# Science Indicators of Scientists in Dr. Babasaheb Ambedkar Marathwada Univeristy, Aurangabad

**Shashank Sonwane** **Govind Adhe** **A A Vaishnav**

**Abstract**

*A strong and broad-based university research sector is one of the main pillars in an effective domestic R&D system. Not only in terms of leading-edge research and new knowledge relevant to the scientific community and society at large, but also as a source of high-quality human resources that, are well-educated and trained. A pool of talent in science and technology, a sophisticated workforce and effective transfer of knowledge are seen as keys to sustainable successful and competitive innovation culture. The Dr. Babasaheb Ambedkar Marathwada University sector is the supplier of new knowledge in terms of scientific publications. The paper attempts to find out the science indicators of the scientists in Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.*

**Keywords:** Science Indicators; Authorship Productivity; Impact Factor ; Collaboration index; Dr. Babasaheb Ambedkar Marathwada University

## 1. Introduction

Science indicators are increasingly used in policy-making. However, failure to relate interpretations of specific measures to the historical development of science can lead to errors in assessing past investments and in prioritizing future investments.

Science Indicators are helpful- and at times, necessary Instrument Used in determining national priorities and assessing returns. Their use derives from the difficulties of directly measuring the contributions of science to economic activity. However, given public interest in accountability, the development and use of these indicators warrants close scrutiny (Feller and Gamata, 2007).

The central role in science policy is illuminated by Iric (1997) metaphor that Scientometrics- a generic term used to describe multiple methods of collecting, analyzing, and presenting science indicators can represented by an equilateral triangle, whose angles are formed by the perspectives of Scientometricians, Scientists, and Policy makers.

This paper attempts to present some of these aspects related to the productivity of the scientists in Marathwada emphasizing on the Scientists in Dr. Babasaheb Ambedkar Marathwada University, Aurangbad (BAMU).

## 2. Objectives of the Study

- Number of Papers published by the Individuals and or/by Institution
- Number of Papers per author

 

- Application of Bradford Law and Lotka's Law
- Impact factor
- Manpower Statistics

## 3. Scope and Limitation

1. There are 10 departments in the faculty of science at BAMU. In these 10 science departments 74 teachers (scientists) are working at present. Present study is limited to the scientists who are working at present in the science departments of BAMU.

2. Journal Citation Report (Michael Martine, 2008). has been used to know impact factor of journals since no other source is available to study impact factor of journals.

3. Science Citation Index (SCI) gives impact factor of authors, however, due to unavailability of SCI researcher has used ISI web of knowledge science research.

4 Impact factor of the author depends on the number of citations received for his or her publications. However if the author has written on an orphan area then nobody may cite his publications, this condition was not taken into account in the present study.

5 Of the 60 scientists, who are considered for the study, only citations of 34 scientists were covered by 'ISI web of knowledge' (v.4.2) web of science. The total citations of individual Scientists were divided by his /her total number of publications to get an impact factor of the author. (Thomson Reuters, 2008.)

## 4 Population Sample

BAMU has in all 41 teaching and 4 other departments. Out of 41 teaching departments 10 departments are from the science faculty, viz. Zoology, Botany, Physics, Chemistry, Bio-chemistry, Mathematics, Statistics, Environment Science, Chemical Technology, and Computer Science & I T. In these science departments total 74 teachers (scientists) are working in the capacity of Professors, Readers, and Lecturers. In other words 74 scientists of science departments formed the sample population. The subject wise distribution of scientists covered under study is given in table no. 1.1.

**Table No. 1.1 Number of Science Departments**

| Sr. No | Departments | Year of Establishment | Total Scientist | Response received | |
|---|---|---|---|---|---|
| | | | | No. | Percentage |
| 1 | Zoology | 1959 | 18 | 15 | 83.33 |
| 2 | Botany | 1962 | 10 | 9 | 90 |
| 3 | Physics | 1965 | 9 | 9 | 100 |
| 4 | Chemistry | 1958 | 8 | 6 | 75 |

| | | | | | |
|---|---|---|---|---|---|
| 5 | Com. Science & IT | 1989 | 8 | 5 | 65.20 |
| 6 | Chemical Technology | 1994 | 6 | 3 | 50 |
| 7 | Environment Science | 1985 | 4 | 4 | 100 |
| 8 | Mathematics | 1962 | 6 | 5 | 83.33 |
| 9 | Statistics | 1992 | 2 | 2 | 100 |
| 10 | Bio-chemistry | 1992 | 3 | 2 | 66.66 |
| | Total | | 74 | 60 | 81.08 |

## 4. Methodology

Information was collected from the faculties in the form of curriculum viate (CV), annual report of BAMU, as well as by using structured questionnaire separately designed for the Faculties. The data collected from the respondents through the CV as well as Questionnaire was tabulated and analyzed.

## 5. Science Indicators of the Scientists

The total number of scientists working in all the science departments of Dr. Babasaheb Ambedkar Marathwada University (BAMU) are 74. Out of them 14 scientists have not responded, while 60 scientists have published 2502 publications giving 41.17 publications per scientists.

### 5.1 Subject wise Productivity

BAMU has in all 10 science departments viz. Zoology, Botany, Physics, Chemistry, Computer Science, Chemical Technology, Environmental Science, Mathematics, Statistics and Bio-chemistry. Each department conducts PG as well as Ph.D programmes in the departments. The data collected from these departments was further analyzed to find out subject wise productivity which is represented in Figure No. 1.1

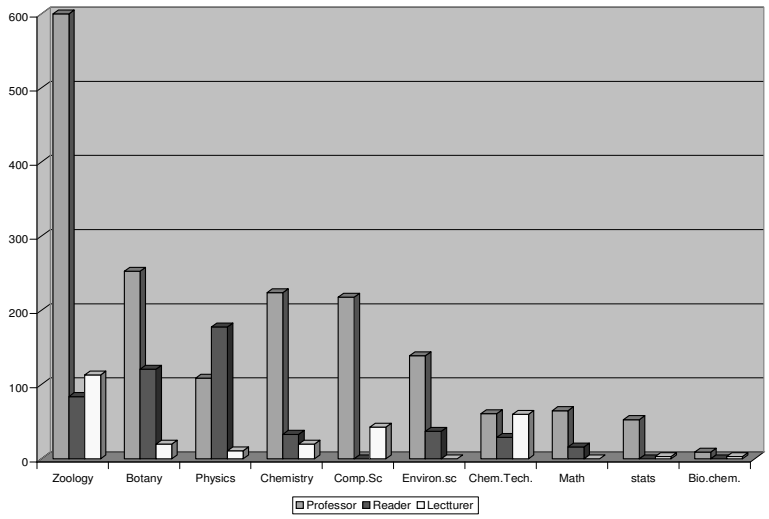


**Figure 1. 1: Productivity of scientists: subject wise distribution**

The figure No.1.1 reveals that amongst the total 2502 publications the subject Zoology ranked first. Zoology alone contributed to 31.85% publications followed by Botany, Physics and Chemistry departments. Least productivity was observed in Bio-Chemistry i.e.0.48%

It can be further noted that total 35 biological scientists combinely have published nearly 54% publications while total 39 pure science scientists have published only 46% publications. This means that even though total number of biologists are less in number than pure science scientists, they have published more publications.

## 5.2 Designation wise Productivity

In all in 10 science departments' of BAMU total numbers of 74 teachers are working, of which 60 teachers have responded & published their publications. Of the 60 teachers, 26 are professors, 21 readers and 13 lecturers.

An attempt was made to analyze productivity of scientists in BAMU by their designation, which is represented in Figure No. 1.2

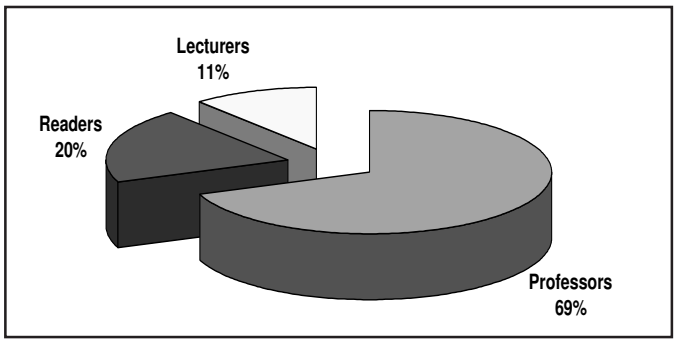


**Figure 1.2: Productivity of Scientists: Designation wise distribution**

It can be observed from Figure No. 1.2 that, of the total 2502 publications, Professors and Readers combinely have contributed to 89% publications. It can be further noted that on an average 69% publications were published by Professors, 20% by Readers and 11% by Lecturers. Which means senior people publish more number of publications.

## 5.3 Gender wise Productivity

Attempt has been made to analyze the data by gender of scientists which is presented in Table No.1.2

**Table 1.2: Productivity of Scientists: Gender wise Distribution**

| Gender | No. of Scientists | No. of Publications | Percentage |
|---|---|---|---|
| Male | 50 | 2301 | 91.97 |
| Female | 10 | 201 | 8.03 |
| Total | 60 | 2502 | 100 |

Data of in all 60 scientists was analyzed according to gender. It can be found from table No.1.1 that male scientists have published 2301 publications giving 46.04 publications per male scientists and female scientists have published 201 publications giving 20.1 publications per female scientists. It can also be observed that male scientists have published 2 times more publications than female scientists

There is significant association between gender of scientists and productivity. It is studied by confidence level as computed by chi-square which is shown in TableNo.1.3

**Table 1.3: Productivity of Scientists: Chi-square Test**

| | Gender | No. of Scientists | Expected | No. of Publications | Expected |
|---|---|---|---|---|---|
| | Male | 50 | 30 | 2301 | 1251 |
| | Female | 10 | 30 | 201 | 1251 |
| | Total | 60 | 60 | 2502 | 2502 |
| **Chi-square Value** | 26.6667 | | 1762.5899 | | |
| **Probability** | | 2.42E-07 | | 0 | |

It can be observed from Table No. 1.3 that, P value is $2.41756*10^{7}$ which is equal to zero. Which indicates that, the total number of female scientists is not reflected by the total contributions they made in academic publications.

Soman, (2002), Kamlan, (2002), Preman, (2002) Sarala, (2005) found that male scientists contributed more than the female… this points out that male scientist's scientific productivity is higher than the female scientists." This may be due to other responsibilities that female scientist have to share in the family apart from teaching work in the department.

An attempt was made to correlate the data by gender and designation of scientists in BAMU which is presented in the table No. 1.4

**Table 1.4: Productivity of scientists: Gender & designation wise distribution**

| Gender | Professor | Reader | Lecturer | Total | % |
|---|---|---|---|---|---|
| Male(50) | 1633 (25) | 470 (18) | 198 (07) | 2301 (50) | 91.97 |
| Female(10) | 98 (01) | 24 (03) | 79 (06) | 201 (10) | 8.03 |
| Totals(60) | 1731 (26) | 494 (21) | 277 (13) | 2502 (60) | 100 |

The figures in bracket indicate number of scientists. Table no.1.4 reveals that male professors have published 70.97% publications, followed by male Readers 20.42 and Lectures publications were very few (8.60). However female professor have published 48.76%, female Lecturers have published 39.30% and Readers were at third position i.e., 11.94%. The ratio of publications of male to female professors is 94.34:5.66, Readers 95.14: 4.85 and lecturers 71.48:28.51.

The gender wise data was further co-related with the subject wise productivity, which is presented in Table No.1.5.

**Table 1.5: Productivity of Scientists: Subject and Gender wise Distribution**

| Subjects | Male | | Female | | Total | Percentage |
|---|---|---|---|---|---|---|
| | No. of Publications | % | No. of Publications. | % | | |
| Zoology | 649 | 81.43 | 148 | 18.57 | 797 | 31.85 |
| Botany | 379 | 97.15 | 15 | 2.85 | 394 | 15.74 |
| Physics | 298 | 100 | 0 | 0 | 298 | 11.91 |
| Chemistry | 275 | 99.28 | 2 | 0.72 | 277 | 11.06 |
| Computer Science | 239 | 91.57 | 22 | 8.43 | 261 | 10.43 |
| Chemical Technology | 150 | 100 | 0 | 0 | 150 | 5.99 |
| Environment Science | 176 | 100 | 0 | 0 | 176 | 7.03 |
| Mathematics | 70 | 87.42 | 11 | 12.58 | 81 | 3.24 |
| Statistics | 56 | 100 | 0 | 0 | 56 | 2.24 |
| Biochemistry | 9 | 75 | 3 | 25 | 12 | 0.48 |
| Total | 2301 | | 201 | | 2502 | 100 |

The Table No.1.5 reveals that the subject Zoology ranked first in males (649) and females (148) publications. The figure also reveals that, the subject physics, chemical technology, environment science and statistics domain do not have female scientists. The figure also indicates that apart from Zoology subject the highest percentage of publications by male scientists in chemistry subject alone is 99.28% of total scientists in chemistry and lowest percentage of publications of male scientists were 75% in Bio-chemistry subject of total scientists in Biochemistry. While the highest percentage is 25% for female scientists was found in bio-chemistry department and the lowest percentage (0.75%) for female scientists were in chemistry domain.

## 5.4 Year wise Productivity

Year wise productivity means the productions (publications) of scientists counted chronologically to see most productive year and most productive subject domain in a particular year.

In the science faculty of BAMU, ten departments are running their courses separately. Few science departments started when the university was established in 1958. Scientists of these departments are contributing years together for the development of departments and university in the form of help in administrative work and produce publications. Present study covers the scientists who are working at present in the science departments and have excluded retired scientists. From amongst working scientists 1972 was the first publication year; hence the study covers the data from the year 1972 to 2007 i.e. 36 years time period.

An attempt was made to analyze the year wise productivity of various ten subjects of science faculty of BAMU. The total publications of all 60 scientists were analyzed subject wise and year wise. It is represented in Table No. 1.6

**Table 1.6: Productivity of scientists: Year and Subject wise Distribution**

| Year | Phys | Zool | Bot | Chem | Math | Environ Tech. | Chem. | Comp.Sc | Bio chem. | Stat | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1972 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 |
| 1973 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 1974 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 1975 | 0 | 7 | 4 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 14 |
| 1976 | 0 | 9 | 4 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 16 |
| 1977 | 1 | 12 | 12 | 2 | 0 | 0 | 0 | 3 | 0 | 0 | 30 |
| 1978 | 2 | 19 | 12 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 36 |
| 1979 | 0 | 20 | 10 | 6 | 0 | 0 | 0 | 4 | 0 | 0 | 40 |
| 1980 | 0 | 24 | 6 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 33 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1981 | 0 | 22 | 3 | 1 | 0 | 4 | 0 | 4 | 0 | 0 | 34 |
| 1982 | 4 | 19 | 14 | | 0 | 2 | 0 | 2 | 0 | 0 | 41 |
| 1983 | 2 | 15 | 13 | 6 | 2 | 2 | 0 | 3 | 0 | 0 | 43 |
| 1984 | 2 | 31 | 8 | 1 | 1 | 1 | 0 | 5 | 0 | 0 | 49 |
| 1985 | 3 | 15 | 11 | 1 | 2 | 9 | 0 | 6 | 0 | 0 | 47 |
| 1986 | 2 | 26 | 18 | 5 | 0 | 5 | 0 | 1 | 0 | 0 | 57 |
| 1987 | 2 | 49 | 11 | 3 | 2 | 4 | 0 | 3 | 0 | 0 | 74 |
| 1988 | 1 | 31 | 9 | 4 | 4 | 2 | 0 | 1 | 0 | 0 | 52 |
| 1989 | 2 | 21 | 8 | 8 | 0 | 1 | 0 | 0 | 0 | 2 | 42 |
| 1990 | 14 | 13 | 7 | 2 | 2 | 5 | 0 | 2 | 0 | 0 | 45 |
| 1991 | 11 | 19 | 5 | 4 | 3 | 1 | 1 | 8 | 0 | 0 | 52 |
| 1992 | 3 | 18 | 10 | 3 | 1 | 7 | 1 | 6 | 0 | 0 | 49 |
| 1993 | 13 | 24 | 6 | 4 | 5 | 7 | 1 | 5 | 0 | 0 | 65 |
| 1994 | 2 | 26 | 9 | 6 | 3 | 16 | 1 | 3 | 1 | 0 | 67 |
| 1995 | 4 | 33 | 13 | 19 | 3 | 3 | 11 | 6 | 0 | 0 | 92 |
| 1996 | 6 | 15 | 8 | 12 | 2 | 5 | 7 | 5 | 3 | 0 | 63 |
| 1997 | 20 | 12 | 8 | 9 | 1 | 9 | 4 | 3 | 0 | 2 | 68 |
| 1998 | 10 | 28 | 24 | 7 | 3 | 19 | 4 | 5 | 1 | 2 | 103 |
| 1999 | 16 | 30 | 33 | 11 | 5 | 11 | 3 | 6 | 0 | 2 | 117 |
| 2000 | 15 | 11 | 15 | 18 | 4 | 7 | 4 | 4 | 0 | 5 | 83 |
| 2001 | 12 | 38 | 26 | 21 | 3 | 6 | 9 | 11 | 0 | 2 | 128 |
| 2002 | 9 | 28 | 14 | 28 | 3 | 9 | 11 | 27 | 0 | 0 | 129 |
| 2003 | 10 | 47 | 13 | 13 | 2 | 11 | 15 | 10 | 3 | 5 | 129 |
| 2004 | 35 | 47 | 29 | 15 | 10 | 7 | 24 | 35 | 3 | 13 | 218 |
| 2005 | 48 | 58 | 24 | 35 | 15 | 16 | 27 | 38 | 1 | 16 | 278 |
| 2006 | 40 | 20 | 4 | 26 | 4 | 7 | 27 | 49 | 0 | 6 | 183 |
| 2007 | 7 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 11 |
| Total | 298 | 797 | 394 | 277 | 81 | 176 | 150 | 261 | 12 | 56 | 2502 |

It can be observed from Table No.1.6 that, most productive year was 2005, as total productivity in this year was 278, followed by (218) 2004 and (183) in 2006. As regards the year and subject wise productivity, Zoology department has produced 58 publications in the year 2005 which is highest number in year wise publications during 1972 to 2007 time period. The table also reveals that, in the year 2006 Computer science & IT and in the year 1987, Zoology department has produced 49 publications each, which are second highest in the year wise publications. Third highest year wise publications produced in 2005 were by the Physics department. It can be observed from the Table No.1.6 that, the year wise productivity is increased from 2001 to 2005, and then it has been decreased in 2006 and 2007.It is surprising to note that, productivity of scientists is decreasing as university is approaching Golden Jubilee year.

## 5.5 Rank list of Authors & Papers

In the age of science, there is competition. Every person has to prove himself physically, economically and intellectually fit. Intellectual mapping shows the rank of person.

An attempt was made to analyze the total publications of scientists of BAMU, to see who is the topper in publications. Analyzed data is presented in Table No.1.7

**Table 1.7: Rank List of Authors**

| No of Papers | Rank of Author | Name of Author | Departments |
|---|---|---|---|
| 156 | 1 | BVJ | Zoology |
| 147 | 2 | SCM | Comp.sci. |
| 129 | 3 | MSS | Chemistry |
| 126 | 4 | AMM | Botany |
| 112 | 5 | UHM | Zoology |
| 105 | 6 | GKK | Zoology |
| 98 | 7 | MUP | Zoology |
| 83 | 8 | BNP | Environ.sci. |
| 77 | 9 | DSM | Botany |
| 75 | 10 | CJH | Zoology |
| 72 | 11 | AMC | Botany |
| 71 | 12 | KVK | Comp.sci. |
| 65 | 13 | GDK | Zoology |
| 64 | 14 | MDS | Physics |
| 62 | 15 | BRA | Chemistry |

| | | | |
|---|---|---|---|
| 61 | 16 | DBS | Chem.tech. |
| 60 | 17 | BKS | Chem.tech. |
| 56 | 18 | RPS | Physics |
| 56 | 18 | MBM | Environ.sci. |
| 54 | 19 | YKK | Zoology |
| 53 | 20 | UHB | Statistics |
| 49 | 21 | KMJ | Physics |
| 47 | 22 | SPZ | Zoology |
| 43 | 23 | PBP | Botany |
| 42 | 24 | SHB | Physics |
| 41 | 25 | MBD | Math. |
| 33 | 26 | TKC | Chemistry |
| 11 | 34 | BND | Physics |
| 2 | 45 | ASR | Chemistry |

The Table No. 1.7 reveal that, Dr B V Jadhav, who has published maximum, i.e. 156 publications, is a topper amongst all 60 scientists. Dr. S C Mehrotra stood 2nd in rank followed by Dr M S Shingare. While Dr Rajbhoj secured last position as her total publications were only 2.

The brief biodata of the top ten Scientists is given in Appendix.

### 5.5.1 Bradford's Law

In the present set of data numbers of authors have been arranged in order of decreasing productivity of articles. They were divided in a nucleus of 3 equal zones. Numbers of articles in each zone were more or less equal, which is shown in Table No. 1.8

**Table 1.8: Bradford's Law of Scattering**

| Zones | No. of papers | No. of Authors |
|---|---|---|
| I | 873 | 7 |
| II | 856 | 12 |
| III | 773 | 41 |

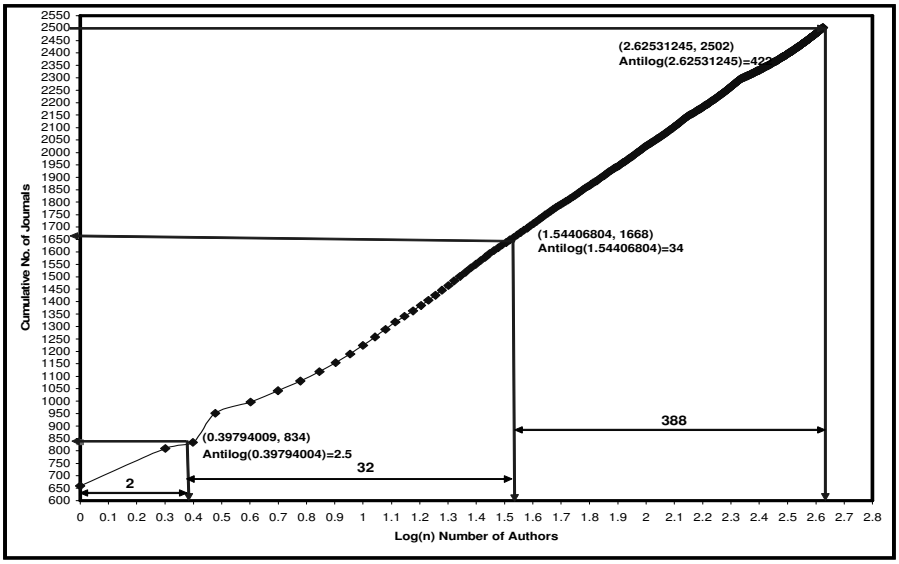


**Figure 1.3: Bradford's Law of Scattering**

The attempt was made to test applicability of Bradford's Law of scattering, as shown in Figure No. 1.3. The total numbers of 2502 publications of 60 scientists were divided into 3 equal zones, while number of authors writing similar number of papers in each zone is in the ratio of 7:12: 41. Which indicates that the data fits into the Bradford's law of scattering.

### 5.5.2 Lotka's Law

An attempt was made to apply the Lotka's Law to the publications of scientists of BAMU. Hence the data was collected from all the scientists of science domains which is presented in the Table No 1.9.

**Table 1.9: Productivity of scientists: Application of Lotka's Law**

| No of Papers | No of Authors | No of Papers | No of Authors |
|---|---|---|---|
| 2 | 1 | 47 | 1 |
| 3 | 2 | 49 | 1 |
| 5 | 3 | 53 | 1 |
| 6 | 1 | 54 | 1 |
| 8 | 1 | 56 | 2 |
| 9 | 1 | 60 | 1 |
| 10 | 3 | 61 | 1 |
| 11 | 4 | 62 | 1 |

| | | | |
|---|---|---|---|
| 12 | 1 | 64 | 1 |
| 13 | 2 | 65 | 1 |
| 15 | 1 | 71 | 1 |
| 16 | 1 | 72 | 1 |
| 18 | 2 | 75 | 1 |
| 20 | 3 | 77 | 1 |
| 21 | 3 | 83 | 1 |
| 28 | 1 | 98 | 1 |
| 29 | 1 | 105 | 1 |
| 30 | 1 | 112 | 1 |
| 31 | 1 | 126 | 1 |
| 33 | 1 | 129 | 1 |
| 41 | 1 | 147 | 1 |
| 42 | 1 | 156 | 1 |

The applicability of Lotka's Law was tested on the data but it was found that, the data does not fit into the Lotka's Law even though the researcher has attempted to apply it with mathematical method.

### 5.6 Impact factor of Scientists

An attempt was made to find out the impact factor of scientists of BAMU. Researcher has tried, but no source was available to find out the impact factor. Very initially, Journal Citation Report (JCR), the Journal Impact Factor (JIF), Science Citation Index (SCI) was searched, but these sources were not available. The present data is taken from 'ISI Web of knowledge' (v.4.2) web of science. The impact factor was calculated by using following method.

$$\text{Impact factor} = \frac{\text{Total number of citations received}}{\text{Total number of publications of an author}}$$

The scientists, who are considered for the study, their citations, were collected from 'ISI web of knowledge' (v.4.2) web of science. The total citations were divided by the total number of publications of scientists to get an impact factor.

An attempt was made to find out the impact factor of all the scientists who were responded to the researcher. Out of the total 60 responded scientists, the impact factor of only 34 scientists was available on the 'ISI Web of Knowledge' that is presented in table No.1.10.

**Table 1.10: Impact Factor of Total Scientists of BAMU**

| Sr. No. | Author | Total Publication | Total citation | Impact factor |
|---|---|---|---|---|
| 1 | Arbad | 62 | 108 | 1.74 |
| 2 | Barve | 15 | 0 | 0 |
| 3 | Behere | 42 | 8 | 0.19 |
| 4 | Bichile | 18 | 48 | 2.67 |
| 5 | Chavan | 72 | 0 | 0 |
| 6 | Chondhekar | 33 | 28 | 0.85 |
| 7 | Dhaigude | 13 | 0 | 0 |
| 8 | Gill | 31 | 43 | 1.39 |
| 9 | Hiware | 75 | 0 | 0 |
| 10 | Jadhav B V | 156 | 0 | 0 |
| 11 | Jadhav K M | 49 | 92 | 1.88 |
| 12 | Kachole | 9 | 101 | 11.2 |
| 13 | Kale | 71 | 2 | 0.03 |
| 14 | Khillare | 54 | 1 | 0.02 |
| 15 | Khirade | 28 | 36 | 1.29 |
| 16 | Kothekar | 30 | 8 | 0.27 |
| 17 | Kulkarni | 105 | 41 | 0.39 |
| 18 | Lande | 20 | 84 | 4.2 |
| 19 | Mehrotra | 147 | 438 | 2.98 |
| 20 | Mokase | 9 | 5 | 0.56 |
| 21 | Mukadam | 77 | 1 | 0.01 |
| 22 | Muley | 56 | 7 | 0.13 |
| 23 | Naik | 29 | 95 | 3.28 |
| 24 | Navarkhele | 10 | 0 | 0 |
| 25 | Panchal | 5 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| 26 | Pande | 83 | 0 | 0 |
| 27 | Patil M U | 98 | 0 | 0 |
| 28 | Patil Satish | 21 | 0 | 0 |
| 29 | Patil Sunil | 20 | 0 | 0 |
| 30 | Rajbhoj | 2 | 0 | 0 |
| 31 | Sharma | 56 | 0 | 0 |
| 32 | Shinde | 61 | 128 | 2.1 |
| 33 | Shingare | 129 | 272 | 2.11 |
| 34 | Shirsath | 64 | 28 | 0.44 |

The table no 1.10 reveals that, B V Jadhav, who is highest in the publication amongst all the scientists has 0 (zero) impact factor. S C Mehrotra who is the second highest in all the scientists having 2.98 impact factors. Even though Dr. M S Kachole has published only 9 papers, his impact factor is 11.2. The table further indicates that, highest numbers of citations were received by Mehrotra's publications.i.e. 438, and second highest is by Shingare i.e. 272. The table further indicates that, out of the total 34 scientists, 38.23% scientist's impact factor is 0 and 29.41% scientists impact factor is 0 to 0.99. It must be further noted that of the 60 scientists there are 10 (8.03%) women. Of the 10 only 2 women have been covered by ISI web of knowledge, and it is strange to note that impact factor of women is zero.

## 7. Conclusions

The result shows that the Scientists had published 2505 publications. The Professors' productivity is 69% while productivity of Readers and Lecturers combinely is 31%. It means that the productivity of professors is double than the Readers and Lecturers.

Male professors have published 70.97% publications, followed by male Readers 20.42 and Lectures publications were very few (8.60). However female professor have published 48.76%, female Lecturers have published 39.30% and Readers were at third position i.e., 11.94%. The ratio of publications of male to female professors is 94.34:5.66, Readers 95.14: 4.85 and lecturers 71.48:28.51. An attempt was made to find out the rank of authors based on the total number of publications. It was found that Dr Jadhav BV from the Zoology domain stood first as he has published 156 publications. Second highest is Dr. S C Meharotra. Amongst the top ten in the rank, Zoology domain contributed 50% .i.e. amongst top ten scientists, 5 scientists are from Zoology.

The data was analyzed to test applicability of Bradford's Law of scattering, (Figure No. 4.19) the total numbers of 2502 publications of 60 scientists were divided into 3 equal zones, while number of authors writing similar number of papers in each zone is in the ratio of 7: 12: 41. This indicates that

the data fits into the Bradford's law of scattering. Dr. Kachole from Biochemistry has the highest impact factor of 11.2 amongst all scientists in the BAMU, followed by Dr Lande from Chemistry has the impact factor of 4.2.

A pool of talent in science and technology, a sophisticated workforce and effective transfer of knowledge are seen as keys to sustainable successful and competitive innovation culture. The Dr. Babasaheb Ambedkar Marathwada University sector is the supplier of new knowledge in terms of scientific publications.

**Appendix**

**Brief Biodata of the Top Ten Scientists.**

1. Dr. B. V. Jadhav is working as professor in Zoology department. He has published 156 research papers during 30 years of his productivity life. His productivity age began in the year 1976 at the chronological age of 22 years.
2. Dr. S. C. Mehrotra is working as professor in Computer Science and IT. He has published 147 research papers during 35 years of his productivity life. His productivity age began in the year 1972 at the chronological age of 25 years.
3. Dr. M S Shingare is working as professor in chemistry. He has published 129 research papers during 32 years of his productivity life. His productivity age began in the year 1975 at the chronological age of 24 years.
4. Dr. A. M. Mungikar is working as professor in Botany. He has published 126 research papers during 33 years of his productivity life. His productivity age began in the year 1974 at the chronological age of 25 years.
5. Dr. U. H. Mane is working as professor in Zoology. He has published 112 research papers during 37 years of his productivity life. His productivity age began in the year 1970 at the chronological age of 23 years.
6. Dr. G. K. Kulkarni is working as professor in Zoology. He has published 105 research papers during 31 years of his productivity life. His productivity age began in the year 1976 at the chronological age of 26 years.
7. Dr. M. U. Patil is working as professor in Zoology. She has published 98 research papers during 30 years of his productivity life. Her productivity age began in the year 1977 at the chronological age of 22 years.
8. Dr. B. N. Pande is working as professors in Environment science. He has published 83 research papers during 25 years of his productivity life. His productivity age began in the year 1981 at the chronological age of 33 years.
9. Dr. D. S. Mukhadam is working as professor in Botany. He has published 77 research papers during 33 years of his productivity life. His productivity age began in the year 1974 at the chronological age of 24 years.

10. Dr. C. J. Hiware is working as professor in Zoology. He has published 75 research papers during 15 years of his productivity life. His productivity age began in the year 1992 at the chronological age of 29 years.

## References


1. Feller, Irwin and Gamata, George. (2007). Science Indicators as reliable evidence. Minerva, 45, 17-30.
2. Iric, Rip. (1997). Qualitative condition of Scientometrics: the new challenges. Scientometrics, 38(1), 7-26.
3. Michael Martine (2008) .http://bussinesslibrary blog.wordpress .com/2008/06/17/journal-citation-report-2008/. (Accessed on 12/6/2008).
4. Thomson, (2008). ISI products useful in promotion and tenure. http://news.lib.vt.edu/libnews/modules.php?name=News&file=print&sid=241 (Accessed on 12th June 2008).
5. Soman, Anu P. (2002). Growth of knowledge in humanities.A Bibliometrics study. In G Devrajan (Ed) Research in Library and Information science New Delhi: Ess Ess Publications, 87-104.
6. Kamalan, Bindu. (2002). Journal of knowledge organization: A bibliometric study and content analysis. In G. Devarajan (Ed.), Research in Library and Information Science. New Dehli: Ess Ess publication, 112-118
7. Preman, P K (2002). Scientific Productivity of Scientists.G Devrajan (Ed) In Research in Library and Information science New Delhi: Ess Ess Publications, 156-166.
8. Sarala, K. R. (2005). Scientific productivity of Agricultural scientists: A scientometric study. In G. Devarajan (Ed.), Library and information science studies in the digital age. Delhi: Ess Ess publication, 260-268.
9. MASTIC. (1996). Malaysian Science and Technology Indicators Report. Malaysian Science and Technology Information Centre, Kaula Lampur.


## About Authors


**Dr. Shashank S Sonwane,** Assistant Professor, Dept. of Library and Information Science, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
E-mail: shashank65@yahoo.com

**Dr. Govind D Adhe,** Assistant Professor and Head, Dept. of Library and Information Science, Dr. Babasaheb Ambedkar Arts and Commerce College, Aurangabad.

**Dr. Ashwini A Vaishnav**, Retd. Professor and Head, Dept. of Library and Information Science, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.