

Authorship Pattern on Spacecrafts Research Output

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***Abstract** - This study examines the authorship productivity and collaborative nature on spacecrafts research outputs during the period 2000 and 2014. The study has been carried out for 15 years and the data for the study was downloaded from the Scopus database. The study found that there are 2,58,861 publications during the study period out of which 14.78% are single author contribution and the remaining were from multi authored one. The average number of authors per publications is 4.14 and the average number of publication per author is 0.24. Most of the researchers in this field prefer collaborated work rather than an individual one. Multi authored publications yielded more citations than single authored one.*

Key words: Authorship Pattern, Citation Analysis, Spacecrafts, Scopus Database

Introduction

A spacecraft¹ is a vehicle, or machine designed to fly in outer space. Spacecraft are used for a variety of purposes, including communications, earth observation, meteorology, navigation, space colonization, planetary exploration, and transportation of humans and cargo.

Authorship pattern is one of the important aspects of Bibliometric/Scientometric analysis. It is necessary to examine the authorship pattern to assess the research contributions. In this study analysis were carried out to identify the author productivity and authorship pattern with the help of the indicators such as Authors frequency (single and multiple), Degree of Collaboration (DC), Collaboration Index (CI), Collaborative Coefficient (CC) and Modified Collaborative Coefficient (MCC).

Objective of the Study

- To study the authorship pattern on spacecrafts research outputs during the study period.
- To find the number of authors contributed for the publications during the study period.
- To study the country wise authorship pattern of publications.
- To examine the citation impact on authorship pattern.

Methodology:

The data for the study has been downloaded from the Scopus database. The study covered a period of 15 years from 2000 to 2014. The search includes the synonymous terms of Spacecrafts to cover the area to the maximum possible extent on related literature. The collected data has been classified by using Excel software and the same has been loaded in to SPSS (Statistical Package for Social Sciences) for analytical purpose. Statistical analysis techniques such as frequency distribution and percentage analysis have been employed depending on the nature of the data collected.

Review of Literature

Zafrunnisha and Pulla Reddy (2009)² studied the authorship pattern and collaborative research in the field of psychology. The required data collected from 141 Ph. D. theses submitted to three universities during the period 1963-2003. Multi-authored papers dominated over single authored one and the degree of collaboration in psychology was 0.53. Majority of the cited journals of Psychology (94.54%) are in English language.

Guns and Liu (2010)³ have studied scientific collaborations in China on the basis of a co-authorship network using Q-measures as indicators. It shows that a relatively small group of Chinese researchers is internationally active, and most of them mainly form bridges between China with the rest of the World. The main domestic broker for China is Liang Liming, whereas the main foreign broker for China is Ronald Rousseau.

Pradhan, Panda, and Chandrakar (2011)⁴ studied the trends in authorship pattern and authors' collaborative research in Indian chemistry literature. A total number of 53,977 data for the study were downloaded from Web of Science during the period 2000-2009.

Elango and Rajendran (2012)⁵ studied the authorship trend and collaboration pattern in Marine Sciences literature. They analyzed the articles published in the Indian Journal of Marine Sciences during the period 2001 to 2010 and used Scientometric tools such as, collaboration index, collaboration co-efficient and dominance factor. The study revealed Multi authored contributions dominated in the area of marine sciences, the average number of authors per collaborated paper was 3.4, average collaboration rate was 0.57 and 58% of the publications were collaborated within the same Institution.

Oyeniya and Olaifa (2012)⁶ studied the articles from NIAE proceedings during the period 2000-2010 for authorship pattern and degree of collaboration. The study found that 589 articles were published by 1315 authors during the study period.

Singh (2013)⁷ analyzed the various bibliometric components of the articles published in the Chinese Librarianship: an International Electronic Journal between 2009 and 2012 and found that 55 articles were published during the period and in the year 2012, highest numbers of articles were published with more numbers of authors than earlier. Single authored contribution dominated during the period and most of the authors belonged to various non-teaching categories and more contributions were reported from India.

Mulla and Dhanamjaya (2014)⁸ studied the authorship pattern, degree of collaboration and author productivity in SRELS Journal of Information Management (SRELS-JIM) during the period 2000 to 2009 in which 686 authors contributed 412 articles. The study reveals that 360 (52.48%) authors contributed 180 (43.69%) articles and the average number of authors per article was 1.66 and average productivity per author was 0.60. Indian Contributors have published a maximum of 544 (79.30%) of articles during the period of study.

Analysis and Discussions

In this study, author productivity and collaborative nature were classified into five different categories viz., Single, Two, Three, Four and Five and above authors. The collaboration of authors has been analyzed and data has been presented in table 1.

Table 1 - Authorship Pattern

S.No.	Number of Authors	Total Publications	Total Publications (%)
1	Single Author	38254	14.78
2	Two Authors	49490	19.12
3	Three Authors	53160	20.54
4	Four Authors	42695	16.49
5	Five ≤ Authors	75262	29.07
	Total	258861	100.00

The above table shows 2,58,861 publications were produced during the study period on spacecraft literature in which single authored contributions amounts to 14.78% and the remaining 85.22% are from multi authored contributions. A maximum of 29.07% of the total publications are contributed by five and above authors followed by 20.54% of the contributions by three authors and 19.12% by two authors. From the analysis it is found that multi authored contributions dominates in Spacecrafts literature. The figure 1 shows the share of authorship pattern on the spacecrafts literature during the study period.

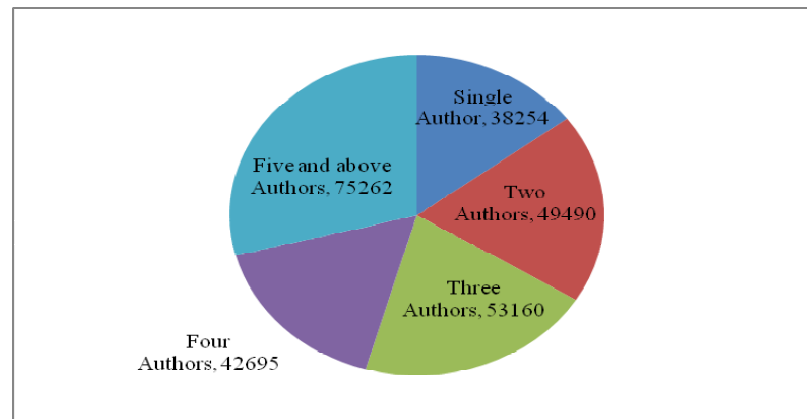


Figure 1- Share of Authorship Pattern on Spacecrafts Research Outputs

Table 2- Author Productivity vs Year

S.No.	Year	TP	No. of Authors	Ave. No. of Authors
1	2000	9527	34474	3.62
2	2001	9556	34631	3.62
3	2002	10549	39263	3.72
4	2003	12573	45266	3.60
5	2004	15612	58706	3.76
6	2005	16709	62095	3.72
7	2006	16980	67534	3.98
8	2007	17779	71239	4.01
9	2008	20483	86756	4.24
10	2009	20003	85375	4.27
11	2010	20459	89594	4.38
12	2011	21222	93285	4.40
13	2012	22070	95939	4.35
14	2013	22155	99197	4.48
15	2014	23184	107239	4.63
	Total	258861	1070593	4.14

(TP – Total Publications, No. of Authors – Number of Authors, Ave. No. of Authors – Average Number of Authors)

The above table shows that a total number of 10,70,593 authors contributed 2,58,861 publications at an average of 4.14 authors per publication. The publication trend shows that there seems a gradual increase in the case of productivity over the years and on the other hand the number of authors involves in collaborated works also increases. The average number of publications per author is 0.24.

Table 3 - Authorship Pattern vs. Countries

S.No.	Country	Single Author	Two Authors	Three Authors	Four Authors	Five ≤ Authors	TP	DC	CI	CC	MCC
1	USA	10717	16214	13906	10227	21262	72326	0.85	3.21	0.58	0.61
2	China	1124	5701	9685	9680	9457	35647	0.97	3.58	0.68	0.71
3	Japan	1356	2104	2380	2019	5610	13469	0.90	3.63	0.64	0.67
4	Germany	1351	2297	2571	2159	4701	13079	0.90	3.50	0.63	0.66
5	UK	1562	2209	2152	1490	3093	10506	0.85	3.22	0.58	0.61
6	France	1022	1597	2064	1886	4655	11224	0.91	3.67	0.65	0.68
7	Italy	913	1583	2104	1868	4333	10801	0.92	3.66	0.65	0.68
8	Russia	1265	1400	1356	969	1844	6834	0.81	3.11	0.56	0.58
9	Canada	685	1644	1553	1000	1695	6577	0.90	3.21	0.60	0.63
10	India	643	1836	2017	1295	1545	7336	0.91	3.17	0.61	0.63
11	Others	17616	12905	13372	10102	17067	71062	0.75	2.95	0.52	0.54
	Total	38254	49490	53160	42695	75262	258861	0.85	3.26	0.59	0.61

(TP – Total Publications, DC - Degree of Collaboration, CI - Collaboration Index. CC- Collaborative Coefficient, MCC- Modified Collaborative Coefficient)

The above table shows that most of the researchers in this field across the world prefer collaborated work rather than an individual one. Single authored publications are reported very low in China, Italy, India and France when compared with the other major contributing countries during the study period. Among the collaborated works five and above authors publications are high among all the major contributing countries except China and India where three authors contributions are reported high among them. The Degree of Collaboration⁹ in publications was ranged between 0.75 and 0.97 with an average of 0.85 among the countries. The Collaboration Index¹⁰ was ranged between 2.95 and 3.67 with an average of 3.26. The Collaboration Index was reported high in countries like France, Italy, Japan, China and Germany when compared with Russia, India, USA, Canada and UK among the major contributors of Publications on Spacecrafts literature. The Collaborative Coefficient¹⁰ was ranged between 0.52 and 0.68 with an average of 0.59. The Collaboration Coefficient was reported high in China with 0.68 and low in Russia with 0.56 among the major contributing countries. The Modified Collaborative Coefficient¹⁰ was ranged between 0.54 and 0.71 with an average of 0.61.

Table 4 – Authorship Pattern & Citation Analysis

S. No.	No. of Authors	TP	CP	CP%	Citations	UCP	UCP%	UCP/CP Ratio
1	Single Author	38254	12996	33.97	145829	25258	66.03	1.94
2	Two Authors	49490	26664	53.88	356575	22826	46.12	0.86
3	Three Authors	53160	29033	54.61	367424	24127	45.39	0.83
4	Four Authors	42695	23787	55.71	304769	18908	44.29	0.79
5	Five ≤ Authors	75262	48942	65.03	914370	26320	34.97	0.54
	Total	258861	141422	54.63	2088967	117439	45.37	0.83

(TP – Total Publications, CP – Cited Publications, UCP- Uncited Publications)

From the above table it seems that in the single authored publications 12996 (33.97%) were cited and yielded 1,45,829 citations. In the collaborated works, five and above authors contributions yielded a maximum of 9,14,370 citations 48942 (65.03%) cited publications followed by 3,67,424 citations for 29033 (54.61%) cited publications in the three authored contributions and 3,56,575 citations for 26664 (53.88%) cited publications in two authored contributions. Nearly two third(66.03%) of the total publications contributed by single authors went uncited and the uncited/cited ratio stood at 1.94. The amount of uncited publications for the publications contributed by five and above authors with 34.97% of the total contributions by them and the uncited/cited ratio stood at 0.54. The average value of uncited/cited ratio is 0.83.

Findings

- Multi authored publications occupies a lion share of 85.22% of the total publications during the study period.
- Average number of authors per publication was 4.14 and the average number of publications per author was 0.24.
- The average value of degree of collaboration was 0.85 shows that most of the researchers across the World in the area of study prefer collaborated works. This may be due to the nature of the work which involves researchers from different disciplines to design and manufacture the spacecrafts components.
- Nearly two third of the total publications (65.03%) by five and above authors were cited and yielded more citations than the citations received by other authorship categories. Nearly two third of the single authored contributions went uncited during the study period.

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