

THE SCIENTOMETRICS OF RESEARCH OUTPUT IN ENVIRONMENTAL MANAGEMENT

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Introduction

This study measures the research output in Environmental Management (EM) research through scientometric techniques. This study deals with the analytical part of the thesis for framed hypotheses with source databases of Web of Knowledge which includes Science Citation Index (SCI), Social Science Citation Index (SSCI) and Arts and Humanities Citation Index (AHCI). With the advent of Information Technology the emergence of viewer tools such as impact factor, h-index, priority index, activity index emphasize the relevance of scientometric studies. In this context, scientometrics and bibliometrics research and hence assessment studies always play a significant role in Library and Information Science Research. Also this study attempts to explain the theoretical and empirical discussions relating to research publications in EM from published reports.

The objectives of the study are: (1) to identify the different sources, continent and country-wise distribution of EM research output, (2) to identify the proportion of authorship pattern and degree of collaboration in EM research and (3) to test the applicability of Lotka's Law, Price's Square Root Law and Pareto Principle (80/20 rule) to measure author productivity in the field of EM research.

Methodology

The present study examines the continent and country wide distribution of research output of global scientists in the EM field. The study examines the relative growth rate, absolute growth level, exponential growth and doubling time of publication during the study period. The authors' productivity and degree of collaboration in EM research output are also examined.

There are various sources contributing to the research output in the EM field. For this study the researcher has taken the secondary sources from Science Citation Index (SCI), Social Science Citation Index (SSCI) and Arts & Humanities Citation Index (ACHI) which is available via the Web of Science (WoS). The WoS is the search platform provided by Thomson Reuters (the former Thomson Scientific emerged from the Institute for Scientific Information (ISI) in Philadelphia). The study period is 1989 to 2014 (26 years) and the search string is “Environmental Management” only. A total of 62059 records were downloaded, after eliminate duplicate records, 61877 records were found and analyzed using Histcite, VOSViewer and MS-Excel software. The tools and techniques used were Relative Growth Rate (RGR) and Doubling Time, Degree of Collaboration and Collaborative Index, Historiographic Map, Bradford’s Law of Scattering Journals, Lotka’s Law of Author Productivity.

Results and discussion

The leading source of articles is in the form of journal articles compared to other sources. The collection was exported to HistCite to obtain a list of 61877 articles produced by 6191 journals and 3,072,359 times cited references along with their local and global citation scores (69,332 LCS and 940,030 GCS). The European continent stood first and second rank. It was also found that USA in North America, UK in Europe and China in Asia dominate their respective geographical areas. Among the seven continents, the European Continent has a specialized relation with world output. “Environmental Sciences” has the highest contribution within the subject category. The “Environmental Management” journal has produced more number of articles and “Ecological Applications” is the most cited journal in the field. From historiographic analysis the “Journal of Cleaner Production” has the highest citation scores and links.

Among the 214,351 authors, the authors of “Huang GH, Chang NB, Li YP and Zhang FS” were the contributors of highest number of articles and identified as the most productive authors in EM field. Through VOSViewer analysis the authors “Huang GH, Liu Y, Zhang FS and Zhang Y” have the highest productivity and highest bibliographic coupling values. Single author productivity is 5.22 percent while multi-authors’ productivity is 94.78 percent. The three-authored productivity has been highest and the three-authored team has contributed the highest

number of authors. The authors of “Burger J and Huang GH” were identified as the active authors of different level of authorship pattern in EM research. The author “Chang NB” was identified as the active first author of different level of authorship pattern. From the historiographic mapping analysis, “Alavi M” has earned the highest citation scores. The collaborative index for universal level is 3.46 and degree of collaboration, C, is equal to 0.82; i.e. 82 percent of collaborative authors’ articles were published during the study period.

Out of 28,127 institutions, the “Chinese Academy of Sciences” produced the most number of articles. The authors of “Porter ME” and “Hollings CS” were identified as the highly cited authors. The journals of “Strategic Management”, “Academic Management Review”, “Nature”, “Academic Management”, “Science” and “Ecological Model” show different colours for identifying the repeated cited journals.

Conclusion

India is far behind USA in North America, UK in Europe and China in terms of publication output, citation quality and share of international papers in the EM field. There is an urgent need for substantial increase in research and development investments, both at the institutional level as well as in terms of external funding from different scientific agencies. Academic institutes should take steps to create interest in research in EM among graduate and postgraduate students and also among young environmental scientists. There should be a substantial increase in international collaboration to increase the output and also to improve the quality of research. In addition there should be more collaboration among the Indian institutions.

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