Scientometric Study of Nuclear Crisis (1970 - 2011)

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(Received on 05 September 2011 and accepted on 08 March 2012)

Abstract - **This study analyzes nuclear crisis research publication in globally measured from Histcite software and other tools. The results show that the growth of Global literature in nuclear crisis deposition and make the quantitative assessment of the research in terms of year-wise research output, geographical distribution of research output, nature of collaboration, characteristics of highly productive institution and the channel of communication used by the scientists.**

Keywords : **Nuclear Crisis, Scientomatic Study**

I. Introduction

Scientometrics is a discipline which analyses scientific publications and citations appended to the papers to gain an understanding of the structure of science, growth of science at global level, performance of a country in a particular domain, performance of institutions, departments/divisions, and scientific eminence of an individual scientist. Research publications are clearly one of the quantitative measures for the basic research activity in a country. It must be added, however, that what excites the common man, as well as the scientific community, are the peaks of scientific and technological achievement, not just the statistics on publications. Many scientometrics studies have appeared in the literature to focus on the performance of science in the field of nuclear crisis.

II. Literature Review

Sooryamoorthy, Radhamany (2010) examined the Medical research in South Africa. Being a scientifically active country in Africa, South Africa has made significant strides in the production of scientific publications [1]. Lee, Su and England, Mark (2010) analyzed the Transition to postmodern science. This change is usually discussed from a more epistemological viewpoint [2]. In order to enhance the understanding of the underlying key factors, bibliometric, demographic and Nobel Prize recipient data spanning of the last hundred years are considered and analyzed. Mehrad, J and Neserri,M (2010) analyzed the Islamic World Science Citation Center [3]. This article deals with the establishment of the Islamic World Science Citation Center (ISC) as the first citation system in the Islamic countries. It attempts to describe the mapping of ISC the way it has been established. At the time being, ISC has begun to evaluate the research performance of the Islamic countries. M. Amudha and C. Muthusamy studied the Scientometric Evaluation of Research Output on Computer Communication. North American Continent has highest publication and largest total citation scores are there in the field of computer communication and dominate first rank [4]. A.Senthamilselvi and R. Srinivasa Ragavan studied the scientometric analysis on Power Electronics. Among the various publishers the IEEE placed in the top list with large number of publications [5]. Balu Maharana, Supreeti Das and Sabitri Majhi described results of research productivity study of agricultural scientists at Central Rice Research Institute (CRRI), Cuttack. Findings of the study indicate that journal article (72.69%) is the predominant type of publication [6].

III. Methodology

Data was collected from the Science Citation Index (SCI) which is available via the Web of Science (WoS). SCI database is one of the very comprehensive databases covering all aspects of science. The study period (1970-2011) is selected as the database is available in machine from since 1982. The search string “nuclear crisis” in the “Basic search” field of SCI was used for the years 1970-2011 to download the records on the subjects 'Nuclear Crisis'. A total of 583 records were downloaded and analyzed by using the Histcite software application as per the objectives of the study.

The most productive author is Perrotti D with each 6 papers dealing with nuclear crisis and each 1.0% of all papers published in this research field. The authors of the seminal publication on nuclear crisis given Table I, Calabretta B (0.7%) and Ganguly S (0.7), appear on rank 2, respectively. It can be clearly visualized from the below table.

The most productive Journal is Korean journal of defense analysis with 19 papers dealing with nuclear crisis and 3.3% of all papers published in this research field. The journal of the seminal publication on nuclear crisis given Table II, Molecular phylogenetics and evolution and Asian survey, appear on rank 2 (1.7%) and 3(1.5%), respectively.

IV. Results And Discussion

Table I Author-wise Document Distribution (first 20 Documents)

S.No	Author	Records	Percent	TLCS	TLCS/t	TGCS	TGCS/t	TLCR	TLCSb	TLCSe
1	Perrotti D	6	1.0	10	1.37	154	18.89	11	3	2
2	Calabretta B	4	0.7	5	0.50	99	9.08	1	1	2
3	Ganguly S	4	0.7	2	0.29	5	0.82	2	1	0
4	Harrison SS	4	0.7	0	0.00	11	1.49	0	0	0
5	Moon CI	4	0.7	1	0.11	4	0.58	0	1	0
6	Asal V	3	0.5	4	0.93	12	3.20	5	0	0
7	Beardsley K	3	0.5	4	0.93	12	3.20	5	0	0
8	Cotton J	3	0.5	0	0.00	27	1.50	1	0	0
9	Joo SH	3	0.5	0	0.00	2	0.40	0	0	0
10	Steigman G	3	0.5	3	0.18	184	10.82	2	1	0
11	Arnedo MA	2	0.3	1	0.25	3	0.75	2	0	0
12	Bartelt S	2	0.3	0	0.00	7	0.58	1	0	0
13	Bartram CR	2	0.3	0	0.00	35	2.14	0	0	0
14	Bleiker R	2	0.3	0	0.00	0	0.00	0	0	0
15	Blumberg B	2	0.3	0	0.00	31	6.20	0	0	0
16	Bluth C	2	0.3	0	0.00	1	0.14	1	0	0
17	Boyer RD	2	0.3	2	0.24	32	3.75	0	2	0
18	Bruss D	2	0.3	1	0.06	14	0.89	1	0	0
19	Bureau F	2	0.3	1	0.08	86	7.28	1	1	0
20	Carpenter TG	2	0.3	0	0.00	0	0.00	0	0	0

Table II Journal-wise Document Distribution (first 20 Documents)

S.No	Journal	Records	Percent	TLCS	TLCS/t	TGCS	TGCS/t	TLCR
1	Korean journal of defense analysis	19	3.3	0	0.00	6	0.74	1
2	Molecular phylogenetics and evolution	10	1.7	8	0.94	217	27.99	2
3	Asian survey	9	1.5	1	0.17	1	0.17	1
4	International affairs	9	1.5	0	0.00	2	0.29	0
5	Blood	8	1.4	4	0.67	500	60.89	4
6	Journal of strategic studies	8	1.4	2	0.17	3	0.50	0
7	Survival	8	1.4	1	0.11	8	1.09	0
8	Atomwirtschaft-atomtechnik	7	1.2	0	0.00	4	0.20	0
9	Atw-internationale zeitschrift fur kernenergie	6	1.0	0	0.00	0	0.00	0
10	Bulletin of the atomic scientists	6	1.0	0	0.00	3	0.11	0
11	Energy policy	6	1.0	0	0.00	9	1.17	0
12	Foreign affairs	6	1.0	0	0.00	33	3.62	0
13	International security	6	1.0	4	0.80	12	2.45	3
14	Oncogene	6	1.0	0	0.00	316	22.92	1
15	Pacific affairs	6	1.0	1	0.17	8	1.25	0
16	pacific focus	6	1.0	0	0.00	2	0.40	0
17	J ournal of environmental radioactivity	5	0.9	0	0.00	6	0.48	0
18	K erntechnik	5	0.9	1	0.08	5	0.38	1
19	K orea observer	5	0.9	0	0.00	0	0.00	0
20	L eukemia	5	0.9	2	0.12	209	12.80	0

TABLE III WORD-WIDE DISTRIBUTION OF DOCUMENTS (FIRST 20 DOCUMENTS)

S.No	Word	Record	Percent	TLCS	TGCS
1	Nuclear	183	31.4	19	526
2	Crisis	162	27.8	11	513
3	North	53	9.1	2	39
4	Korea	48	8.2	2	40
5	Korean	44	7.5	2	14
6	Energy	28	4.8	3	148
7	Power	27	4.6	2	21
8	Cells	26	4.5	5	1146
9	Cell	24	4.1	4	433
10	Human	22	3.8	4	928
11	Management	21	3.6	1	47
12	Leukemia	19	3.3	4	453
13	War	19	3.3	5	23
14	Myeloid	18	3.1	4	442
15	Chronic	16	2.7	2	244
16	Case	15	2.6	1	21
17	New	15	2.6	4	100
18	Security	15	2.6	0	16
19	Historical	14	2.4	1	71
20	Peninsula	14	2.4	0	1

Analysis of the keywords appeared either on the title or assigned by the indexer or the author himself will help in knowing in which direction the knowledge grows. The high frequency keywords will enable us to understand the various aspects of nuclear crisis under study. The high frequency keywords were: Nuclear 31.4%, Crisis 27.8%, North 9.1%, Korean 7.5% and Energy 4.8%.

During 1970-2011 a total of 583 publications were published in nuclear crisis by USA. The average Number of Publications produced per year was 6%. The highest number of publications produced in 2008 and 2010(Each 54 records). Table 4 was given year-wise growth and collaboration rate in nuclear crisis. It can be clearly visualized from the Table IV that growth of the literature was very low during 1970 to1976, 1983, 1983 (Each one record). It Indicate that research in nuclear crisis received a major impetus this period.

Nuclear crisis Scientists communicated their research results through a variety of communication channels. Table V provides the distribution of publications in various channels of communication. It was observed that 71.4 % of the literature was published in article followed by 8.7% in review, 7.4% in Proceeding Papers, 7.0% in book review, 3.6 % in Editorial Material, 0.7 % in News Item, 0.7% in Note, 0.2% in Letter and 0.2% in Meeting Abstract.

TABLE IV YEAR-WISE DISTRIBUTION OF DOCUMENTS

S.No.	Publication Year	Records	Percent	TLCS	TGCS
1	1970	1	0.2	0	0
2	1971	1	0.2	0	1
3	1973	1	0.2	0	0
4	1976	1	0.2	0	0
5	1979	2	0.3	0	29
6	1980	3	0.5	0	12
7	1981	2	0.3	0	0
8	1983	1	0.2	0	0
9	1984	5	0.9	0	59
10	1985	3	0.5	0	1
11	1986	1	0.2	0	2
12	1987	3	0.5	0	1
13	1990	4	0.7	0	21
14	1991	9	1.5	1	70
15	1992	13	2.2	0	335
16	1993	12	2.1	3	408
17	1994	8	1.4	0	256
18	1995	18	3.1	6	448
19	1996	12	2.1	1	114
20	1997	13	2.2	1	212
21	1998	16	2.7	1	87
22	1999	22	3.8	2	162
23	2000	23	3.9	5	485
24	2001	17	2.9	1	218
25	2002	16	2.7	5	122
26	2003	34	5.8	10	326
27	2004	49	8.4	16	1005
28	2005	47	8.1	5	444
29	2006	46	7.9	8	248
30	2007	44	7.5	10	235
31	2008	54	9.3	5	209
32	2009	41	7.0	5	125
33	2010	54	9.3	0	18
34	2011	7	1.2	0	0

Table VI nuclear crisis have contributed more predominantly in English than any other languages as 544 (93.3%) publications were in English followed by German 26(4.5%), French 6 (1.0%) publications, Russian 5 (0.9%) publications, polish and Spanish each one (0.2) publication.

There were 583 institutions and subdivisions involved in research activity in the field of nuclear crisis. Table 7 provides publication productivity of top 20 institutions. University Texas, MD Anderson Cancer Center topped the list with 4 publications followed by Cato Institute with three publications.

TABLE V SOURCE-WISE DISTRIBUTION DOCUMENTS

S.No	Document Type	Records	Percent	TLCS	TGCS
1	Article	416	71.4	77	4707
2	Review	51	8.7	8	652
3	Proceedings Paper	43	7.4	0	181
4	Book Review	41	7.0	0	0
5	Editorial Material	21	3.6	0	40
6	News Item	4	0.7	0	2
7	Note	4	0.7	0	71
8	Letter	1	0.2	0	0
9	Meeting Abstract	1	0.2	0	0
10	Reprint	1	0.2	0	0

TABLE VI LANGUAGE-WISE DISTRIBUTION DOCUMENTS

S.No	Language	Records	Percent	TLCS	TGCS
1	English	544	93.3	84	5602
2	German	26	4.5	0	38
3	French	6	1.0	0	7
4	Russian	5	0.9	1	5
5	Polish	1	0.2	0	0
6	Spanish	1	0.2	0	1

TABLE VII INSTITUTION AND SUBDIVISION-WISE (FIRST 20 DOCUMENTS)

S. No	Institution with Subdivision	Records	Percent	TLCS	TGCS
1	University Texas, MD Anderson Canc er Center	4	0.7	2	208
2	Cato Institute	3	0.5	0	0
3	Indiana University	3	0.5	2	5
4	Keio University, School of Medicine	3	0.5	0	46
5	Ohio State University, Dept. of Astronomy	3	0.5	3	184
6	Penn State University, Milton S Hershey Medical Center	3	0.5	0	23
7	Stanford University	3	0.5	0	0
8	University of Minnesota	3	0.5	0	2
9	Yonsei Univ ersity, Dept. Polit. Science	3	0.5	1	4
10	Deutsch Atomforums eV	2	0.3	0	0
11	Hammersmith hospital, royal postgraduate medical school	2	0.3	0	29
12	Hiroshima University, School of Medicine	2	0.3	0	29
13	Indiana university, school of medicine	2	0.3	1	61
14	johns hopkins university, center for oncology	2	0.3	0	113
15	Kings College of London, Dept War Studies	2	0.3	0	1
16	Korea University, Dept Polit Sci & Int Relat	2	0.3	1	1
17	Lilly Res Labs, Discovery Chem Res & Technol ogy	2	0.3	2	32
18	Max Planck Inst Cell Biology	2	0.3	1	36
19	Monash University, Dept Biochem & Mol Biology	2	0.3	0	31
20	Ohio State University, Ctr Comprehens Canc	2	0.3	1	30

TABLE VIII COUNTRY-WISE DOCUMENTS DISTRIBUTION (FIRST 20 COUNTRIES)

S.No	Country	Records	Percent	TLCS	TGCS
1	USA	204	35.0	47	3390
2	UK	56	9.6	16	666
3	Germany	50	8.6	11	445
4	France	31	5.3	1	209
5	Italy	30	5.1	9	539
6	Japan	30	5.1	4	520
7	South Korea	27	4.6	5	22
8	Canada	22	3.8	8	706
9	Spain	16	2.7	2	76
10	Russia	15	2.6	1	12
11	Australia	14	2.4	2	134
12	Switzerland	13	2.2	0	110
13	Peoples R China	11	1.9	1	11
14	Belgium	10	1.7	2	153
15	Netherlands	9	1.5	4	153
16	India	5	0.9	0	23
17	Sweden	5	0.9	1	32
18	Taiwan	5	0.9	0	2
19	Turkey	5	0.9	0	10
20	Austria	4	0.7	0	1
21	Croatia	3	0.5	0	4
22	Czech Republic	3	0.5	0	12
23	FRG	3	0.5	0	1
24	Greece	3	0.5	0	1
25	Ireland	3	0.5	0	24
26	Norway	3	0.5	0	5
27	Poland	3	0.5	0	32
28	Israel	2	0.3	0	0
29	Kuwait	2	0.3	0	0
30	Mexico	2	0.3	0	1
31	New Zealand	2	0.3	0	4
32	Portugal	2	0.3	0	48
33	Saudi Arabia	2	0.3	0	4
34	Singapore	2	0.3	0	0
35	South Africa	2	0.3	0	0
36	USSR	2	0.3	0	0
37	Argentina	1	0.2	0	19
38	Azerbaijan	1	0.2	0	4
39	Barbados	1	0.2	0	2
40	Brazil	1	0.2	0	3
41	Bulgaria	1	0.2	0	1
42	Cuba	1	0.2	0	1
43	Fr Polynesia	1	0.2	0	37
44	Hong Kong	1	0.2	0	7
45	Hungary	1	0.2	0	0
46	Iran	1	0.2	0	0
47	Morocco	1	0.2	0	0
48	Oman	1	0.2	0	5
49	Pakistan	1	0.2	0	2
50	Panama	1	0.2	0	37
51	Serbia	1	0.2	0	0
52	Slovakia	1	0.2	0	0
53	Slovenia	1	0.2	0	0
54	Others	74	12.7	3	61

There were as many as 54 countries carrying out research in the field of nuclear crisis. Table 8 provides a list of collaboration countries whose research output is more than 50 publications. USA is top producing country with 204 publications (35.0%) followed by UK with 56 publications (9.6%), Germany with 50 Publications (8.6%).

The most cited reference is Krijgsman W, 1999, Nature, v400, p652 with 22 papers dealing with nuclear crisis and each 3.8% of all papers published in this research field. The cited reference of the seminal publication on nuclear crisis given Table IX, appear on rank 2 & 3 Posada D, 1998, Bioinformatics, v14, p817 and Felsenstein J, 1985, Evolution, v39, p783, respectively.

V. CONCLUSION

This study point out from the author-wise analysis the author "Perrotti D" has the highest producer of the subject of nuclear crisis. By the journal-wise analysis the most productive Journal is "Korean Journal Of Defense Analysis" published more article in the subject of nuclear crisis. By seeing the word occurrence (used by Zipf's Law) analysis the high frequency keywords are "Nuclear", "Crisis" are frequent occurrence in the sample data. The average Number of Publications produced per year was 6%. It was observed that 71.4% of the literature was published in Article. By seeing institution-wise analysis University Texas, MD Anderson Cancer Center is highest participation of publication in this area. It could be identified the collaborated countries along with USA and is having the highest output. The most cited reference is Krijgsman W, 1999, Nature, v400, p652. It is hoped that this study will be helpful to researchers who want to identify primary sources of information. Studies of this kind will be helpful for library and information professionals who want to provide suitable services for users and researchers. It can also serve as a feedback to librarians in the selection and acquisition of documents most useful to researchers in Nuclear Crisis.

TABLE 9 CITED REFERENCE-WISE DOCUMENTS DISTRIBUTION (FIRST 20 COUNTRIES)

S.No	Author / Year / Journal	Records	Percent
1	Krijgsman W, 1999, Nature, V400, P652	22	3.8
2	Posada D, 1998, Bioinformatics, V14, P817	21	3.6
3	Felsenstein J, 1985, Evolution, V39, P783	17	2.9
4	Hsu Kj, 1977, Nature, V267, P399	17	2.9
5	10.1093/Bioinformatics/Btg180	14	2.4
6	Duggen S, 2003, Nature, V422, P602, Doi 10.1038/Nature01553	14	2.4
7	Ronquist F, 2003, Bioinformatics, V19, P1572, Doi	14	2.4
8	Huelsenbeck Jp, 2001, Bioinformatics, V17, P754	13	2.2
9	Schelling Tc, 1966, Arms Influence	13	2.2
10	Thompson Jd, 1997, Nucleic Acids Res, V25, P4876	13	2.2
11	Schelling Tc, 1960, Strategy Conflict	12	2.1
12	Hewitt G, 2000, Nature, V405, P907	10	1.7
13	Kocher Td, 1989, P Natl Acad Sci Usa, V86, P6196	10	1.7
14	Waltz Kn, 1979, Theory Int Politics	10	1.7
15	Wit Js, 2004, Going Critical 1 N K	10	1.7
16	Swofford Dl, 2002, Paup Phylogenetic An	9	1.5
17	10.1093/Bioinformatics/Btg359	8	1.4
18	Blondel J, 1999, Biol Wildlife Medite	8	1.4
19	Druker Bj, 2001, New Engl J Med, V344, P1031	8	1.4
20	Druker Bj, 2001, New Engl J Med, V344, P1038	8	1.4

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