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A Scientometric Mapping of Green Building Research Publications: A Study

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Abstract **- This study analyzed the growth of research publications in the field of Green Building. A total of 8287 records were downloaded from Web of science database for the period of twenty eight years. The findings revealed that USA has the maximum number of contribution with 2072 records, having a global citation score of 49655 and a local citation score of 2505. In the ranking of authors, Jim CY has published the highest number of publications with 35 records, having a global citation score of 728. Further Contribution of journals, preference of publication, etc were also analyzed in this paper. The study also applied histograph analysis using histicite based on Global Citation Scores (GCS).**

Key Words: Scientometrics, Histcite, Web of Science, Global Citation Scores (GCS)

I. INTRODUCTION

GREEN building denotes to both a structure and the using of processes that are environmentally liable and resource-efficient throughout a building's life-cycle: from siting to design, structure, action, conservation, revamp, and annihilation. In other words, green building design involves discovering the stability between homebuilding and the sustainable environment. This entails close cooperation of the design team, the architects, the engineers, and the client at all project stages. The Green Building practice expands and complements the classical building design concerns of economy, utility, durability, and comfort. S*cientometrics* is a study, measuring the. "Quality" of science where emphasis is placed on investigations where the mechanisms of science are studied by statistical methods. This paper analyzes the research output of Green Building using scientometric tools.

A. OBJECTIVES

- To analyze the year wise publication of research output in Green Building
- To find out the prolific authors in Green Building research
- To find out the document wise distribution of publication.
- To analyze the journal wise distribution of publication.
- To create a histograph based on Global Citation Scores

B. METHODOLOGY

The data for the study were extracted from web of science database which is a scientific and indexing service maintained by Thomson Reuters. The research productivity of Green Building was analyzed. The following search strategy has been used to extract data
ADDRESS-ABS-KEY ("Green Building") AND PUB-YEARS (1990-2017) The bibliographic details such as authors, document types, collaboration etc were analyzed using Histcite which is a software package used for bibliometric analysis and information visualization.

C. ANALYSIS

A total of 8782 records were published in Green Building research from the year 1990-2017. The research output was analyzed using various scientometric indicators.Weighted pendulum Charpy -type impact test .

D. PUBLICATION YEARS

Table 1: Year wise Analysis of Green Building Research Output

S.NO	PUBLICATION YEAR	RECORDS	TLCS	TGCS
1	1990	4	0	41
2	1991	37	33	933
3	1992	32	9	608

4	1993	33	16	1786
5	1994	48	7	674
6	1995	64	27	1366
7	1996	50	7	999
8	1997	76	19	3612
9	1998	92	92	3293
10	1999	91	192	2309
11	2000	110	133	4584
12	2001	133	332	5193
13	2002	123	58	4834
14	2003	140	105	3772
15	2004	167	156	5398
16	2005	195	385	6542
17	2006	271	526	8077
18	2007	317	661	9793
19	2008	390	885	12774
20	2009	386	488	8524
21	2010	477	735	10781
22	2011	554	973	9794
23	2012	681	829	10065
24	2013	811	864	8770
25	2014	928	720	7545
26	2015	1146	371	4221
27	2016	1328	113	1277
28	2017	98	1	8
	TOTAL	**8782**	**8737**	**137573**

Table 1 presents the year wise research output of Green Building research from the year 1990-2017. It was found out that, totally 8782 publications were published by the researchers during the period of 28 years. The highest number of publications is found to be 1328 in the year 2016 with a Local Citation Score of 113 and a Global Citation Score of 1277, followed by 1146 papers in the year 2012 with a Local Citation Score of 371 and a Global Citation Score of 4221. It was found out from the table that the research publications in the field of Green Building are increasing every year, which indicates a positive and healthy trend.

E.PROLIFIC AUTHORS

Table 2: Ranking of Top ten authors in Green Building Research

S.NO	AUTHORS	RECORDS	TLCS	TGCS
1	Jim CY	35	259	728
2	Zhang Y	25	3	279
3	Li Y	23	12	185
4	Cole RJ	20	115	371
5	Ghaffarianhoseini A	18	120	248
6	Wang L	18	5	267
7	Chen J	17	0	162
8	Kim J	17	18	387
9	Wang X	17	3	210
10	Chen L	16	44	313

Table 2 indicates the ranking of top ten authors by the number of publications in Green Building research during the period 1990-2017. The study found out that totally 25539 authors contributed to Cell Biology Green Building. It is clearly seen from the table that Jim CY has published the highest number of publications with 35 records, having a global citation score of 728, followed by Pandey A and Sharma A with 25 and 23 records each, having a global citation score of 279 and 185 respectively

F. DOCUMENT TYPES

Table 3: Document-wise Distribution of Publications

S.NO	DOCUMENT TYPES	RECS	TLCS	TGCS
1	Article	7567	7498	106563
2	Review	517	755	23518
3	Article; Proceedings Paper	390	426	6507
4	Editorial Material	118	51	532
5	News Item	81	1	26
6	Book Review	44	0	1
7	Letter	19	3	173
8	Review; Book Chapter	18	1	207
9	Meeting Abstract	10	0	0
10	Note	7	2	25
11	Correction	4	0	0
12	Article; Book Chapter	3	0	19
13	Reprint	3	0	2
14	Software Review	1	0	0
	TOTAL	**8782**	**8737**	**137573**

Table 3 reveals the Document wise distribution of publication in Green Building research in India. The highest numbers of publications were in the form of journal articles contributing to 7597 records with a Local Citation Score of 7498 and a Global Citation Score of 106563 followed by Review with 517 records with with a Local Citation Score of

755 and a Global Citation Score of 23518. It is also noted that the global citation rate exceeded the local citation rate which indicates that the visibility of the publications is higher.

S.NO	JOURNAL	RECORDS	TLCS	TGCS
1	ENERGY AND BUILDINGS	208	1140	4030
2	JOURNAL OF GREEN BUILDING	188	160	357
3	BUILDING AND ENVIRONMENT	179	1138	3986
4	LANDSCAPE AND URBAN PLANNING	108	360	2429
5	JOURNAL OF CLEANER PRODUCTION	105	87	759
6	BUILDING RESEARCH AND INFORMATION	102	502	1669
7	RENEWABLE & SUSTAINABLE ENERGY REVIEWS	92	268	2357
8	SUSTAINABILITY	69	11	175
9	URBAN FORESTRY & URBAN GREENING	57	105	553
10	APPLIED ENERGY	53	194	967

The study found out the total research output on Green Building during the period of 28 years, comprising of 8782 records were published in 2806 journals. The journal "Energy and Buildings" stands first with 208 records, having a global citation score of 4030 and a local citation Score of 1130 followed by Journal of Green Building with 188 records, having a global citation score of 357 and a local citation score of 160.

G.CONTRIBUTION OF COUNTRIES

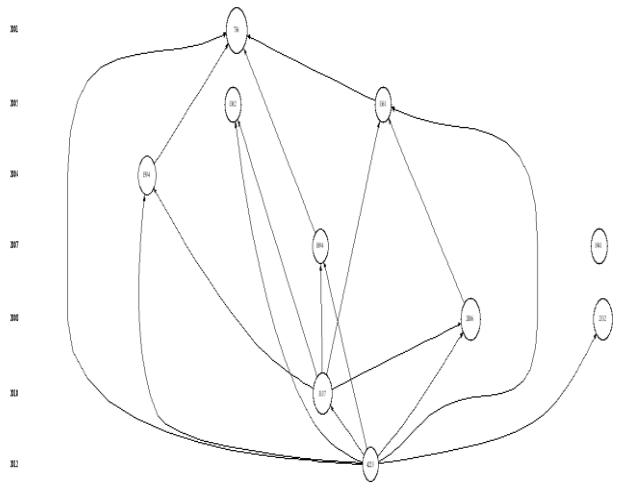
Table 5: Country Wise analysis of Green Building research publications (Top Ten)

S.NO	COUNTRIES	RECORDS	TLCS	TGCS
1	USA	2072	2505	49655
2	China	1311	1206	15653
3	UK	741	975	12663
4	Unknown	570	272	4437
5	Germany	548	301	11434
6	Canada	434	720	9531
7	Italy	415	538	4992
8	France	401	261	7184
9	Australia	389	638	5295
10	Spain	281	248	3444

Table 5 shows the contribution of top ten countries in Green Building research. It is inferred from the table that USA has the maximum number of records with 2702 having a global citation score of 49655, followed by China and UK with 1311 and 741 records each having Global Citation Scores of 15653 and 12663 respectively.

H. HISTRIOGRAPHIC ANALYSIS OF JOURNALS

An attempt can be made to develop histograph for Green Building research output using histcite software, for which 8782 papers have been included and references have been quoted in the papers also. The collection is exported to software and shows 8782 papers and 381745 cited references with LCS 8737 and GCS 137573 during the period 1990 – 2017, it was found out that a total of 8782 records were published during the given period. The findings obtained in



this study may be useful for prospective students, researchers and subject experts in the relevant field.

II CONCLUSION

The solicitation of quantitative procedures to scientific research has highlighted the contribution of countries, institutions, journals and also individual researchers. In the productivity analysis of Green Building research output during the period 1990-2017, it was found out that a total of 8782 records were published during the given period. The findings obtained in this study may be useful for prospective students, researchers and subject experts in the relevant field.

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