Scientometric Study on Research Literature of Management Sciences

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Abstract

This paper discussed about the scientometric analysis for growth and literature output of the Management Science. It includes the year wise publication, to identify the ratio of the growth rate of publication, RGR and Dt and authorship pattern. During the period of 2009-2013 there were 74387 publications were published The ratio of growth rate (1.23) are quall for the year 2010 and 2011 but in the year 2012 it was decreased to 0.78.

Keywords

Scientometric Study; Literature Output; Management Sciences,

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INTRODUCTION

The 20th century may be described as the century of the development of metric sciences. In this century itself there have been the developments of librametrics, bibliometric, scientometric, altmetrics, econometrics, cybermetrics or webometrics [Sen 2004; Ming, 2000], and lastly informatics. The term "bibliometrics" was first used by Pritchard [1969] to replace the name "statistical bibliography" for the growing field of quantitative analysis of bibliographies. For some years, however, both "bibliometry" and "bibliometric" were in vogue. Borgman and Furner (2002) have reviewed the relationship of scholarly communication and bibliometrics. The bibliometric study reveals that careful evaluation of periodical literature by providing a complete picture of core publications of any particular discipline. Bibliometric study is, therefore, being consistently adopted by LIS professionals and researchers to asses and evaluates the scientific output of the published literature on any particular discipline for an explicit period through the application of bibliometric and citation indicators. Moreover, bibliometric studies have been massively useful for librarians in selection and policies of weeding. It serves as a useful tool to the academic community in identifying most popular authors and potential publications. Furthermore it helps in determining the highly cited journals, ranking of prolific authors, authorship pattern, and the impact factor of journals and other significant details of any specific literature under study.

MANAGEMENT SCIENCE

Management science (MS), is an interdisciplinary branch of applied mathematics devoted to optimal decision planning, with strong links with economics, business, engineering, and other sciences. It uses various scientific research-based principles, strategies, and analytical methods including mathematical modeling, statistics and numerical algorithms to improve an organization's ability to enact rational and meaningful management decisions by arriving at optimal or near optimal solutions to complex decision problems. The discipline is typically concerned with determining the maxima (of profit, assembly line performance, crop yield, bandwidth, etc.) or minima (of loss, risk, costs, etc.) of some objective function. In short, management sciences help businesses to achieve goals using various scientific methods. The field was traditionally known as Operations research (OR) in the United

States and Canada, or operational research in the United Kingdom. These three terms are often used interchangeably to describe the same field.

NEED FOR THE STUDY

In the recent ten years many bibliometric studies in the field of management sciences there has been explosive growth and development. Information explosion or literature growth has become a major challenge for scientist, researchers and scholars because they have to update with recent development in their respected discipline. Bibliometric techniques are major tools for assessment of research activity.

OBJECTIVES OF THE STUDY

The objectives of the present study were:

1. To reveals the year wise publication of Management Science
2. To identify the ratio of the growth rate of publication
3. To find out the RGR and Dt of Management Science publications
4. To assess the authorship pattern
5. To classify the type of documents

RESEARCH METHODOLOGY

The study reveals that the scholarly communication of management science of research from 2009 - 2013 have been taken into consideration for present study. Keeping the objectives of the study in mind, a total number of 74,387 articles published during the stated period the data were downloaded from the ISI Scopus for retrieving the data into the database the search term applied was "Management Science" we expected the maximum retrieval of results. A total number of results were downloaded from the Scopus each record contains English language abstract and bibliographic information (e.g. author, name of journal, author address).The data thus collected were fed into MS Excel worksheet to process the gathered data for subsequent analysis. The study employed required bibliometric measures to test the validity of the findings.

DATA ANALYSIS AND INTERPRETATION

Table 1: Year Wise Publications of literature in Management Science

S.No.	Year	TP	%	Cum.	Cum. %
1	2009	11958	16.08	11958	16.08
2	2010	14760	19.84	26718	35.92
3	2011	18092	24.32	44810	60.24
4	2012	14198	19.09	59008	79.33
5	2013	15379	20.67	74387	100.00
	Total	**74387**	**100.00**		

Table 1 shows the year wise distribution of papers published on Management Science which is available in the Scopus database. The numbers varied from year to year but during the period of 2009-2013 there were 74387 publications were published. The highest number of articles were published in the year 2011 that is 18092 which is (24.32%) of the total publication. The second highest number of articles that is 15379 were published in the year 2013 which constitutes (20.37%) of the total articles, the third position highest number of articles that is 14760 were published in the year 2010 which constitutes (19.84%) of the total articles followed by 14198 (19.09%) articles were published in the year 2012 and 11958 (16.08%) articles were published in the year 2009. It is observed from the total that the quantity of articles published seem increased in the year 2013 when comparing previous year.

Table 2. Author Collaboration

S.No.	Collaboration	TP	%
1	Single Author	656	0.88
2	Two Authors	13975	18.79
3	Three Authors	52	0.07
4	Four Authors	19696	26.48
5	> 4 Authors	40008	53.78
	Total	**74387**	**100.00**

Majority of the papers have been written in joint authorship which shows in the table 2. It is seen that only 656 (0.88%) of publications are single authored, 13975(18.79%) contributions were contributed by two authors and 52 (0.07%) are three authored papers. And 19696 (26.48%) contributions are contributed by four authors and 40008 (53.78%) contributions are contributed by more than four authors.

Table 3: Ratio of Growth and Compound Annual Growth Rate Vs Year Wise

S.No.	Year	TP	RoG	CAGR
1	2009	11958	-	0.05
2	2010	14760	1.23	0.01
3	2011	18092	1.23	-0.05
4	2012	14198	0.78	0.04
5	2013	15379	1.08	0.00
	Total	**74387**		

Table 3 indicates ratio of growth and the compound annual growth rate about the research publication of Management Science based on the Scopus data bases. For the period of 2009 to 2013, the ratio of growth rate (1.23) are quall for the year 2010 and 2011. But in the year 2012 it was decreased to 0.78 after that in the year 2013 it is in 1.08 level.

Table 4. RGR and Dt Vs Year Wise

S.No.	Year	TP	Cum.	W1	W1	RGR	Dt
1	2009	11958	11958	-	9.3892	-	-
2	2010	14760	26718	9.3892	10.1931	0.80	0.86
3	2011	18092	44810	10.19309	10.7102	0.52	1.34
4	2012	14198	59008	10.71019	10.9854	0.28	2.52
5	2013	15379	74387	10.98543	11.2170	0.23	2.99
	Total	**74387**					

The Relative Growth Rate (RGR) is the increase in number of articles per unit of time. This definition is derived from the definition of relative growth rates in the study of growth analysis of individual plants and effectively applied in the field of Botany (Hunt {1978 and 1982}; Poorter and Garnier, 1996; Hoffmann and Poorter, 2002. There exists a direct equivalence between the relative growth rate and the doubling time (Bradford, 1934).

Table 5: Authorship Pattern

S. No.	Year	Single Author	Two Authors	Three Authors	Four Authors	> 4 Authors	Total	DC	CI	CC	MCC
1	2009	111	2314	4	3090	6439	11958	0.99	4.12	0.72	0.75
2	2010	134	2910	10	4213	7493	14760	0.99	4.09	0.72	0.75
3	2011	162	3778	21	5162	8969	18092	0.99	4.05	0.72	0.75
4	2012	107	2355	6	3647	8083	14198	0.99	4.21	0.73	0.76
5	2013	142	2618	11	3584	9024	15379	0.99	4.22	0.73	0.76
Total		**656**	**13975**	**52**	**19696**	**40008**	**74387**	**0.99**	**4.13**	**0.72**	**0.75**

Table 5 states the year wise distribution of publication based on the authorship pattern about the literature of management science. In the year 2009, 111 publications by single author, 2314 publication by two authors, 4 publications by three authors, 3090 publication by four authors and 6439 contribution by more than four authors with the degree of collaboration is 0.99. During the period of 2009 to 2013 the degree of collaboration is constantly 0.99.

Table 6. Document Type of Publications

S.No.	Document Type	TP	Percent
1	Abstract Report	2	.00
2	Article	34450	46.31
3	Article in Press	602	.81
4	Book	979	1.32
5	Book Chapter	3990	5.36
6	Business Article	2	.00
7	Conference Paper	26634	35.80
8	Conference Review	462	.62
9	Dissertation	4	.01
10	Editorial	413	.56
11	Erratum	35	.05
12	Letter	142	.19

13	Note	454	.61
14	Review	5851	7.87
15	Short Survey	367	.49
	Total	**74387**	**100.00**

(TP- Total Publications)

Table 6 elucidates the distribution of management science literature in various document types. Among the total publication 74387, articles is 34450 (46.31%), followed by 26634 (35.80%) of the total literature by conference paper type, 5851 (7.87%) publications by the review type. But only two contribution available equally from abstract report and business article

Table 7: Citations Analysis

S.No.	Year	Uncited	Cited	TP	TC	%	CPP	RQI
1	2009	4673	7285	11958	85473	31.61	7.15	0.51
2	2010	6929	7831	14760	76015	28.11	5.15	0.71
3	2011	10228	7864	18092	53949	19.95	2.98	1.22
4	2012	6823	7375	14198	38265	14.15	2.70	1.35
5	2013	9836	5543	15379	16674	6.17	1.08	3.35
	Total	**38489**	**35898**	**74387**	**270376**	**100.00**	**3.63**	**1.00**

(TP-Total Publications, TC-Total Citations, CPP – Citations per paper, RQI – Relative Quality Index)

Tables indicates the cited and uncited publications about the growth of literature of management science. In the year 2009 there were published 11958 article, among these 7285 articles were cited and 4673 were uncited. In the year 2011, published 18092 articles published which includes 10228 uncited and 7864 were cited. During the period of 2009 to 2013 among the total publications, 35898 articles were cited and 38489 article were uncited. It is revealed from the table, more than the fifty percent of the articles were uncited.

FINDINGS

- During the period of 2009-2013 there were 74387 publications were published
- The ratio of growth rate (1.23) are quall for the year 2010 and 2011 but in the year 2012 it was decreased to 0.78
- In the year 13975(18.79%) contributions were contributed by two authors
- During the period of 2009 to 2013 among the total publications, 35898 articles were cited and 38489 article were uncited

CONCLUSION

Management science is includes branch of applied mathematics devoted to optimal decision planning, with strong links with economics, business, engineering, and other sciences. When comparing other subjects the management science has minimum publications. In this paper are more number of article must be published by research article.

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