

## **Scholarly Communication of the Vikalpa from 2003-2012: A Scientometric Analysis**

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### **Abstract**

The paper explores the research productivity of the Journal Vikalpa for the period of 2003-2012, which is indexed in the EBSCO on-line database. Various quality aspects of the 437 research articles published in the period were studied. The study elaborates on various aspects of the journal such as year wise distribution of the articles, growth rate of articles, authorship pattern, and degree of the authorship collaboration, distribution of the contribution by institutions, country wise, length of the articles and geographical distribution of authors. The analysis of the data revealed that average growth rate of literature was 1.07 and moderate degree (.4234) of collaboration was observed. Further, research showed that average number of authors per paper was 1.7 and Single authored research articles constitute maximum to the total research output (57.87%). On an average 43 articles were published in each year during the study period. The maximum number of articles have been contributed by academic institutions. Further it is found that the Relative Growth Rate (RGR) of articles was found to be gradually increasing from 0.6931 in the year 2003 to 2.4964 in the year 2012 and correspondingly the values of doubling time of the articles was found to be decreasing from .9998 in the year 2004 to 0.2776 in the year 2012. The Study also reveals that India has the largest contributor of literature for Vikalpa Journal. Finally, the research productivity of authors of Vikalpa Journal does not obey the Lotka's law of scientific productivity.

**Keywords:** Bibliometrics; Management, Vikalpa, Authorship Pattern, Collaborative Research, Publication Analysis

### **Introduction**

Bibliometrics is a set of techniques devoted to the quantitative analysis of scientific and technical activities. These techniques implement statistical and mathematical tools to measure the data that measures researcher's contributions to science and technical development. Roasting, et.al (2007) reported that quantitative studies of researcher's communication activities tend to have a better understanding of phenomena of construction, dissemination and use of scientific and technical knowledge. Bibliometrics has been considered as a standard tool of science policy and research management in the last decades. All significant

compilations of science indicators heavily rely on publication and citation statistics and other, more sophisticated bibliometric techniques. Braun, et al. (1987) pointed out that the aim of bibliometric studies is to measure national research performance in the international context or to describe the development of a science field with the help of bibliometric means. Today, bibliometrics is one of the truly rare interdisciplinary research fields extended to almost all scientific fields. bibliometric methodology comprises of components from mathematics, social sciences, natural sciences, and engineering and even from life sciences. Sengupta (1985) in his study reveals that both bibliometrics and scientometrics are a set of methods used for measuring the production and dissemination of scientific knowledge.

The present study focuses attention on the scientometric analysis of the pattern of publication, authorship productivity, Relative growth rate, doubling time and collaborative research in the field of management.

### **About Vikalpa Journal**

The Journal for Decision Makers is a quarterly publication of the Indian Institute of Management, Ahmadabad. Its objective is to disseminate concepts of professional management and contribute to a better understanding of the context, resources, structures, systems, processes, and performance of organizations. Its focus is on applied research and on reflections that are relevant to practicing managers and to meet standards of academic rigors(<http://www.iimahd.ernet.in>). Vikalpa is a peer-reviewed journal promoting the dissemination of knowledge and good practices of professional management, to contribute to a better understanding of management theories and practices. The journal adopts a special focus on management research, managerial problem solving, and decision-making, especially in emerging economies. It also aims to create a platform to bring together scholars, policy makers, and management practitioners interested in growth, change, and innovation in developing societies. The journal publications encompass a wide variety of types of research, which include research articles, Book Reviews; cover reviews of current books on managements, case studies, case Analysis and colloquium etc. It is a publication of the Indian Institute of Management Ahmadabad. It is also indexed in EBSCO host online database.

### **Previous studies**

A number of studies have been done during the last three decade to evaluate the research output. Some of the important articles are reviewed to make the study more simple and effective. The premier works like Subramanian (1983), Kumari Sneha Gupta (1990) & Garrison (1992) have studied contribution of scientific research through bibliometric analysis. Barun, et al. (1994), Bhattacharya et al. (1997) studied productivity, literature growth and subject distributions and their citations. In 1994 Sudhier studied the contribution of scientific research in Kerala during the time period of 1994-1997; he found that the growth rate of scientific research output of Kerala has increased 201.67% and corresponding increase of national output shows about 27.10%. Nagapual (1995) made a bibliometric assessment of India's scientific publications based on the SCI for 1990 and 1994. The report gives detailed

analysis on disciplines specialization, institutions, states and ranking of 3000 India research intuitions. Mahapatra and Padmanav (2006) studied the growth of scientific research literature on Orissa published during 1985-2004. In this study, the authorship pattern year wise growth, subject wise breakup of papers, category of journals, place of origin, length of papers, and productivity of journals were evaluated. In 2008 Raut T.K carried out citation analysis study on strategic management journal, it was found that with an average of 63 citations per article which is a good number of citations in social science research. Gupta and Dhawan(2009) to evaluate the research output in the field of physics in India. Vimala and Pulla Reddy (2009) traced authorship pattern and collaborative research in zoology with a sample of 19,323 journal citations figured in the theses on zoology accepted for the award of the doctoral degree by Sri Venkateshwara University, Tirupathi, India. Pradhan, Panda and Chandrakar (2011) studied the trends in the authorship pattern and author's collaborative research in Indian chemistry literature with a sample of 53977 articles during the period 2000-2009. Rakhi (2013) in his study was made an attempt to analyze the amount of publications that has been published during 1998-2012. Lotka's law has been used to measure the productivity of authors. Study finally reveals that there is partial similarity between observed number and expected number of authors. Thavamani & Velmurugan (2013) studied the publication trends of scholarly papers in Annals of Library and Information Studies published form New Delhi.

### **Need for the study**

The present study has been undertaken as an attempt to recognize certain bibliometric characteristics of Vikalpa Journal using bibliometrics techniques and identify the trends in various aspects of the literature over a study period of 10 years (2003-2012).

### **Objectives of the study**

The primary objective of the study is to understand the growth pattern of Vikalpa journal and their research output characteristics during the study period of 2003-2012. The specific objectives of the study are as follows:

- To study the number of papers published and growth rate of the literature and thier characteristics over the study period (2003-2012),
- To know the authorship pattern and the degree of author collaboration,
- To find out Relative Growth Rate (RGR) and doubling time of the article over the study period,
- To examine Loktas Law in the field of Management,
- To find out most prolific authors and most prolific institutions wise distribution of research articles,
- To examine the average length of articles,
- To study the distribution of publications by institution and country wise, and finally
- To study the type of Publications wise distribution of articles.

### Methodology

The research data was collected from the online version of the Vikalpa Journal which is indexed in EBSCO on-line database pertaining to the period of 2003-2012 and it is used as the main source for the present study. It covers wide range of articles including research articles, book reviews, case studies, colloquium case analysis and reports. It is a quarterly on line journal, published by Indian Institute of Management, Ahmedabad. To meet the objectives of the present study, necessary data was collected on the basis of following bibliometrics components such as article contribution by year, number of authors, authorship pattern, degree of authorship collaboration, institution wise and country wise. Finally, the data was organized, calculated, tabulated, analyzed and presented in the form of tables and graphs for the purpose of interpretation and discussion.

### Data Analysis and Interpretation

Data on the bibliometric records was collected from the EBSCO online database of Vikalpa journal pertaining to the period of 2003-2012. A total of 437 articles bibliographic records were collected which formed the source data for the study.

Table 1

*Year wise contribution and average growth rate of articles*

Year	No. of Article	% of Articles	Rate of growth of Articles	Statistical Results	
2003	54	12.36		Max	55
2004	54	12.36	1	Min	32
2005	37	8.47	1.46	$\bar{X}$	43.7
2006	55	12.59	0.67	SD	8.35
2007	45	10.3	1.22	R	23
2008	43	9.84	1.05	R <sup>c</sup>	69.79
2009	44	10.07	0.98		
2010	37	8.47	1.19		
2011	32	7.32	1.16		
2012	36	8.24	0.89		
Total	437	100	1.07		

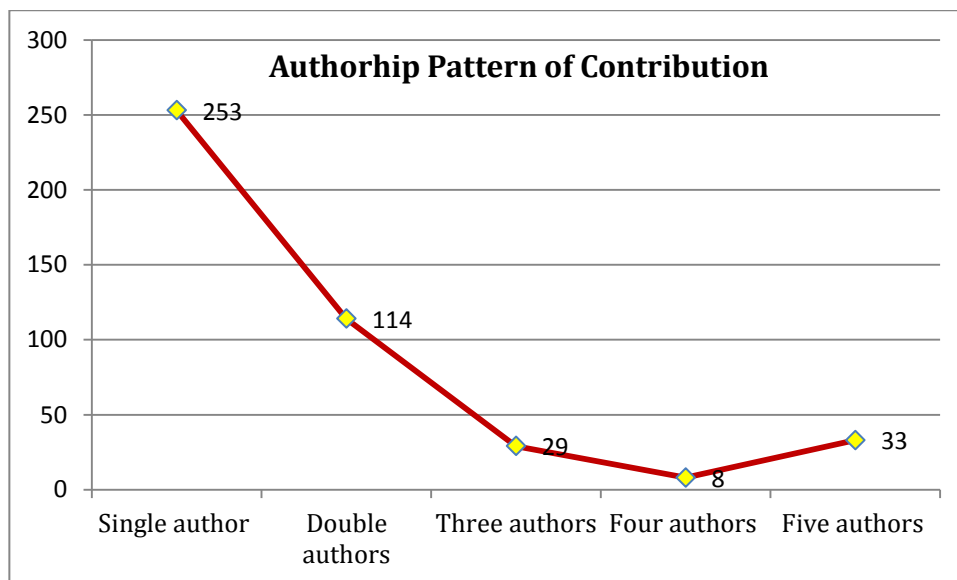
Table-1 depicts the year wise contribution and average growth rate of articles in the vikalpa journal from 2003 to 2012. It is evident from the table-1 that 437 articles were published during the study period (2003-2012). It is observed that highest numbers of articles (N=55- 12.559%) were published in the year 2006. The second highest number of articles 54 (12.36%) was published in the year 2003 while the lowest numbers of articles were contributed in the year 2011(N=32-7.32%). Further, it is found that the average rate of increase in the number of publications per year is 1.07 (Table-1). On an average 43 articles were published in each year during the study period.

Table 2

*Authorship pattern and degree of authorship collaboration*

Year	No of article	Single Author (Ns)	Double Authors	Three Authors	Four Four Authors	Five Authors	Total no of multi Authored Papers	Total No Authors	Nm/ (Nm+Ns)
2003	54	36	12	3	1	2	18	83	0.3333
2004	54	33	14	2	1	4	21	91	0.3889
2005	37	29	4	1	0	3	8	55	0.2162
2006	55	30	16	5	1	3	25	96	0.4545
2007	45	22	12	6	2	3	23	87	0.5111
2008	43	23	13	2	1	4	20	79	0.4651
2009	44	25	14	2	0	3	19	74	0.4318
2010	37	17	12	3	0	5	20	75	0.5405
2011	32	15	9	4	1	3	17	64	0.5313
2012	36	23	8	1	1	3	13	61	0.3611
Total	437	253	114	29	8	33	184	765	0.4211
		57.89	26.087	6.67	1.83	7.55	42.11	Avg Author per paper 1.7506	Average 0.4234

$$\text{Average author per paper} = \frac{\text{Total no. of authors}}{\text{Total no. of papers}} = \frac{745}{437} = 1.7048$$



Graph-1

It is revealed from the table-2 that 765 authors have contributed 437 articles and average number of authors per paper is 1.7506. Single authored research articles constitute maximum i.e., 57.89%, where as multiple authored research papers constitute nearly about 42.11% of the total number of research articles. It shows that Single authored research articles have made

major contribution to the field. Further, it is found that degree of collaboration over ten years is .4234 which indicates that more than 42% of the publications are authored by two or more than two authors. However, the study conducted by Pradhan,P (2011) on the authorship pattern and degree of collaboration in India chemistry literature found that the degree of collaboration was more than .9631 and multi authored research play predominant role in chemistry research. It can be concluded from the above analysis that degree of collaboration is relatively less in the field of management as compared to the science and technology.

### Relative Growth Rate (RGR)

The Relative Growth Rate (RGR) is the increase in the number of articles/ pages per unit of time. The mean Relative Growth Rate over specific period of interval can be calculated from the following equation (Hunt R 1978).

$$RGR = \frac{\text{Log}x_e w_2 - \text{Log}x_e w_1}{\frac{T_2 - T_1}{2}}$$

Where as

RGR = Mean relative growth rate over the specific period of interval

$\text{log}x_e w_1$  = Log of initial number of articles

$\text{log}x_e w_2$  = Log of final number of articles after a specific period of interval

$\frac{T_2 - T_1}{2}$  = Unit difference between the initial time and the final time.

In this study year is taken as unit of time for calculation of GRG.

### Doubling Time (Dt)

There is a direct relation between the relative growth rate and doubling time of the articles. If the number of articles/pages of a subject double during a given period then the difference between the logarithms of numbers at the beginning and end of this period must be logarithms on number (Bradford, 1934). If the natural logarithm is used this difference has a value of .693. Thus, the corresponding doubling time for each specific period of interval and for both articles and pages can be calculated by the formula.

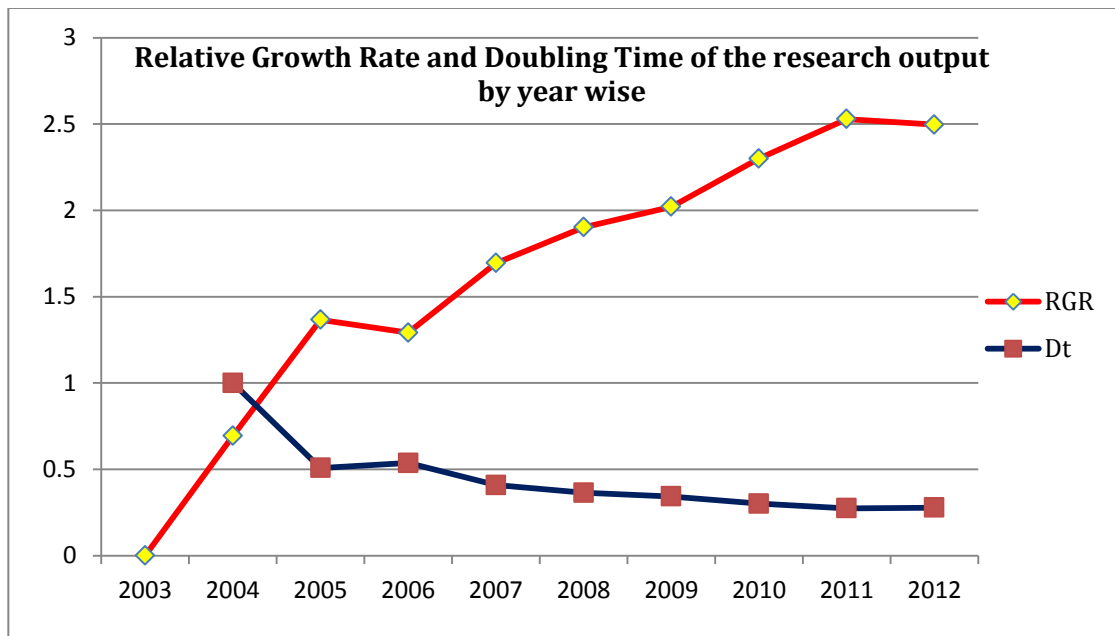
$$\text{Doubling Time (Dt)} = \frac{.693}{RGR}$$

Table 3

*Relative Growth Rate and Doubling Time of the research output by year wise*

year	Quantum of output	Cum total output	$\text{Log}x_e w_1$	$\text{Log}x_e w_2$	RGR	Block period	Dt	Block period
2003	54	54	3.989	3.989	0	1.3893		0.5635
2004	54	108	3.989	4.6821	0.6931		0.9998	
2005	37	145	3.6109	4.9767	1.3658		0.5074	
2006	55	200	4.0073	5.2983	1.291		0.5368	
2007	45	245	3.8067	5.5013	1.6946		0.4089	
2008	43	288	3.7612	5.663	1.9018		0.3644	

year	Quantum of output	Cum total output	$\text{Log}x_{e w_1}$	$\text{Log}x_{e w_2}$	RGR	Block period	Dt	Block period
2009	44	332	3.7842	5.8051	2.0209	2.3364	0.3429	0.299
2010	37	369	3.6109	5.9108	2.2999		0.3013	
2011	32	401	3.4657	5.994	2.5282		0.2741	
2012	36	437	3.5835	6.0799	2.4964		0.2776	
Total	437							



It is seen from the Table-3 and Graph-2 that RGR has been increasing from 2004 (.6931) to 2012 (2.4964). On the other hand, Doubling Time (Dt) has shown decreasing trend. The data in Table-3 reveals that Doubling Time has decreased from .9998 in the 2004 to .2776 in the year 2012 (Graph-3).

Table 4

*Year wise average length of articles*

year	No of articles	No of pages	Average length of articles
2003	54	667	12.352
2004	54	664	12.297
2005	37	531	14.352
2006	55	663	12.055
2007	45	632	14.045
2008	43	632	14.698
2009	44	516	11.728
2010	37	489	13.217
2011	32	500	15.625

year	No of articles	No of pages	Average length of articles
2012	36	526	14.612
Total	437	5820	13.319

Table – 4 shows the year wise average length of articles published in Vikalpa is 13.319 pages in the period under study. It further reflects that the publishing year 2007 accommodate the highest average length of 14.045 pages per article, while the lowest average length of 12.055 pages per article was noticed in the year 2006. Considering the average length of articles published in vikalpa, it can be deduced that the journal provides the contributors an ample scope for exercising their thought contents comprehensively and exhaustively.

Table 5

*Institution Wise Distribution of Articles*

Type of Institution	No of articles	% of Articles	cum % of articles
Academic Institutions	379	86.73	86.73
Corporate Bodies	51	11.67	98.39
Government Institution	2	0.456	98.86
Research Institutions	5	1.14	100
Total	437	100.00	

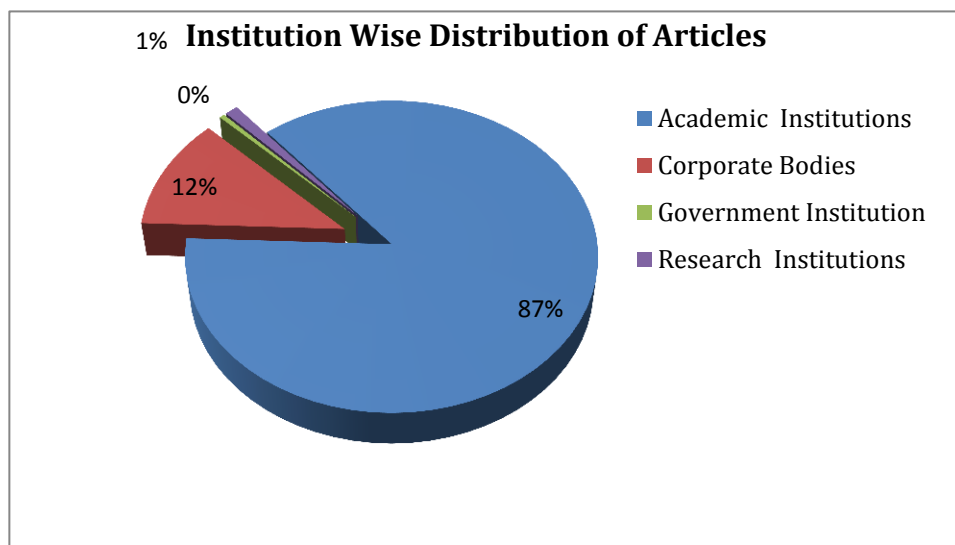
**Graph – 4**

Table-5 provides the institution wise distribution of research articles, out of 437 contributions, the highest number of research articles have been contributed by academic institution (N=379, 86.73%) followed by corporate bodies (N=51, 11.67%) which constitute hardly about 11.67% of the articles. However, it is observed that very negligible contribution has been made by Government Institutions (N=2, .456%) and Research Institutions (N=5-1.14%). It can be concluded from the above analysis that the academic institutions have made major contribution to Vikapla Journal.

Table 6

*Country wise contribution of articles*

Country	No of article	% of Articles	Cum % of articles
Australia	1	0.2288	0.2288
Bhutan	1	0.2288	0.4577
Canada	2	0.4577	0.9153
China	1	0.2288	1.1442
France	1	0.2288	1.373
India	404	92.449	93.822
Israel	2	0.4577	94.279
Singapore	1	0.2288	94.508
UK	5	1.1442	95.652
Ukraine	1	0.2288	95.881
USA	18	4.119	100
Total	437	100.00	

Geographical Distribution of contribution is presented in the table-6, out of the 437 articles, 404 articles were published by India only, i.e which amounts to 92% of the total number of articles. However on the other hand the USA has contributed only 4.119% of articles to Vikalpa Journal. Further, it is observed that remaining countries like Australia, Bhutan, Canada, France, Israel, UK and Ukraine have made very less contribution to Vikalpa Journal.

Table 7

*Most Prolific Authors in the field of Management*

Most Prolific Authors	No of Articles	Rank
Manjunath, K	27	1
Sarkar, Mitali	25	2
Gupta, Anil	15	3
Seshadri, D V R	14	4
Bhatnagar, Deepti	9	5
Ravichandran, N	8	6
Srinivasan, K S	7	7
Manikutty, S	6	8.5
Raghavan, Achal	6	8.5
Pandey, I M	5	10

Table 7 presents the most prolific authors who have contributed to management literature. It is observed that Manjunath K has made the highest contribution by publishing 27 research articles during the study period (2003-2012). The next highest contribution is made by Sarkar Mitali with a publication of 25 research articles. On the other hand researcher like Gupta Anil and Seshadri DVR have also made significant contribution by contributing 15 and 14

research articles to Vikalpa Journal. However, other authors namely Bhatnagar Deepti, Ravichandran N, Srinivasan KS and Manikutty S have also made moderate contributions.

### Productivity of Authors Based on Lotka's Law

It is appropriate to examine and analyze the implications of Lotka's Law in relation to the author productivity on the publication of articles. Lotka's Law describes the frequency of publication by authors in a given field. It states, "the number of authors making n contribution is about 1/n of those making one; and the proportion of all contributors, that make a single contribution, is about 60 %"(Lotka 1926, cited in potter 1988). This means that out of all the authors in a given field, 60 % will have just one publication, and 15 % will have two publications (1/2 times.60). 7 percent of authors will have three publications (1/3 times.60), and so on. According to lotka's law of scientific productivity, only a six percent of the authors in a field will produce more than 10 articles.

Table 8

*Productivity of Authors Based on Lotka's Law*

No of contribution	Observed No Authors (F)	Observed % of Authors	Expected No of Authors	Expected % of Authors Predicted by lotkas law (P)	(F-P) <sup>2</sup> /P
1	642	100	100	642	0
2	57	8.88	25	160.5	66.74
3	20	3.12	11.11	71.33	36.94
4	11	1.71	6.25	40.13	21.14
5	5	0.78	4	25.68	16.65
6	4	0.62	2.78	17.83	10.73
7	1	0.15	2.041	13.10	11.18
8	2	0.31	1.56	10.03	6.43
14	1	0.156	0.51	3.27	1.581
25	1	0.15	0.16	1.023	0.0007
27	1	0.16	0.132	0.8807	0.0162
Total	745				

In the light of the above discussion, it is found from the table-8 that single paper contributed authors constitute more than 86.0% of the total authors. And only 0.4 % of authors have contributed more than 10 papers. Further, it is found that the observed values do not match with the expected values as per the Lotka's Law. Hence, Table-8 does not obey the Lotka's Law of Scientific Productivity. The study conducted by Rakhi V. S (2013) revealed that there is partial similarity between observed and expected number of authors. However the study carried out by Narendra Kumar (2010) to test the applicability of Lotka's laws to research productivity of CSIR, India. It was found that the observed number of authors is quite close to the expected no of authors. Hence the study follows the Lotka's Law of Scientific Productivity.

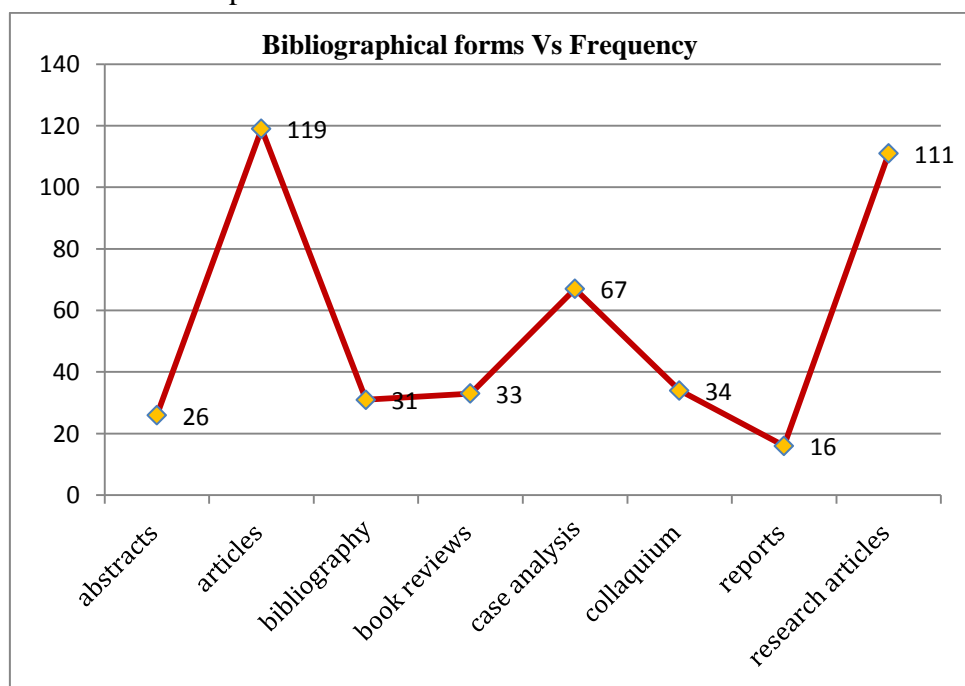
Table 9

## Bibliographical forms Vs Year Wise Distribution

Year	Abstracts	Articles	Bibliography	Book Review	Case Analysis	Colloquium	Report/ others	Research Articles	Total
2003	4	17	3	6	8	3	1	12	54
2004	4	14	3	5	11	4	1	12	54
2005	3	12	2	2	6	3	0	9	37
2006	4	26	4	3	9	2	0	7	55
2007	4	10	4	3	6	4	2	12	45
2008	4	8	4	2	8	4	2	11	43
2009	3	15	4	1	7	3	2	9	44
2010	0	7	4	4	4	4	1	13	37
2011	0	4	3	3	4	4	3	11	32
2012	0	6	0	4	4	3	4	15	36
Total	26	119 (27.31)	31 (7.09)	33 (7.55)	67 (15.33)	34 (7.78)	16 (3.66)	111 (25.4)	437

**Note:** Figures in the brackets indicate percentage

Table-9 reveals the bibliographical forms of documents, year wise distribution of articles. It is evident from the table-9 that majority of the research output is being published in the form of articles (N=119 -27.31%) and research articles (111-25.4%) respectively. However, considerable amount of research publications are also brought out in the form of Case Analysis (N=67-15.33%), Book Reviews (N=33- 7.55%) and Colloquium (N=34-7.78%) respectively. On the other hand, very negligible amount of research output is also published in the form of Report and other forms (16). It can be analyzed from the above discussion that majority of research out is published either in the form of articles or research articles.



### Findings of the study

The analysis of the study reveals the following major findings

- The present study analyze various bibliometric components of 437 research articles published in vikalpa journal from 2003-2012.
- The highest numbers of research articles (N=55- 12.559%) were published in the year 2006. The second highest number of articles 54 (12.36%) was published in the year of 2003
- The average rate of increase in the number of publications per year is 1.07. on an average 43 articles were published in each year during the study period.
- A total of 765 authors have contributed 437 articles and average number of authors per paper is found to be **1.7506**
- The majority of the research articles are written by single authors (57.89%) followed by double authors (42.11%).
- The degree of the author collaboration in vikalpa journal is .4234 (42%) during the study period, therefore moderate degree of authorship collaboration is observed in management research.
- Relative growth rate has been increasing at the rate of .6931 in 2004 to 2.4964 in 2012. Doubling time has been decreased from .9998 in the 2004 to .2776 in the year 2012.
- Average length of articles published in Vikalpa is 13.319 pages during the study period. Therefore journal provides the contributors an ample scope for exercising their thought contents comprehensively and exhaustively.
- The maximum number of articles (86.73%) have been contributed by academic institutions. This is followed by corporate institutions (11.67%)
- The highest no of article i.e, 404(92.279%) has been contributed by authors from India followed by USA.
- Manjunath K has made the highest contribution by publishing 27 research articles. The next highest contribution is made by Sarkar Mitali with publication of 25 research articles.
- The research data in the field of management does not obey the Lotka's Law of Scientific Productivity.
- Majority of the research output is being published in the form of articles (N=119 - 27.31%) and research articles (11-25.4%).

### Suggestions

Due to lack of time and certain unavoidable circumstances, author could not make the study a title more exhaustive, which could have provided few more results. Therefore, the author feels that this research may provide a base for following area of research in future.

1. The Vikalpa journal may be re-visited after a couple of years for a different time slot and the scope of the study could be extended to incorporate to verify broadford law of scattering, citation analysis, half life period, annul aging factor, impact factor based on the citations.

2. It is also possible to identify some of the core journals in the field of management and may be carried on in the light of the present research.

### Conclusion

Bibliometric analysis is a reliable tool to evaluate the development and quality of scientific production. The *Vikalpa* is a reputed international referred journal in the field of management exclusively devoted to managerial problem solving, and decision-making, especially in the emerging economies. It is gaining world –wide popularity and identification because of its quality of research work. Analysis of 437 research articles of the journal shows that it publishes high quality of research articles leading with research papers, Book Reviews; cover reviews of current books on managements, case studies, case Analysis and colloquium etc. It aims to provide a platform to bring together scholars, policy makers, and management practitioners interested in growth, change, and innovation in the developing societies. It can be inferred from the study that the significant research is being taking place in the field of management. The study reveals a remarkable difference between the number of single authors and multiple authors. The study concludes that single authorship research is predominant as compared to multiple contributions in the Journal. Collaboration and team work are among the most important necessities in the management research.

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