

# INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT

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9. **MAIN TEXT:** The main text should follow the following sequence:

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- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

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- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

**CONFERENCE PAPERS**

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**SCIENTOMETRIC MAPPING OF GREEN COMPUTING: THE GLOBAL PERSPECTIVE****M. PADMINI****LECTURER****DEPARTMENT OF MANAGEMENT STUDIES****V.S.B ENGINEERING COLLEGE****KARUR****T. R. SAJANI NAIR****LIBRARIAN****DEPARTMENT OF LIBRARY & INFORMATION SCIENCE****V.S. B. ENGINEERING COLLEGE****KARUR****R. SURYA****LECTURER****DEPARTMENT OF MANAGEMENT STUDIES****V. S. B. ENGINEERING COLLEGE****KARUR****T. SUHIRTHARANI****STUDENT****DEPARTMENT OF MANAGEMENT STUDIES****SRIMATHI INDIRA GANDHI COLLEGE****TRICHY****ABSTRACT**

*An analysis of 2455 publications published by scientists on Green Computing during 1999–2011 and indexed by Web of Science online Database indicates that the publication output in the Global Research Publication. University of Heidelberg, CNRS, MIT, University of Coimbra University of Tokyo, University of Washington and Indian level Indian Institute of Technology and institutes are the major producers of research output. Most of the prolific authors are from the highly productive institutions. This work is to provide a profile of research in Green Computing Research Publications of all over the world. This includes tracking the number of papers, scatter of papers over journals, and its effect on publication output, authors' institutional affiliations and authorship patterns.*

**KEYWORDS**

Green Computing, Scientometrics, Scientometric Mapping.

**INTRODUCTION**

In the last one decade, there has been an increasing interest in using Scientometric Mapping for assessing or monitoring research activities. Assessment of research activity is considered to be one of the main instruments needed to maintain high standards of research performance in research centers and universities. Recently, ranking of Universities, departments, and even promotion and tenure decisions within departments seem to have been based, among other things, on the scientists' research productivity, h-index and impact of publications. This work is to provide a profile of Green Computing research and compare with universal countries. This includes tracking the number of papers, scatter of papers over journals, and its effect on publication output, authors' institutional affiliations and authorship patterns. Green computing is the environmentally responsible use of computers and related resources. Such practices include the implementation of energy-efficient central processing units (CPUs), servers and peripherals as well as reduced resource consumption and proper disposal of electronic waste (e-waste).

**OBJECTIVES**

The main objectives framed for the purpose of the study are to identify and analyse the rate of growth of research literature on Green Computing Research.

- Growth of output during 1999–2011;
- Distribution of output in different forms;
- Communication pattern of scientists as reflected by the country
- Identification of highly productive institutions, their activity of research
- Identification of prolific authors

**METHODOLOGY**

The present study attempts to find the pattern of information published by researchers on green computing Publication in all over the world. The study analyses the growth and development of publication output as reflected in Web of Science online database from 1999 to 2011. There are 2455 records that were retrieved from Web of Science, an abstract and citation database of research literature and web sources. The publications of scientists are mostly in the form of journal articles, Proceedings paper, review, editorial materials, Notes, Letters, and meeting-abstracts. The research papers published by scientists in Green Computing Research Publications covered in the annual version of Science Citation Index Extended were taken as the prime source for the present study. There were 107 papers by Indian scientists published from 1999 to 2011.

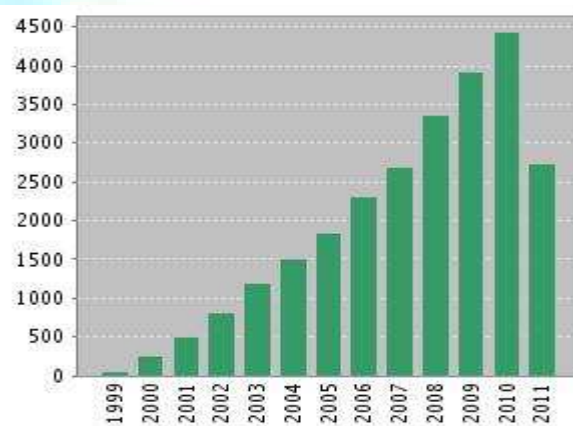
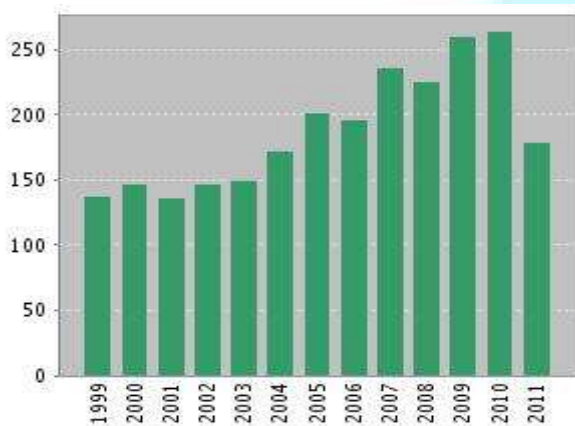
**ANALYSIS AND INTERPRETATION**

**GROWTH OF LITERATURE**

The highest number of publications in the years being studied was 264 in 2010. The average number of publications per year was 188.85. The lowest number of publications was 136 in 2001. The number of papers published from different countries during 1999–2011 is 2455. Indian Contribution is less than 5 percent. (107 Publications)

**TABLE 1: SHOWS YEAR WISE DISTRIBUTION OF PUBLICATIONS**

Year	Publications	%
2010	264	10.754
2009	260	10.591
2007	236	9.613
2008	226	9.206
2005	202	8.228
2006	197	8.024
2011	179	7.291
2004	173	7.047
2003	150	6.11
2000	147	5.988
2002	147	5.988
1999	138	5.621
2001	136	5.54
<b>Total</b>	<b>2455</b>	<b>100</b>



Published Items in Each Year

Citations in Each Year

**H-INDEX OF GREEN COMPUTING PUBLICATIONS**

The h-index is based on a list of publications ranked in descending order by the Times Cited. The value of h is equal to the number of papers (N) in the list that have N or more citations. 62 Papers have received more than 62 Citations.

- Results found : 2455
- Sum of the Times Cited : 25662
- Sum of Times Cited without self-citations : 24715
- Citing Articles : 22410
- Average Citations per Item : 10.45
- h-index : 62

**AUTHORSHIP PATTERN**

An attempt has been made to analyze the research performance of individual scientists in Green Computing research publications. The contributions of individual scientists are varies. The highest number of papers is 23 Papers by A. Tadeu and followed by Cederbaum, LS 19 Publications followed by other scientists. Top 20 authors with respect to the number of articles dealing with Green Computing research publication and published in the Web of Science source journals by Indian and Universal authors.

**TABLE 2: SHOWS AUTHOR WISE DISTRIBUTION OF PUBLICATIONS (TOP 20)**

Author	Publications	%
TADEU A	23	0.937
CEDERBAUM LS	19	0.774
KUMAR R	14	0.57
ANTONIO J	11	0.448
BARD PY	11	0.448
GODINHO L	11	0.448
SANCHEZ SESMA FJ	10	0.407
TSANG L	10	0.407
LUZON F	9	0.367
MARTIN OJF	9	0.367
CEDERBAUM LORENZ S	8	0.326
CORNOU C	8	0.326
LI J	8	0.326
MANSUR WJ	8	0.326
SIMOES N	8	0.326
ZHAO L	8	0.326
CAMPILLO M	7	0.285
LEONG MS	7	0.285
MAITI SANTANU K	7	0.285
MAITI SK	7	0.285



**DOCUMENT WISE DISTRIBUTION OF PUBLICATIONS**

More than 97 percent of the 2455 publications were journal articles were by Scientists. The publications of scientists are mostly in the form of journal articles, Proceedings paper, review, editorial materials, Letters, and correction.

**TABLE 3: DOCUMENT WISE DISTRIBUTION OF PUBLICATIONS**

Document Type	Publications	%
ARTICLE	2404	97.923
PROCEEDINGS PAPER	205	8.35
REVIEW	40	1.629
EDITORIAL MATERIAL	4	0.163
LETTER	3	0.122
CORRECTION	2	0.081

**JOURNAL WISE DISTRIBUTION OF PUBLICATIONS**

During the 13 years period (1999–2011), Scientists have produced a total of 2455 publications. More than 97 percent of the 2455 publications were journal articles were by Scientists. The highest number of publications was 121 in Physical Review B and Journal of Chemical Physics 55 Publications followed by Geophysical Journal international and so on.

**TABLE 4: SHOWS JOURNAL WISE DISTRIBUTION OF PUBLICATIONS**

Source	Publications	%
PHYSICAL REVIEW B	121	4.929
JOURNAL OF CHEMICAL PHYSICS	55	2.24
GEOPHYSICAL JOURNAL INTERNATIONAL	48	1.955
JOURNAL OF HIGH ENERGY PHYSICS	46	1.874
PHYSICAL REVIEW D	46	1.874
IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION	44	1.792
BULLETIN OF THE SEISMOLOGICAL SOCIETY OF AMERICA	38	1.548
ENGINEERING ANALYSIS WITH BOUNDARY ELEMENTS	26	1.059
PHYSICAL REVIEW E	26	1.059
IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES	25	1.018
MICROWAVE AND OPTICAL TECHNOLOGY LETTERS	24	0.978
PHYSICAL REVIEW A	22	0.896
JOURNAL OF APPLIED PHYSICS	21	0.855
JOURNAL OF THE ACOUSTICAL SOCIETY OF AMERICA	21	0.855
NUCLEAR PHYSICS B	21	0.855
GEOPHYSICS	20	0.815
JOURNAL OF COMPUTATIONAL PHYSICS	20	0.815
JOURNAL OF GEOPHYSICAL RESEARCH SOLID EARTH	20	0.815
JOURNAL OF PHYSICS CONDENSED MATTER	17	0.692
JOURNAL OF SOUND AND VIBRATION	17	0.692

**INSTITUTION WISE DISTRIBUTION OF PUBLICATIONS**

An analysis of 2455 publications published by scientists during 1999 – 2011 and indexed by Web of Science online Database indicates that the publication output in the Indian Green Computing. University of Heidelberg, CNRS, MIT, University of coimbra University of Tokyo, University of Washington and Indian level Indian Institute of Technology and institutes are the major producers of research output. 2455 papers were widely distributed over 656 different institutions and universities. University of Heidelberg contributed about 31 publications and followed by others. In Indian level Indian Institute of Technology has contributed 18 publications and followed by others.

**TABLE 5: SHOWS INSTITUTION WISE DISTRIBUTION OF PUBLICATIONS (TOP 25)**

Institution	Publications	%
UNIV HEIDELBERG	31	1.263
CNRS	29	1.181
MIT	29	1.181
UNIV COIMBRA	27	1.1
UNIV TOKYO	25	1.018
UNIV WASHINGTON	25	1.018
UNIV CALIF SAN DIEGO	24	0.978
UNIV ILLINOIS	24	0.978
CHINESE ACAD SCI	23	0.937
STANFORD UNIV	23	0.937
UNIV NAFL AUTONOMA MEXICO	23	0.937
IST NAZL FIS NUCL	22	0.896
NATL UNIV SINGAPORE	21	0.855
RUSSIAN ACAD SCI	21	0.855
UNIV GRENOBLE 1	21	0.855
CALTECH	19	0.774
DUKE UNIV	19	0.774
NASA	19	0.774
OHIO STATE UNIV	19	0.774
UNIV TEXAS	19	0.774
INDIAN INST TECHNOL	18	0.733
OAK RIDGE NATL LAB	18	0.733
UNIV CALIF BERKELEY	18	0.733
UNIV CALIF SANTA BARBARA	18	0.733
UNIV SO CALIF	18	0.733

**COUNTRY WISE DISTRIBUTION OF PUBLICATIONS**

Authors of the 107 Indian Green Computing papers collaborated with scientists from a number of countries, including the USA, Germany, Japan, China, and so on. The number of papers published from different countries during 1999–2011 is shown in Table. The USA is the undoubted leader, followed by Germany, France, China, Italy, Japan, Canada, England, Spain and India.

**TABLE 6: COUNTRY WISE DISTRIBUTION OF PUBLICATIONS (TOP 20)**

Country	Publications	%
USA	835	34.012
GERMANY	248	10.102
FRANCE	210	8.554
PEOPLES R CHINA	181	7.373
ITALY	173	7.047
JAPAN	154	6.273
CANADA	128	5.214
ENGLAND	125	5.092
SPAIN	117	4.766
INDIA	107	4.358
SWITZERLAND	71	2.892
RUSSIA	57	2.322
BRAZIL	52	2.118
AUSTRALIA	49	1.996
NETHERLANDS	49	1.996
BELGIUM	46	1.874
PORTUGAL	43	1.752
SWEDEN	40	1.629
TAIWAN	39	1.589
GREECE	35	1.426

**CONCLUSION**

This paper has highlighted quantitatively the contributions made by the researchers on Green Computing during 1999-2011 as reflected in Web of Science online database. During 13 years period contributions in terms of number of publications is not significant. A comparison of Indian output in relation to the world output may help in understanding the contribution in a better angle. Though the records available in the Web of Sciences database reveal a small number, it is important that the Web of Sciences covers only the peer-reviewed journals. If a broader coverage database is available, it may provide a reasonable number of papers. We suggest for tracking citation record of papers so that the impact of publications in Green Computing may be visible.

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