONCEPT	<u>30</u>	8.1	0	0
10	DISCUSSIONS	<u>30</u>	8.1	0	0

The occurrence of the word “Green” in the database of Web of Science on searching “Green Economics” was occurred in 349 times (94.1%) and “Economy” was occurred in 273 times(73.6%) It is also found that the occurrence of the word “economics” was 87 times(23.5%)

5. Document type of Records on Green Economics

#	Document Type	Recs	Percent	TLCS	TGCS
1	Article	<u>151</u>	40.7	42	1065
2	Book Review	<u>108</u>	29.1	0	16
3	Editorial Material	<u>72</u>	19.4	8	50
4	News Item	<u>11</u>	3.0	0	4



5	Article; Proceedings Paper	<u>9</u>	2.4	0	114
6	Review	<u>9</u>	2.4	0	291
7	Letter	<u>5</u>	1.3	2	4
8	Meeting Abstract	<u>5</u>	1.3	0	0
9	Note	<u>1</u>	0.3	0	0

The study reveals that 40.7 percent of the publications on Green Economics were articles in the journals (151) and 29.1 percent of the publications were about book review on the books published on Green Economics (108). It is also found that 19.4 percent of the records were (72) Editorial Materials.

6. Countrywise Distribution of Records

#	Country	Recs	Percent	TLCS	TGCS
1	Unknown	<u>90</u>	24.3	1	187
2	USA	<u>82</u>	22.1	8	581
3	UK	<u>58</u>	15.6	15	216
4	Canada	<u>22</u>	5.9	6	53
5	Australia	<u>18</u>	4.9	3	94
6	India	<u>15</u>	4.0	1	50
7	Peoples R China	<u>12</u>	3.2	6	85
8	Italy	<u>11</u>	3.0	1	57
9	Germany	<u>9</u>	2.4	0	31
10	South Africa	<u>9</u>	2.4	0	11

Findings

From the analysis, the following inferences were made as findings:

- The analysis reveals that the highest 18.1 percentage of papers (67) have been published in the year 2011 and 14.6 percentage (54) in the year 2012. The citation scores of TLCS and TGCS were 12 and 185 during 2011 and 23 and 210 respectively during the year 2012. The highest TGCS was 365 for 18 records published during the year 2008.
- It is found from the above table that 3 records each was produced by Ahmed N and Jackson T respectively on Green Economics. The maximum of 5 records were published anonymously. The TGCS for Davies A R with 2 records is having the maximum of 26 and TLCS is 5
- The journal, "Natural resources forum" published 34 records (9.2 percent) and next to this, "Energy Policy" with 10 articles (2.7 percent) which is having the TGCS of 89 points.
- The occurrence of the word "Green" in the database of Web of Science on searching "Green Economics" was occurred in 349 times (94.1%) and "Economy" was occurred in 273 times (73.6%) It is also found that the occurrence of the word "economics" was 87 times (23.5%)
- In this study United States of America ranked in the first place with 82 records (22.1%) with 581 global citations. Next to this, United Kingdom with 58 records (15.6%) scoring the TGCS of 216

Conclusion

The "Green Economics" especially the growing subject field in which the awareness and publication productivity of the subject related matters like environmental economics, green house effect etc. were developing in the faster rate. The problem of indexing the articles in Scopus or Web of Science database is due to the nature of the work related to Social Sciences or Economics literature. The researcher found more than 5000 articles from Google Scholar on Environmental economics and green economics is the positive sign of the development of the subject in different green oriented subjects.

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