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Scientometric Analysis of Metamorphosis: A Journal of Management Research

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ABSTRACT

Scientometric analysis of 200 research article published in the journal, "*Metamorphosis: A Journal of Management Research*" from its debut year 2002 to 2016 is studied. The study focuses on various aspects of the journal such as the distribution of articles, annual growth rate, authorship pattern, authorship productivity, degree of collaboration, collaborative index, country-wise distribution of articles, citation analysis. The study shows that most of the papers, 114 out of 200 (57per cent) were published by single authors whereas 86 out of 200 (43 per cent) were contributed by joint authors. Overall average degree of collaboration, average collaborative index and average citation per paper were 0.43, 2.35, and 25.59, respectively. Remarkable collaborative contributors are from India with 81.65 per cent sharing. The study may help those who wish to map the scientometric patterns of journals or institutions or an individual.

Keywords: Scientometric analysis; Mapping research; Authorship pattern; Degree of collaboration

1. INTRODUCTION

Scientometrics is a branch of the science, 'Science of Science'. Haitun[1] treats Scientometrics, as a scientific discipline, which performs reproducible measurements of scientific activity. Now a days, scientometrics is one of the truly interdisciplinary research field extended to almost all scientific fields. For conducting this study, *Metamorphosis: A Journal of Management Research* has been taken into account. In this mapping study, the authors has discussed, analysed, and calculated different scientometric aspects by using scientometric tools such as the degree of collaboration, collaborative index, average author per paper.

2. LITERATURE REVIEW

Alan Pritchard explained the bibliometrics as "the application of mathematical and statistical methods to books and other media of communication"[2]. Nalimov and Mulchenko[3] interpreted scientometrics as "the application of those quantitative methods which are dealing with the analysis of science viewed as an information process".

For conducting this study, the authors have reviewed many related research articles. Singh[4] has done a Scientometric analysis of *Indian Journal of Pure and Applied Physics* for the period from 2006-2010 using Web of Science database. He concluded that the maximum numbers of papers were published in joint authorship with 93.46 per cent where as merely 6.54 per cent papers were contributed as single authored. The author R. Kumar and the institution CSIR were the most prolific author and institution with 8.29 per cent and 3.2 per cent sharing respectively. 1.87 average citations per paper were noticed.

Velmurugan and Radhakrishnan[5] conducted the scientometric study of *Malaysian Journal of Library and Information Science*. In their study, they described that the highest numbers of contributions (75.36 per cent) were from joint authors and rest 24.64 per cent contributions were single authored. The country Malaysia placed first with 31.84 per cent contribution whereas India placed third with 11.01 per cent contribution. The average author per paper, the average productivity per author and degree of collaboration was 2.36, 0.42 and 0.75 respectively during the period between 2008 to 2014.

Navaneethakrishnan[6] in his study analysed that multiple authors published the maximum research papers. The degree of collaboration was progressively increased. It was 0.33 in the year 1962 and 0.80 in the year 2012. US collaborative contributors got the first rank with 15.93 per cent contributions during the study span.

A Scientometric analysis of 203 article published in *Annals of Library and Information Studies* has also been done by Velmurugan[7] for the years 2007 to 2012. He concluded that most of the contributions 88 (43.35 per cent) were by two authors, the highest number of contributions 43 (21.19 per cent) were in 2010 and the least number 27 (13.31 per cent) were published in 2012. Maximum research output 39(22.94 per cent) was related to the 'User Studies' subject field and 37 articles were related to bibliometrics, scientometrics and webometrics.

3. OBJECTIVES

The objectives of the study include:

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- To assess year wise distribution of articles.
- To find out the annual growth rate of research articles.
- To determine the authorship pattern of the papers.
- To find out the degree of collaboration and collaborative index of the journal.
- To identify the country wise distribution of articles.
- To analyse the year wise citation pattern.

4. SOURCE JOURNAL

Metamorphosis: A Journal of Management Research, is a renowned management journal, published from Sage in association with IIM Lucknow. It is bi-annual journal, publishing original research contributions as full research articles, book review papers, discussions, forums, management case studies, interviews and conference notes on health care service quality management, demand management, material management, customer relationship management, education management, e-commerce, international marketing research, FDI performance with India, apparel industry, internet banking, supply chain planning, sanitation services, interest rate, service quality, IPR and other management areas. The references, annotations, bibliographies, exhibits, and Webliographies induces its research beauty remarkably.

5. METHODOLOGY

The data presented in this research article has been taken from the website of '*Metamorphosis: A Journal of Management Research*' (<http://journals.sagepub.com/loi/met>) which is published by Sage Publications. Bound volumes of this journal have also been consulted as per requirement of this study. This research data has been collected, organised, analysed and calculated using Microsoft Excel software. Scientometrics apparatus and techniques have also been used to generate tables, charts and graphs for final study.

6. RESULTS AND DISCUSSIONS

6.1 Year-Wise Distribution of Articles

Table 1 provides chronological distribution of publications of the study span. Out of 200 publication published during the period 2002-2016, the maximum number of 19 (9.50 per cent) papers were published in 2010 followed by 2007 (8.50 per cent), 2008 (8.00 per cent) and 2011 (7.50 per cent), respectively. The minimum numbers of 10 (5.00 per cent) papers were published in two different years, i.e. in 2003 and 2014. The range of publications per year is in between 10-19 per cent. It is noted that 50 per cent of holistic publications output is from 2002 to 2009, and the balance (50 per cent) were published in between 2010 to 2016. It is also revealed that equal contributions occurred during the periods 2012, 2013 and 2016 (7.00 per cent), 2002, 2004, 2005, 2009 and 2015 have 6.00 per cent each and 2003 and 2014 have 5.00 per cent each.

6.2 Annual Growth Rate of Research Articles

Annual growth rate (AGR) is the change in the value of a measurement over the period of a year. To calculate AGR, we used below-listed formula ;

$$AGR = \frac{\text{End value} - \text{First value}}{\text{First value}} * 100$$

Table 1 also provides a complete scenario of AGR from the year 2002 to 2016. It is observed that the highest AGR 58.33 per cent was noticed in the year 2010 followed by 54.55 per cent in 2007, the same AGR 20 per cent in the year 2004 and 2015 and 16.67 per cent in 2016 respectively. The lowest AGR -28.57 per cent was noticed in the year 2014. The range of AGR during the study span is in between -28.57 per cent to 58.33 per cent. Velmurugan and Radhakrishnan[5] have used the same formula in their research work.

Table 1. Year wise distribution of articles

Year	Volume number	Articles	%age	Cumulative (%)	AGR (%)
2002	1	12	6.00	6.00	0
2003	2	10	5.00	11.00	-16.67
2004	3	12	6.00	17.00	20
2005	4	12	6.00	23.00	0
2006	5	11	5.50	28.50	-8.34
2007	6	17	8.50	37.00	54.55
2008	7	16	8.00	45.00	-5.88
2009	8	12	6.00	51.00	-25
2010	9	19	9.50	60.50	58.33
2011	10	15	7.50	68.00	-21.05
2012	11	14	7.00	75.00	-6.67
2013	12	14	7.00	82.00	0
2014	13	10	5.00	87.00	-28.57
2015	14	12	6.00	93.00	20
2016	15	14	7.00	100.00	16.67
Total		**200**	**100.00**		

6.3 Authorship Pattern

Table 2 show a complete authorship pattern. Out of 200 contributions, 114 (57 %) were contributed by single authors followed by 59 (29.50 %) by double author, 24 (12 per cent) by triple author and merely 3 (1.50 per cent) by four authors respectively. It is noted that more than 50 per cent articles were authored by single author and the least number, 3 (1.50 %) by four authors.

6.4 Authorship Pattern of Solo vs Co-Authorship Contributions

Table 3 depicts that the maximum number of articles were contributed in single authorship with 114 records out of 200 total items along with 57 per cent sharing. Eighty-six articles with 43 per cent sharing were noticed in the joint-authorship which is less in comparison to single authorship pattern. More than 50 per cent articles were published in single authorship productivity.

6.5 Author Productivity

Table 4 shows a real picture of average author per paper (AAPP) and productivity per author in the stipulated time span. The authors calculated the AAPP and productivity per author by using formula as follows.

$$AAPP = \frac{\text{Number of authors}}{\text{Number of papers}}$$

Table 2. Authorship pattern

Pattern	Total contributions	Cumulative value	%age
Single author	114	114	57.00
Double author	59	118	29.50
Triple author	24	72	12.00
Four author	3	12	1.50
Total	200	316	100

$$\text{Productivity per author} = \frac{\text{Number of papers}}{\text{Number of authors}}$$

Here we found minimum AAPP as 1.08 with maximum productivity per author is 0.92 in the year 2002. On the other hand, we got maximum AAPP at 2.07 with minimum productivity per author at 0.48 in the year 2013.

6.6 Single vs Multi-Authored Papers

Table 5 represents that out of 200 research offerings, single authored are 114 articles while the rest eighty-six papers were contributed by joint authors. It is analysed that the maximum research articles were published by single authors.

6.7 Degree of Collaboration

The degree of collaboration is defined as the ratio of the number of collaborative research papers to the total number of research papers in the discipline during a given period of time. It is calculated by Subramanyam[8] formula

$$C = \frac{Nm}{Nm+Ns}$$

where C is degree of collaboration in discipline, Nm is number of multi-authored papers in the discipline published during a year, and Ns is number of single authored papers in the discipline published during a year

Table 6 reveal that the highest value of DC 0.71 was observed in the year 2013 and the lowest value of 0.08 in the year 2002. There were fluctuations in the degree of collaboration, and the overall value of DC was 0.43 during the study span.

6.8 Collaborative Index of Articles

It is a mean number of authors per joint paper. For this analysis, the authors omitted the single authored papers which are equal to 1 always. To determine the mean number of authors per jointly authored paper, the following formula has been used by Elango and Rajendran[9] in their scientometric study;

$$CI = \frac{\text{Total number of authors}}{\text{Total joint papers}}$$

It can be observed from Table 7 that there was maximum CI 4 in the year 2003 and minimum CI 2 in two different years 2002 and 2009 respectively. There was 2.35 average collaborative index during the stipulated study span.

Table 4. Author productivity

Year	Total articles	Authors	AAPP*	Productivity per author
2002	12	13	1.08	0.92
2003	10	16	1.60	0.56
2004	12	17	1.42	0.71
2005	12	18	1.50	0.67
2006	11	17	1.55	0.65
2007	17	25	1.47	0.68
2008	16	23	1.44	0.70
2009	12	18	1.50	0.67
2010	19	28	1.47	0.68
2011	15	21	1.40	0.71
2012	14	27	1.93	0.52
2013	14	29	2.07	0.48
2014	10	18	1.80	0.56
2015	12	24	2.00	0.50
2016	14	22	1.57	0.64
Total	200	316	1.58	0.63

*AAPP= Average authors per paper

6.9 Country Wise Distribution of Articles

Table 8 provides a rank list with percentage of records of 316 contributions made. The majority of 81.65 per cent contributions are from India which is at the first position, followed by 6.33 per cent contributed by the USA and 3.48 per cent of contributions came from the UK which is at the third place. 1.90 per cent of contributions are from Japan, 1.27 per cent from Australia and Canada are at the fifth rank. 0.63 per cent are from France and Bangladesh; 0.32 per cent from Norway, Vietnam, Kuwait, Portugal, South Africa, Singapore, Denmark, Belgium, and Columbia.

6.10 Year Wise Citation Contributions

Table 9 elucidates the year wise number of references that authors cited in their articles. There were 200 article with total 5118 reference during the study period. It shows the number of citations used in the particular volumes of the journal, Metamorphosis: a journal of management research. The maximum number of 615 citation with 12.02 per cent sharing was noticed in the year 2015, and the minimum number of 103 citation with 2.01 per cent distribution was determined in the year 2003.

Table 3. Authorship pattern of solo and co-authorship contributions

Pattern	Years															Number of articles	% age
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016		
Single	11	8	8	7	6	11	11	6	12	10	6	4	3	4	7	114	57.00
Joint	1	2	4	5	5	6	5	6	7	5	8	10	7	8	7	86	43.00
Total	12	10	12	12	11	17	16	12	19	15	14	14	10	12	14	200	100

Table 5. Year wise single and multi-authored papers

Year	Single authored papers (%)	Multi authored papers (%)	Total	Percentage of records
2002	11 (9.65)	1 (1.16)	12	6.00
2003	8 (7.02)	2 (2.33)	10	5.00
2004	8 (7.02)	4 (4.65)	12	6.00
2005	7 (6.14)	5 (5.81)	12	6.00
2006	6 (5.26)	5 (5.81)	11	5.50
2007	11 (9.65)	6 (6.97)	17	8.50
2008	11 (9.65)	5 (5.81)	16	8.00
2009	6 (5.26)	6 (6.97)	12	6.00
2010	12 (10.53)	7 (8.14)	19	9.50
2011	10 (8.77)	5 (5.81)	15	7.50
2012	6 (5.26)	8 (9.30)	14	7.00
2013	4 (3.50)	10 (11.63)	14	7.00
2014	3 (2.63)	7 (8.14)	10	5.00
2015	4 (3.50)	8 (9.30)	12	6.00
2016	7 (6.14)	7 (8.14)	14	7.00
Total	114 (100)	86 (100)	200	100

Table 6. Degree of collaboration

Year	Ns*	Nm**	Total (Ns+Nm)	DC***
2002	11	1	12	0.08
2003	8	2	10	0.2
2004	8	4	12	0.33
2005	7	5	12	0.42
2006	6	5	11	0.45
2007	11	6	17	0.35
2008	11	5	16	0.31
2009	6	6	12	0.5
2010	12	7	19	0.37
2011	10	5	15	0.33
2012	6	8	14	0.57
2013	4	10	14	0.71
2014	3	7	10	0.7
2015	4	8	12	0.67
2016	7	7	14	0.5
Total	114	86	200	0.43

*Ns= No. of single authored papers, **Nm= No. of multi-authored papers, ***DC= Degree of collaboration

7. CONCLUSIONS

'Metamorphosis: a journal of management research' has published 200 research article from its inception year 2002 to 2016, i.e. from its volume 1 to volume 15. A maximum number of 19 articles were published in the year 2010 with 9.50 per cent sharing. In 2010, the highest number of AGR 58.33 per cent has been noticed. Out of 200 paper, 114 (57 %) articles were contributed by single authors. Highest AAPP, productivity per author, DC and CI has been calculated in 2013, 2002, 2013 and 2003 respectively. Overall 18 country' contributors were noticed in the stipulated study span, and India spotted at first rank with 258 contributions with 81.65 per cent sharing. USA ranked second with 20 (6.33 %) article and the UK got the third position with 11 (3.48 %) manuscript. In this study, the authors observed that 5118 reference were used in 200 item, and its overall average citations per paper were 25.59. In this study, it may be seen that the overseas contribution in Indian journal is significantly less. This describes that there is an urgent need to

Table 7. Collaborative index of articles

Year	Multi-authored papers	Total authors of multi-authored papers	CI
2002	1	2	2.00
2003	2	8	4.00
2004	4	9	2.25
2005	5	11	2.20
2006	5	11	2.20
2007	6	14	2.33
2008	5	12	2.40
2009	6	12	2.00
2010	7	16	2.29
2011	5	11	2.20
2012	8	21	2.63
2013	10	25	2.50
2014	7	15	2.14
2015	8	20	2.50
2016	7	15	2.14
Total	86	202	2.35

*CI= Collaborative Index

Table 8. Country wise distribution

Rank	Country	Number of authors	Percentage of records
1	India	258	81.65
2	USA	20	6.33
3	UK	11	3.48
4	Japan	6	1.90
5	Australia	4	1.27
5	Canada	4	1.27
6	France	2	0.63
6	Bangladesh	2	0.63
7	Norway	1	0.32
7	Vietnam	1	0.32
7	Kuwait	1	0.32
7	Portugal	1	0.32
7	South Africa	1	0.32
7	Singapore	1	0.32
7	Denmark	1	0.32
7	Belgium	1	0.32
7	Columbia	1	0.32
Total		316	100

Table 9. Year-wise citation contribution

Year	Volume number	No. of papers	No. of references	Average no. of references per paper	%age
2002	1	12	316	26.33	6.17
2003	2	10	103	10.3	2.01
2004	3	12	181	15.08	3.54
2005	4	12	200	16.67	3.91
2006	5	11	302	27.45	5.90
2007	6	17	288	16.94	5.63
2008	7	16	347	21.68	6.78
2009	8	12	260	21.67	5.08
2010	9	19	297	15.63	5.80
2011	10	15	464	30.93	9.07
2012	11	14	412	29.43	8.05
2013	12	14	444	31.71	8.68
2014	13	10	387	38.7	7.56
2015	14	12	615	51.25	12.02
2016	15	14	502	35.86	9.81
Total		**200**	**5118**	**25.59**	**100**

attract researchers of the other countries to have the significant presence in Indian journals as well. It is quite evident that technological infrastructure and research funds are essential prerequisites to overcome this problem.

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In the current study, he analysed, interpreted and presented the data.