

Scientometric Dimensions of Research Productivity in Universities of Karnataka

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ABSTRACT

An analysis of 3047 research articles published by the research community in the five universities of Karnataka has been reported based on the national consortia portal JCCC@UGC INFONET. The research publications contributed by the academic community between 1969 and May 2011 reveals that University of Mysore has highest research publications with 1100 articles appearing in JCCC@UGC INFONET portal. Authorship trend reveals that single author contribution is diminishing to a great extent with just 3.93% of authors published individually while 43.41% of authors have contributed with four and five authors. The domain wise publications are mainly from science stream, with Chemistry, Physics and Mathematics dominating the area of research contributions and Library and Information Science at ninth position. Application of Bradford's law reveals that onethird of scientific journals publish 2409 articles accounting for 79 percent of publication.

Key words: Scientometrics; Research productivity; Bibliometrics; Publication productivity; Core Journals; Authorship Pattern.

INTRODUCTION

Information is the lifeblood of research and developmental activities and the performance in the field of scientific development depends upon the extent of research and development (R & D) work done in the country. The infrastructure required to assist the R & D is generously provided for by three sources - the government, the industry and the university itself. It is stated that India has a very wide base of scientists producing a large number of research projects in the universities to procure a doctorate or part of research work. The norms of University Grants Commission for recruitment or promotion calls for development of research bent of mind for academic and research community, which has resulted in extensive research proposals and

publications at national and international level.

The existing literature on scientometric and bibliometric techniques, which have become tools to evaluate the productivity of research institutes, individual researcher and to map the growth of subject have been culled out and studies have been reported over a period of time. Publication and citation counts are being extensively used for evaluation purpose of an institutes some of them are Shubert and Braun (1981); Garg and Rao (1988); Kalyane and Kalyane (1991) Zachos (1991); Gupta, Suresh Kumar and Khanna, (1999); Koganuramath, Angadi and Kademani (2002); Swarna, Kalyane and Vijai Kumar (2002) and Lee (2003). Zainab (2001) compared the perceived adequacy of library resources for research, the formal channels found to be useful in providing information needed for research, the methods used to keep abreast with current research literature, the problems faced when obtaining information required for research with publication productivity of 83 academic engineers and 239 academic scientists from the University of Malaya and National University of Malaysia.

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Sudhler and Abhila (2011) analyzed the research productivity of social scientists at the Centre for Development Studies (CDS), Thiruvananthapuram, during 1998-2008, covering 599 research articles published by the CDS researchers, including 38.23% journal articles, 23.54% chapters in books and 15.03% working papers. Kaur and Aggrawal (2010) brought out the results of a bibliometric study of research publications of Department of Chemistry, Gurunanak Dev University, Amritsar, for the period 2002-2006. Bhatia (2010) studied quantitatively research publications published by the scientists of National Institute of Occupational Health (ICMR) Ahmedabad, India during 2002-2006. Sevukan and Sharma (2010) evaluated the research performance of biotechnology faculties in central universities of India from 1997-2006. The data used for the study were retrieved from two database sources, namely, PubMed, NCBI (National Centre for Biotechnology Information); and ISI *Web of Science* database – Science Citation Index Expanded (SCIE). The results indicate that the growth of literature in biotechnology has steadily increased from 15 articles in 1997 to 43 articles in 2006; two-authored publications predominate the pattern of authorship; applicability of Lotka's law is validated from the values $n = 2.12$, $C = 0.669$, and $D = 0.027$ obtained using least square method.

“Publish or Perish” is often heard in academic environment for better scientific productivity and, in fact, the development of any discipline or visibility of any profession depends upon the tempo of scientific and research output in the form of publications and innovation. Thus, academic and research community serving in educational institutions of higher learning has remained an important yardstick for measuring the impact factor and quality of research. In this direction, an attempt has been made to provide scientometric dimensions of the research faculty and scholars employed in the universities of Karnataka to show their research bent of mind in an academic and research setup.

OBJECTIVES

The main objectives of the study are to include:

- Research productivity of academic and research community working in universities of Karnataka,
- Authorship patter of research publications
- Domain-wise publications of scientific productivity,
- Year-wise growth of research publications and
- Preference of research communication channel among research community.

METHODOLOGY

JCCC@UGC-INFONET is a gateway to comprehensive collection of subscribed journals under UGC Infonet consortia including open source journals, which includes all the e-publications of the academic and research community in and around the world. JCCC@UGC-INFONET portal has been used to identify the research publications of the faculty and scholars covering period from 1969 to May 2011 at five universities in Karnataka, namely University of Mysore, Mysore; Karnatak University, Dharwad; Bangalore University, Bangalore; Gulbarga University, Gulbarga; and Kuvempu University, Shankarghatta.

Advance search at JCCC@UGC IFONET selecting the field - Author Address and University name given within quotes to retrieve the research publications published by the respective research community covering the subject categories built in is presented in the screen shot.

Limitation of the study

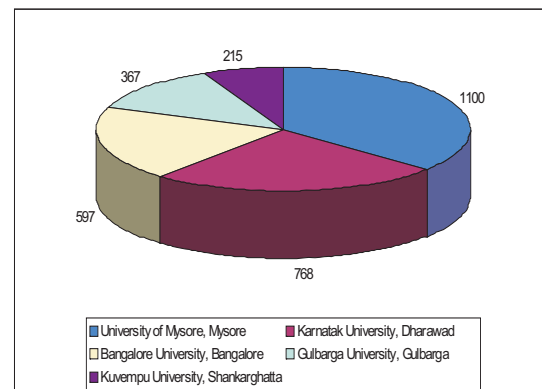
Although JCCC@UGC INFONET covers the entire strata of journals published from national international perspective including e-resources under UGC Infonet programme, all

the journals of Indian origin and few from other publishers might have been left out of there are chances of duplication of articles appearing more than one time in the same search. Hence, the publications of such journals published by the university academic community are not included in the study. Besides, JCCC@UGC INFONET is the only major source based on which the study is undertaken to reveal the scientometric productivity of the universities in Karnataka.

RESULTS AND DISCUSSION

During the span of 42 years, i.e. 1969 to May 2011, the number research publications of the academic community serving or served in the aforesaid universities have been found to be 3047 reported from JCCC@UGC INFONET portal. University of Mysore is the oldest university established in Karnataka has maximum (1100) research publications and correspondingly, Kuvempu University, Shankarghatta, has least publications (215) as seen in Table 1 and Chart 1.

Chart 1: provide legend



Collaborative research has been the order of the day and, nowadays, research is carried out by a group of researchers rather than by a single researcher to a larger extent. Table 2 depicts the authorship pattern of research publications by the research community in universities of Karnataka. It is quite clear that the number of articles contributed by a single author is just 3.93 percent while 1323 articles are contributed by more than four authors (43.41%). 27.69 percent of articles (844) are contributed by two authors and 24.94 percent by three authors (760).

Table 1: Research Productivity of Universities in Karnataka

University	Year of Establishment	Total Number of Research Articles
University of Mysore, Mysore	1916	1100
Karnatak University, Dharwad	1949	768
Bangalore University, Bangalore	1964	597
Gulbarga University, Gulbarga	1980	367
Kuvempu University, Shankarghatta	1987	215
Total		3047

Table 2: Authorwise Productivity

Authorship Pattern	No. of articles	Percentage
Single Author	120	3.93
Double Authors	844	27.69
Three Authors	760	24.94
Four and more Authors	1,323	43.41
Total	3047	100

Table 3: Subjectwise Productivity

Subject/ Domain	No. of articles	Percentage
Chemistry	1153	37.8
Physics	430	14.1
Mathematics	182	6.0
Polymer Science	164	5.4
Biochemistry	142	4.7
Zoology	160	5.25
Botany	95	3.1
Industrial Chemistry	84	2.8
Library & Information Science	77	2.2
Applied Botany	68	2.2
Geology	51	1.7
Food Science and Nutrition	44	1.4
Applied Botany and Biotechnology	41	1.3
Biotechnology	39	1.3
Computer Science	34	1.1
Microbiology	30	1.0
Environmental Science	27	0.9
Applied Electronics	21	0.7
Anthropology	17	0.6
Statistics	16	0.5
Electronics	15	0.5
Biopsychology	15	0.5
Materials Science	23	0.75
Sericulture	11	0.4
Psychology	10	0.3
Education	5	0.2
Other areas	Less than 5	

Research articles published in various subjects have been reported and some of the sub-subjects have themselves grown as independent subjects like Biotechnology, Biochemistry, and Industrial Chemistry etc. Chemistry, Physics and Mathematics dominate the area of research contributions by the academicians in a university set up while Library and Information Science come at 9th position with 77 articles and the rest is shown in Table 3.

Table 4: Yearwise Research Productivity

Year	No. of articles	Percentage
1969	1	0.0
1979	2	0.1
1980	7	0.2
1981	1	0.0
1983	3	0.1
1984	1	0.0
1985	1	0.0
1986	1	0.0
1987	1	0.0
1988	4	0.1
1990	3	0.1
1991	9	0.3
1992	5	0.2
1993	5	0.2
1994	6	0.2
1995	4	0.1
1996	16	0.5
1997	47	1.5
1998	56	1.8
1999	64	2.1
2000	82	2.7
2001	123	4.0
2002	188	6.2
2003	160	5.3
2004	172	5.6
2005	211	6.9
2006	317	10.4
2007	323	10.6
2008	313	10.3
2009	418	13.7
2010	376	12.3
2011 (Partial)	127	4.2
Grand Total	3047	100.00

Table 5: Research Communication Channel

Rank	Scientific Communication Channel	Frequency	Percentage
1.	Journal of Applied Polymer Science	125	4.1
2.	Transition Metal Chemistry	81	2.7
3.	Synthetic Communications	80	2.6
4.	Current Science	58	1.9
5.	SRELS Journal of Information Management	56	1.8
6.	Synthesis and Reactivity in Inorganic, Metal-Organic, and Nano-Metal Chemistry	55	1.8
7.	Molecular Crystals and Liquid Crystals	52	1.7
8.	Bulletin of Materials Science	42	1.4
9.	Archives of Phytopathology and Plant Protection	35	1.1
10.	European Journal of Medicinal Chemistry	33	1.1
11.	Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy	32	1.1
12.	Others (Journals with less than 32 publications)	2398	

Although the number of articles published by the research community of universities started in 1969, in 1997 47 articles were published and gradually increased to 188 articles in 2002. More than 300 articles appeared between 2006 and 2010 and 418 articles were contributed in 2009 (Table 4).

Among the various scientific communication journals, the top eleven journals in which most of the articles appeared are shown in Table 5. Journal of Applied Polymer Science ranks top with 125 articles followed by Transition Metal Chemistry (81) and Synthetic Communications (80). In Library and Information Science, SRELS Journal of Information Management takes fifth position and is a preferred medium of publication for articles in the field with 56 articles. Bradford's Law of Scattering serves as a guideline to library professionals in determining the core journals. The law states that journals in a single field can be grouped into three parts, each containing the same number of articles expressed as $1:n:n^2$. A total of 678 scientific journals have been used for research communication by the research

community publishing 3047 articles. According to Bradford's law, one third of scientific journals publish 2409 articles (79%), second onethird publish 411 articles and the remaining onethird has 227 articles.

CONCLUSION

It would be needless to mention that the research articles contributed by the academicians from varied disciplines of universities in Karnataka reveal the qualitative publications, as JCCC@UGC INFONET includes qualitative publications only in the light of the national knowledge commission striving to build knowledge society. This study is an indicator for development covering areas of Science, Social Science and Humanities. In fact, this study would be a simulation for younger generations to emulate and contribute not only as a mandatory but in the interest of development of this discipline and to be in tune with the requirements of national bodies like the UGC.

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