



Confederation of Indian Industry

Glimpses of Research Productivity of Indian Universities and Research Institutions

An Analytical Report Based on Indian Citation Index (ICI)

CII – ICI Report 2017



Indian Citation Index

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Indian Citation Index

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Contents

Summary	1-4
I. Overseas – Scholarly Contribution	1
II. Indian States – Scholarly Contribution	1
III. Indian Institute of Technology (IITs) – Scholarly Contribution	2
IV. National Institute of Technology (NITs) – Scholarly Contribution	2
V. Indian Institute of Management (IIMs) – Scholarly Contribution	2
VI. Central Universities – Scholarly Contribution	2
VII. Deemed Universities – Scholarly Contribution	3
VIII. State Universities – Scholarly Contribution	3
IX. Private Universities – Scholarly Contribution	3
X. Council of Scientific and Industrial Research (CSIR) – Scholarly Contribution	3
XI. Indian Council Medical Research (ICMR) – Scholarly Contribution	4
XII. Department of Science and Technology (DST) – Scholarly Contribution	4
XIII. Defence Research and Development Organization (DRDO) – Scholarly Contribution	4
XIV. Indian Council of Agricultural Research (ICAR) – Scholarly Contribution	4
Chapter 1	5-7
Background information	5
<i>i) Introduction</i>	5
<i>ii) Scope</i>	6
<i>iii) Time Span</i>	7
<i>iv) Methodology</i>	7
<i>v) Data Collection and Organization</i>	7
<i>vi) Limitations</i>	7
Chapter 2	8-13
Foreign Research contribution Published in Indian journals	8
Chapter 3	14-17
Indian States: Research Papers Based Performance	14

Chapter 4	18-35
Indian Institute of Technology (IITs): Research Papers Based Performance	18
Chapter 5	36-47
National Institute of Technology (NITs): Research Papers Based Performance	36
Chapter 6	48-51
Indian Institute of Management (IIMs): Research Papers Based Performance	48
Public Universities in India: Central, States, Deemed and Private Universities	52
Chapter 7	53-60
Central Universities: Research Productivity Performance	53
Chapter 8	61-62
Deemed Universities: Research Papers Productivity Based Performance	61
Chapter 9	63-64
State Universities: Research Productivity Performance	63
Chapter 10	65-68
Private Universities: Research Productivity Performance	65
Chapter 11	69-70
Council of Scientific and Industrial Research (CSIR): Research Productivity Performance	69
Chapter 12	71-72
Indian Council of Medical Research (ICMR): Research Productivity Performance	71
Chapter 13	73-74
Department of Science and Technology (DST): Research Productivity Performance	73
Chapter 14	75-76
Defence Research and Development Organization (DRDO): Research Productivity Performance	75
Chapter 15	77-78
Indian Council of Agricultural Research (ICAR): Research Productivity Performance	77
Bibliography	

List of Tables

SN	Tables	Pages
1	Table 2.1: 25 Top Foreign Countries Based on Research Papers/Articles	8
2	Table 2.2: Distribution of 'Articles' Among Foreign Countries	9
3	Table 2.3 Distribution of Foreign Articles in Top Journals	10
4	Table 2.4: Subject wise Articles Published from Foreign Countries	11
5	Table 2.5: Distribution of Articles and Citations of foreign Countries in Top Journals	13
6	Table 3.1: State-wise Research Productivity Based on Articles, Citations & Citation/Paper	14
7	Table 3.2: Distribution of Articles Contribution in Group of Top Contributing Indian States	15
8	Table 3.3: Rank Order of States Based on Institutions count, vis-à-vis to their Articles, Citations, Articles/Institute and Citations/Institute	16
9	Table 4.1: IITs Published 10 and > 10 Articles	18
10	Table 4.2: IITs wise Count of Top Authors based on Articles Published	20
11	Table 4.3: IIT wise Top Journals based on Article Published	23
12	Table 4.4: Top 20 Subject Categories of IITs Based on Articles Published	31
13	Table 5.1: NITs Published 10 and > 10 Research Papers	36
14	Table 5.2: NIT Wise Top Authors Based on Articles Published	38
15	Table 5.3: NIT wise Top Journals based on Articles published	40
16	Table 5.4: NITs Performance Based on Subject Wise Articles	44
17	Table 6.1: IIMs Published 10 and > 10 Articles	48
18	Table 6.2: IIM Wise Top Authors Name with Number of Articles, Citations & % Share	49
19	Table 6.3: IIMs Wise Top Journals based on Articles Published	50
20	Table 7.1: 20 Top Central Universities Based on Articles Published	53
21	Table 7.2: Distribution of Articles in Group of Top Universities	54
22	Table 7.3: Top 50 Authors of Central Universities	55
23	Table 7.4: Top 50 Journals Based on Articles of Central Universities	57

24	Table 7.5: Distribution of Articles in Group of Top Journals	58
SN	Tables	Pages
25	Table 7.6: Subject Wise Research Articles from Central Universities	59
26	Table 7.7: Subject Wise Distribution of Articles	60
27	Table 8.1: Top 20 Deemed Universities Based on Articles	61
28	Table 8.2: Distribution of 'Articles' in Group of Top Deemed Universities	62
29	Table 9.1: 20 Top State University Based on Articles Published	63
30	Table 9.2: Distribution of 'Articles' Share in Group of State Universities	64
31	Table 10.1: Top 20 Private Universities based on Articles	65
32	Table 10.2: Distribution of 'Articles' in Group of Top Private Universities	66
33	Table 10.2: Top Authors of Private Universities Published 10 and >10 Articles	67
34	Table 11.1: Top 10 CSIR's Institutes Research Productivity based on Articles and Citations	69
35	Table 11.2: Distribution of 'Articles' and 'Citations' in Group of Top CSIR Institutes	70
36	Table 12.1: ICMR Research Productivity Based on Articles and Citations	71
37	Table 12.2: Distribution of 'Articles' and 'Citations' in Group of ICMR Institutes	72
38	Table 13.1: DST Research Productivity based on Articles and Citations	73
39	Table 13.2: Distribution of 'Articles' and 'Citations' in Number of DST Institutes	74
40	Table 14.1: Top 10 DRDO Laboratories Based on Articles and Citations	75
41	Table 14.2: Distribution of 'Articles' and 'Citations' in Number of DRDO Institutes/Laboratories	76
42	Table 15.1: ICAR 10 Institutes Research Productivity Based on Articles and Citations	77
43	Table 15.2: Distribution of 'Articles' and 'Citations' in Number of ICAR Institutes	78

List of Figure

SN	Figures	Pages
1	Figure 2.1: Foreign Contribution Articles and Citations	9
2	Fig 2.2: 25 Top Indian Journals Based on Articles Published from Foreign Countries	10
3	Fig. 3.1 Research Papers and Citations of Indian States	15
4	Fig. 4.1 Top 15 IITs Research Papers and Citations	19
5	Fig. 5.1 Top 21 NITs Research Papers and Citations	37
6	Fig. 6.1 Top 09 Productive IIMs Research Papers and Citations	48
7	Fig. 7.1: Top 20 Central Universities - Articles and Citations	54
8	Fig. 8.1: Top 20 Deemed Universities Articles & Citations	62
9	Fig. 9.1: 20 Top State University Based on Articles & Citations	64
10	Fig. 10.1: Top 20 Private Universities based on Articles & Citations	66
11	Fig. 11.1: Top 10 CSIR Research Institutes based Articles and Citations	70
12	Fig.12.1. ICMR Top 10 Research Institutes Articles and Citations	72
13	Fig. 13.1: Top 10 DST Institutes based Articles and Citations	74
14	Fig.14.1: 10 Top DRDO Institutes/Laboratories Articles and Citations	76
15	Fig.15.1: Top 10 ICAR Institutes/Laboratories Articles and Citations	78

Summary

Overseas – Scholarly Contribution

- ❖ **175** foreign countries have published **135041** research papers in **931** journals published from India, collaborative as well as exclusive.
- ❖ 1st position based on counts of 'Research Articles' published by **175** foreign countries is occupied by China with **16460** research articles which is **12.189%** to foreign articles total.
- ❖ 1st position based on counts of 'Citations' received to **175** foreign countries is occupied by USA with **6395** Citations which is **13.768%** to foreign countries citations total.
- ❖ **25** (**14.285%** to total **175** countries) top countries have published **80.937%** articles in Indian journals and remaining **150** (**85.715%**) foreign countries have published **19.063%** articles.
- ❖ Based on counts of articles, rank order of all foreign countries from serial number **25** to **175**, have less than **1%** share of research papers to foreign countries total.
- ❖ **25** (**2.685% of 931**) top journals have **36.716%** research articles to foreign contribution total.
- ❖ **10** (**9.31%**) top journals have **< & = 1%** share of foreign articles and rest **11** to **931** have **> 1%** share of foreign papers.
- ❖ It is observed that wherever lesser number of articles & correspondingly higher number of citations are accrued, C/P computation does not elicit realistic indicator of research quality.

Indian States – Scholarly Contribution

- ❖ India as a country comprises **36** states and UTs constituents. All these constituent units have good spread of teaching, learning and research institutes/universities but all are not equitable in size, population & spread of institutions and infrastructure. Therefore, each one has diverse strength & ecosystem, and accordingly produces research papers.
- ❖ All **36** states have contributed **450440** research articles and received **241034** citations thereto.
- ❖ **24** top Indian states out of **36** have published their research papers in more than **500** Indian journals with more than **2000** papers & most of them have received more than **200** citations.
- ❖ **05** (**13.889%**) top states contribution is **50.336%** to all **36** states total; **15** (**61.667%**) top states contribution is **86.580%**; and **25** (**69.444%**) states contribution is **98.343%** to all **36** states total.

Indian Institute of Technology (IITs) – Scholarly Contribution

- ❖ IITs are public autonomous institutes of higher education primarily focus in engineering and technology sector. They are governed by Institutes of Technology Act 1961 which has declared them institutions of national importance.
- ❖ IITs are **23** in numbers as per Institutes of Technology Act 1961 amended up to 2016. Out of **23** IITs, **17** IITs have published **7656** articles in **535** Indian journals covering **48** subject categories of ICI, and received **3498** citations. **06** IITs, namely IIT Bhilai, IIT Goa, IIT Jammu, IIT Dharwad, IIT Palakkad and IIT Trupati have no contribution, probably being relatively new establishments.

National Institute of Technology (NITs) – Scholarly Contribution

- ❖ NITs are 31, established over a long span of time line; their spread is almost in every state of the country. NITs are public autonomous institutions of higher education in India. NITs are governed by the National Institutes of Technology Act 2007. These institutes are of national importance and have special recognition from the Government of India.
- ❖ Out of **31** NITs, **27** NITs have contributed 3976 articles, published in **346** Indian journals covering **44** subject categories of ICI, and received **1055** citations. **04** NITs namely NIT Andhra Pradesh, NIT Meghalaya, NIT Mizoram, and NIT Uttarakhand have made no contribution.

Indian Institute of Management (IIMs) – Scholarly Contribution

- ❖ The Indian Institute of Management (IIMs) is a group of **20** public autonomous Institutes of Management Education and Research in India. The establishment of IIMs was initiated by Pt. Jawaharlal Nehru, first Prime Minister of India based on the recommendation of the Planning Commission of India.
- ❖ Out of **20** IIMs, **13** IIMs have contributed **801** articles, published in **130** Indian journals covering **25** subject categories of ICI and received **369** citations. **07** IIMs, namely IIM Nagpur, IIM Bodh Gaya, IIM Amritsar, IIM Sambalpur, IIM Sirmour, IIM Visakhapatnam, and IIM Jammu contributed no paper/article.

Central Universities – Scholarly Contribution

- ❖ Central universities are **47** in the country wherein **44 (93.62%)** have made contribution as per ICI database and rest **03 (6.38%)** did not, probably being relatively new establishments.
- ❖ **20** top central universities, i.e. **45.46%** of total **47** have contributed **93.729%** papers. All **44** contributing central universities have published papers in **805** journals published from India covering **44** subject categories of ICI.

- ❖ **100 (12.42%)** top journals have published **55.826%** articles to central universities total. And same way **100 (12.42%)** top journals have received **78.766%** citations. **~45%** research papers of central universities have published in **705 (~82%)** Indian journals.

Deemed Universities – Scholarly Contribution

- ❖ Deemed Universities are **122** in number across the country and out of these ICI has research papers data of **99 (81.15%)** universities and rest **23 (18.85%)** have no research papers contribution in ICI database.
- ❖ **99** Deemed Universities have published **15624** articles covering **48** subjects in **817** journals and received **7351** citations as per ICI database. **10** top Deemed Universities have **43.752%** articles contribution and **50 (50.50%)** top Deemed Universities have **91.859%** articles contribution. **100 (12.24%)** top journals have published **43.56%** papers of total.

State Universities – Scholarly Contribution

State universities are 365 in India as per UGC site, funded & regulated by respective states of the country. Out of 365, 283, i.e. 77.53% state universities have contributed 103946 articles in 954 journals and received 58911 citations. The rest 82 (22.46%) state universities have no contribution as per ICI database.

- ❖ Notably, in **20** top contributing state universities, **12** are from 'Agricultural' sector, means **60%** top state universities are from Agricultural field. It also indicates that Agricultural research publications are more inclined towards journals published from India, probably; agricultural research output is more of local nature, need, applications and also India is one of the Agricultural dominating country.

Private Universities – Scholarly Contribution

- ❖ Private universities are **283** in numbers and now have become substantial part of higher education system of India. 'Private Universities' are established by the state legislature council resolution and notification thereof.
- ❖ **156 (55.12%)** out of **283** Private Universities have **7289** articles contribution published in **631** Indian journals and received **2401** citations. The rest **127 (44.87%)** Private Universities have contributed no article. It indicates very poor performance of Private Universities.
- ❖ Among **20** top contributing private universities out of **156**, 'SRM University' occupies **1st** rank with **911 (12.498%)** articles to private universities total.

Council of Scientific and Industrial Research (CSIR) – Scholarly Contribution

- ❖ CSIR is one of the centrally funded premier R&D organizations with a chain of **39** odd institutes/national laboratories located across the country. No two Institutes/Laboratories of CSIR are identical in their R&D areas.

- ❖ **39** institutes/laboratories together have published **7598** papers and received **5547** citations.

Indian Council Medical Research (ICMR) – Scholarly Contribution

- ❖ The Indian Council of Medical Research (ICMR), New Delhi established in **1911**. ICMR is the apex body in India for the formulation, coordination and promotion of biomedical research. It is one of the oldest medical research bodies in the world.
- ❖ ICMR has **23** mission-oriented national institutes located in different parts of India, **4** Regional Medical Research Centre, deals with regional health problems; and **5** Unit/Centre, deals with specific health issues related to food, toxicology, etc.
- ❖ ICMR system published **2383** papers in total and received **3297** citations thereto and its overall C/P is **1.383**. Top **50** authors published **1079** papers and received **1726** citations.

Department of Science and Technology (DST) – Scholarly Contribution

- ❖ Department of Science and Technology is centrally funded apex body to promote and strengthen country's S&T. DST **23** institutes are working in all diversified fields of S&T and they all have contributed **2536** articles/papers and received **2179** citations thereto.

Defence Research and Development Organization (DRDO) – Scholarly Contribution

- ❖ DRDO has **49** institutes/laboratories working in various diversified areas of military technology such as aeronautics, armaments, combat vehicles, electronics, instrumentation engineering systems, missiles, materials, naval systems, advanced computing, simulation and life sciences.
- ❖ DRDO's all **49** laboratories/institutes working different specialized fields have contributed **2098** papers and received **1184** citations.

Indian Council of Agricultural Research (ICAR) – Scholarly Contribution

- ❖ The Indian Council of Agricultural Research (ICAR) is an autonomous organization under the Department of Agricultural Research and Education (DARE), Ministry of Agriculture and Farmers Welfare, Government of India. Formerly known as Imperial Council of Agricultural Research, it was established on **16 July 1929** as a registered society under the Societies Registration Act, **1860** in pursuance of the report of the Royal Commission on Agriculture. ICAR is the apex body for coordinating, guiding and managing research and education in agriculture including horticulture, fisheries and animal sciences in the entire country with **101** institutes and **71** agricultural universities located across the country.

- ❖ ICAR has **101** research institutes working in different general and micro areas of agricultural sciences but as per ICI database out of **101** institutes, **100** institutes have contributed **32307** articles and received **25651** citations thereto.

Chapter 1

Background information

Introduction

The knowledge-base of any society is its intellectual asset and it plays a strategic role in its overall progress and development. For this, availability of vibrant institutional frame and scientific temperament are essential ingredients. India a very old and large country has its glorious past with inherent contradictions to generate and utilize knowledge. In ancient times, there was the *Gurukula* system of education in which only a select band of pupil, rather small segment of society, used to study in teacher's (Guru) house. In this system, students used to stay as long as they wished to or until the *guru* felt that the student had learnt everything. In that era, teaching and learning system was confined to personal domain of a few. Thus the knowledge was not public property for use and accordingly it was not treated as public good.

The evolution path of modern higher education system in India started with the establishment of Madras, Calcutta, and Bombay universities in 1857. After Independence, universal and compulsory education for all children in the age group of 6-14 was ensured by the government of India through Article 45 of the Constitution. Resultantly, as of now over 700 universities or university level institutes and ~500 R&D institutes/laboratories have come up in the country.

Initially, teaching and learning was not the role of universities, they used to conduct examinations but now all is an integral part of university system. Globally, now universities and institutions are being assessed and evaluated based on their infrastructure, ecosystem and research productivity. Accordingly, the students/researchers are making their choice of study/work. The research output in terms of research papers, books, reports, patents, standards, etc. are measurable objects. For about 350 years, journals are the main and major source of research communication and over the period a concept of referred and high impact factor journals has evolved to monitor and maintain the quality standards of publications or research documents or research papers. In higher education and research establishments' publication

counts in refereed journals has become a globally recognized and accepted criterion. Universities and research institutions are in a race of publication of research articles, and that is too in so called refereed international journals; higher the counts of publications and citations received to them, decides their relative superiority among the comity of academic world. So, now at stake is relative placement of universities/institutes in the national and global rankings, the allocation of budgets from governments, national prestige, and the ability to attract best students, faculty and a higher ladder in the pecking order of academic world.

In case of India, while measurement and evaluation is made for ranking purpose, that need to consider the fact, that in majority universities/institutes are teaching institutions and have a limited research mission or profile. Similar kind of situation seems true in the case of global higher education system that is why only about a thousand or so out of the world's 18,000 universities¹ or university level institutes find place in so-called international rankings.

Factually, the measurement of academic and research productivity is not straight forward because the key function of teaching quality is seldom measured adequately. However, research productivity in terms of research papers is easier to measure than other kinds of academic work. National and global rankings count publications/research papers published in journals that are indexed in nationally, globally visible and available indices – such as the Web of Science, Scopus, Indian Citation Index (ICI) and equivalents of respective disciplines. These indices list only a small number of journals of the world and tend to favour English language publications. Also, some of the regulatory and decision making authorities are not very clear in understanding and defining national, international and index journals. However, evaluation and measurement of research productivity needs to take care of the existing fallacies of diverse nature. It is true that one size cannot fit all when it comes to assessing research productivity in particular and academic work in general.

Scope

The scope of this study is to provide a scholarly landscape of Indian universities and institutions of higher education based on 'Indian Citation Index (ICI)' database. Usually, the research output in the form of research articles emanates from academics and research establishments and is communicated mainly through journals. India's 52 per cent research output is in journals published from India and 48 per cent

is in foreign journals². Interestingly, in majority academic or scholarly people of India and may be of elsewhere call such foreign journals as ‘international’ though, there is no such classification. Indian Citation Index (ICI) has been developed for facilitating the inclusion of 52 per cent share of India’s research papers output which was unaccounted for so far for producing comprehensive, complete and realistic research productivity scenario of the country.

Time Span

For the purpose of this report data has been taken from 2007 to 2016, i.e. 10-year period. The time span of 10 years has been considered enough to analyze various trends on different parameters and 10 years data is also sufficient to undertake and develop such analytical studies and reports.

Methodology

A very simple methodology of Data extraction & Retrieval has been used to search and retrieve relevant data from ‘Indian Citation Index (ICI) database.

Data Collection and Organization

The retrieved data is saved in Excel format and the same is analyzed and organized into tables and charts which are self-explanatory in nature.

Limitations

This report is based on ‘Indian Citation Index (ICI)’ database which currently indexes 1000+ journals published from India covering all subject disciplines. ICI does not index journals published from foreign countries even if they publish articles of authors of Indian origin. The data depth of ICI database is 2004 onwards. The data errors if any found in this report may be due to errors in source data, typographical, computational, etc.

Chapter 2

Foreign Research contribution Published in Indian journals

Table 2.1: 25 Top Foreign Countries Based on Research Papers/Articles

Number of Countries = 175; Number of Articles of total Countries = 135041; No. of Citations = 46447

Rank	Country Name	No. of Articles	County wise % share of Research Papers	County wise Citations	Country wise Citation/Paper
1	China	16460	12.189	3687	0.224
2	Iran	14002	10.369	4742	0.339
3	United States of America	13616	10.083	6395	0.47
4	Turkey	6993	5.178	2399	0.343
5	Nigeria	5407	4.004	1595	0.295
6	United Kingdom	4754	3.52	2374	0.499
7	Egypt	4668	3.457	1616	0.346
8	Malaysia	4645	3.44	1683	0.362
9	Saudi Arabia	4402	3.26	1468	0.333
10	South Korea	3750	2.777	1562	0.417
11	Pakistan	2826	2.093	835	0.295
12	Japan	2448	1.813	720	0.294
13	Russia	2439	1.806	665	0.273
14	South Africa	2438	1.805	728	0.299
15	Canada	2228	1.65	971	0.436
16	Indonesia	2119	1.569	759	0.358
17	Australia	2101	1.556	916	0.436
18	Germany	2057	1.523	789	0.384
19	Brazil	2056	1.523	633	0.308
20	Bangladesh	1986	1.471	812	0.409
21	Thailand	1848	1.368	523	0.283
22	Italy	1795	1.329	446	0.248
23	Iraq	1631	1.208	852	0.522
24	France	1540	1.14	498	0.323
25	Algeria	1089	0.806	213	0.196

Based on number of papers published, in 175 foreign countries, top 10 are: China 16460 (12.189% to total foreign contribution) research articles, Iran 14002 (10.369%) papers, USA 13616 (10.083%) papers, Turkey 6993 (5.178%) papers, Nigeria 5407 (4.004%) papers, UK 4754 (3.52%) papers, Egypt 4648 (3.457%) Papers, Malaysia 4645 (3.44%) papers, Saudi Arabia 4402 (3.261%) papers, and South Korea 3750 (2.777%) papers.

Figure 2.1: Foreign Contribution Articles and Citations

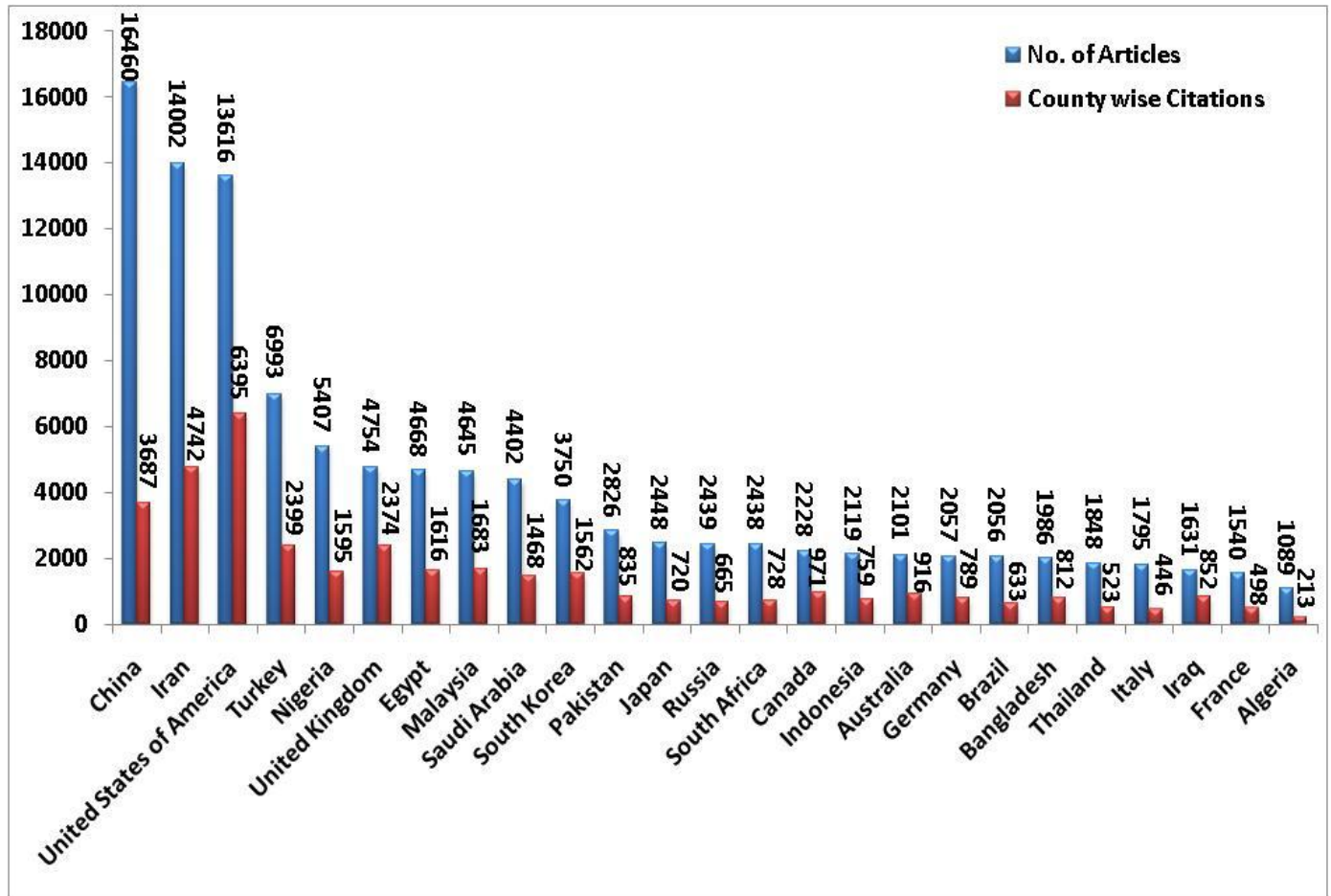


Table 2.2: Distribution of 'Articles' Among Foreign Countries

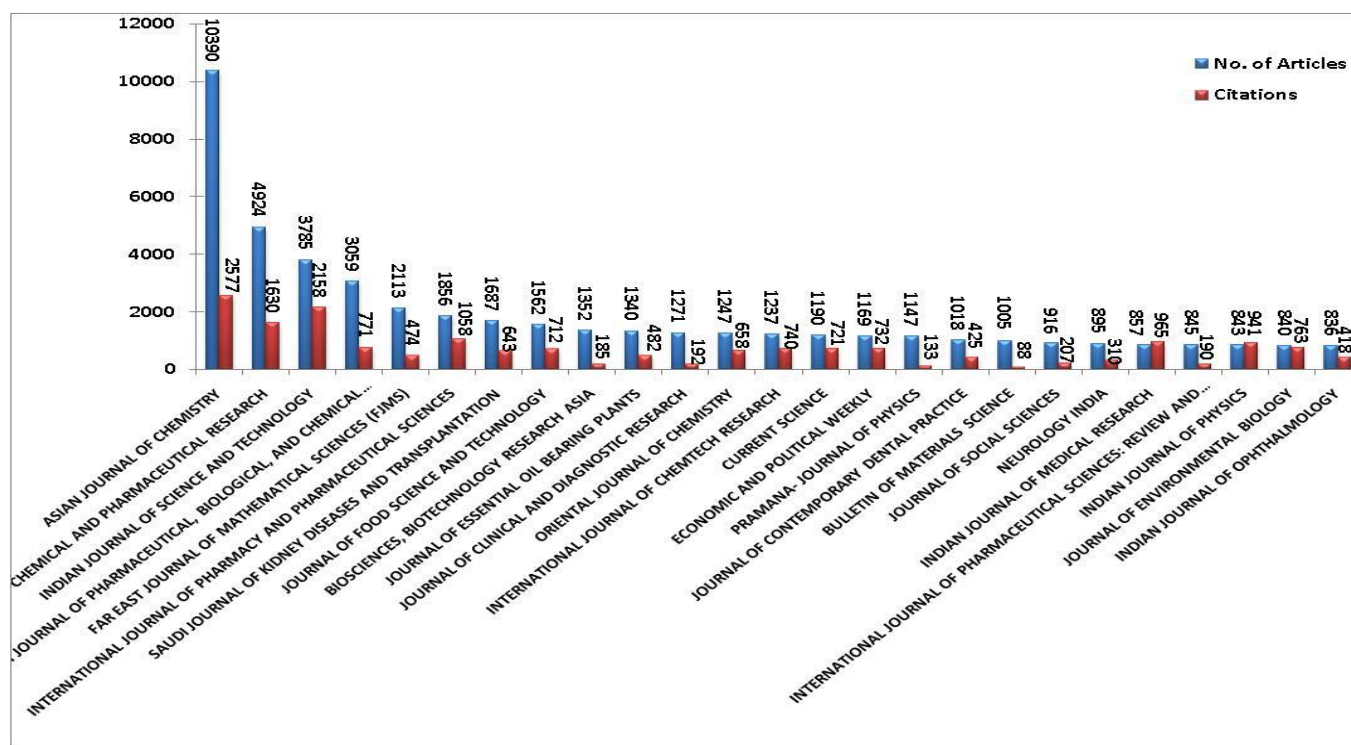
No of Countries	1-5 (2.857%)	1-10 (5.714%)	1-15 (8.571%)	1-20 (11.428%)	1-25 (14.285%)	1-175 (100%)
Articles Share %	41.823	58.276	67.085	75.085	80.937	100

Distribution of articles based on number of countries is: top 05 foreign countries % share is 41.823% articles of total; similarly, top 10 countries share is 58.276% articles; top 15 countries share is 67.085% articles; top 20 countries share is 75.085% articles; top 25 countries share is 80.937% articles; and rest 150 foreign countries share is about 19% articles of the total foreign contribution. Thus, the top 25 foreign

countries distribution of articles as is shown in Table 2.1 looks significant and remaining foreign countries articles contribution is on fringe side. Table 2.2.

Fig 2.2: 25 Top Indian Journals Based on Articles Published from Foreign Countries

Number of Journals = 931; Number of Articles of total Countries = 135041



Total numbers of journals are 931 wherein foreign countries have published articles. Among these 931 journal, 10 top journals based on number of articles published are: 'Asian Journal of Chemistry' 10390 (8.051%) papers published from 94 foreign countries; 'Journal of Chemical and Pharmaceutical Research' 4924 (3.815%) papers published from 93 foreign countries; 'Indian Journal of Science and Technology' 3785 (2.933%) papers published from 91 countries; 'Research Journal of Pharmaceutical, Biological, and Chemical Sciences' 3059 (2.370%) papers published from 84 countries; 'Far East Journal of Mathematical Sciences' 2113 (1.637%) papers published from 79 countries; 'International Journal of Pharmacy and Pharmaceutical Sciences' 1856 (1.438%) papers published from 90 foreign countries; 'Saudi Journal of Kidney Diseases and Transplantation' 1687 (1.307%) papers from 70 countries; 'Journal of Food Science and Technology' 1562 (1.210%) papers from 89 countries; 'Biosciences, Biotechnology Research Asia' 1352 (1.048%) papers from 53 countries; and 'Journal of Essential Oil Bearing Plants' 1340 (1.038%) papers from 91 countries.

Table 2.3 Distribution of Foreign Articles in Top Journals

No of Journals	1-5 (0.537%)	1-10 (1.074%)	1-15 (1.611%)	1-20 (2.158%)	1-25 (2.685%)	1-931 (100%)
Articles Contribution %	18.153	24.117	28.809	32.690	36.043	100

Distribution of foreign articles in top 05, 10, 15, 20, and 25 journals, share of articles are 18.153%, 24.117%, 28.809%, 32.690%, 36.043% respectively and rest are in remaining number of journals.

Table 2.4: Subject wise Articles Published from Foreign Countries

Number of total Subjects = 49; Number of total Countries = 175; Number of total Subject Articles = 168414; Number of total Subjects Citation = 52907

SN	Subjects	No. of Countries	% Share of Countries	Subject Articles	Subject wise % share of Articles	Citations	Subject wise % share of Citations
1	Health Science	160	91.429	35360	20.996	12620	23.853
2	Biological Science	147	84.000	17149	10.183	5921	11.191
3	Social Science	141	80.571	7317	4.345	2403	4.542
4	Pharmacology and Pharmaceutical Science	137	78.286	18081	10.736	6433	12.159
5	Chemistry	132	75.429	21265	12.627	6359	12.019
6	Environmental Science	130	74.286	5141	3.053	1805	3.412
7	Engineering Science and Technology	123	70.286	5825	3.459	1657	3.132
8	General Science and Technology	117	66.857	6534	3.880	3269	6.179
9	Mathematics	116	66.286	5541	3.290	862	1.629
10	Statistics	116	66.286	5063	3.006	824	1.557
11	Agriculture	113	64.571	2951	1.752	807	1.525
12	Botany	113	64.571	2682	1.593	977	1.847
13	Computer Science and Technology	104	59.429	3021	1.794	509	0.962
14	Physics	102	58.286	3685	2.188	1547	2.924
15	Economics	101	57.714	2526	1.500	539	1.019
16	Veterinary Science	101	57.714	2038	1.210	509	0.962
17	Food and Beverage Science	100	57.143	1980	1.176	894	1.690
18	Biotechnology	99	56.571	2813	1.670	443	0.837
19	Management	99	56.571	1952	1.159	254	0.480
20	Education	97	55.429	1787	1.061	266	0.503
21	Earth and Geological Science	94	53.714	1446	0.859	598	1.130
22	Business and Marketing	92	52.571	1208	0.717	263	0.497
23	Material Science	89	50.857	1848	1.097	237	0.448
24	Zoology	89	50.857	1677	0.996	389	0.735
25	Others	82	46.857	1004	0.596	384	0.726

26	Dairying, Dairy, Animals and Animals Produce	71	40.571	620	0.368	130	0.246
27	Astronomy, Astrophysics, Space and Geodesy	69	39.429	719	0.427	136	0.257
28	Anthropology	68	38.857	1033	0.613	252	0.476
SN	Subjects	No. of Countries	% Share of Countries	Subject Articles	Subject wise % share of Articles	Citations	Subject wise % share of Citations
29	Library and Information Science	68	38.857	662	0.393	163	0.308
30	Psychology	68	38.857	932	0.553	378	0.714
31	Arts and Humanities	67	38.286	670	0.398	41	0.077
32	History and Philosophy of Science and Knowledge	58	33.143	324	0.192	271	0.512
33	Pollution	57	32.571	701	0.416	82	0.155
34	Toxicology	54	30.857	288	0.171	35	0.066
35	Oceanography and Marine Science	51	29.143	413	0.245	86	0.163
36	Law	50	28.571	257	0.153	78	0.147
37	Meteorology	49	28.000	300	0.178	166	0.314
38	Forestry	46	26.286	197	0.117	32	0.060
39	Textile	45	25.714	320	0.190	93	0.176
40	Remote Sensing	43	24.571	292	0.173	101	0.191
41	Rural development	43	24.571	142	0.084	19	0.036
42	Fishery	40	22.857	134	0.080	17	0.032
43	Energy and Fuel Science	38	21.714	202	0.120	21	0.040
44	Water	33	18.857	103	0.061	1	0.002
45	Population Studies	31	17.714	97	0.058	17	0.032
46	Domestic Science	22	12.571	87	0.052	18	0.034
47	Telecommunication	12	6.857	21	0.012	0	0.000
48	Nanoscience and Nanotechnology	3	1.714	3	0.002	0	0.000
49	Apiculture	2	1.143	3	0.002	1	0.002

Foreign countries have made contribution in all 49 subject categories of ICI, among them 10 top subject categories are: 'Health Science' 35360 (20.996%) papers from 160 countries and received 12620 citations, followed by 'Biological Science' 17149 (10.183%) papers from 147 countries and received 5921 citations, 'Social Science' 7317 (4.345%) papers from 141 countries and received 2403 citations, 'Pharmacology and Pharmaceutical Science' 18081 (10.736%) papers from 137 countries and received 6433 citations, 'Chemistry' 21265 (12.627%) papers from 132 countries and received 6359 citations, 'Environmental

Science’ 5141 (3.053%) papers from 130 countries and received 1805 citations, ‘Engineering Science and Technology’ 5825 (3.459%) papers from 123 countries and received 1657 citations, ‘General Science and Technology’ 6534 (3.880%) papers from 117 countries and received 3269 citations, ‘Mathematics’ 5541 (3.290%) papers from 116 countries and received 862 citations, and ‘Statistics’ 5063 (3.006%) papers from 116 countries and received 824 citations

Table 2.5: Distribution of Articles and Citations of foreign Countries in Top Journals

No of Subjects	1-5 (10.204%)	1-10 (20.408%)	1-15 (30.612%)	1-20 (40.816%)	1-25 (51.02%)	1-49 (100%)
Articles %	58.886	75.573	84.400	90.676	94.941	100
Citation %	63.765	79.674	87.951	92.422	94.498	100

Table 2.5 shows subject wise distribution of articles and citations of foreign countries in top subjects and accordingly top 05 subjects have 58.886% articles and 63.765% citations; top 10 subjects have 75.573% articles and 79.674% citations; top 15 subjects have 84.400% articles and 87.951% citations; top 20 subjects have 90.676% articles and 92.422% citations; top 25 subjects have 94.941% articles and 94.498% citations, and rest 24 subjects have fringe contribution of foreign countries.

Chapter 3

Indian States: Research Papers Based Performance

Table 3.1: State-wise Research Productivity Based on Articles, Citations & Citation/Paper

SN	State Name	Article	State wise % of Research Papers	Rank A	Citation	Rank C	C/P	Rank C/P
1	Tamil Nadu	57823	12.837	1	30235	1	0.523	22
2	Maharashtra	50564	11.225	2	26955	2	0.533	20
3	Karnataka	42425	9.419	3	24062	3	0.567	11
4	Uttar Pradesh	41645	9.245	4	22987	4	0.552	13
5	Delhi	34276	7.609	5	22667	5	0.661	5
6	West Bengal	22805	5.063	6	10352	6	0.454	30
7	Telangana	19565	4.344	7	10065	8	0.514	23
8	Gujarat	17506	3.886	8	10121	7	0.578	10
9	Andhra Pradesh	17173	3.812	9	7920	10	0.461	29
10	Rajasthan	16231	3.603	10	8860	9	0.546	16
11	Punjab	15161	3.366	11	7374	13	0.486	25
12	Haryana	15045	3.340	12	7448	12	0.495	24
13	Madhya Pradesh	14284	3.171	13	7780	11	0.545	17
14	Kerala	13200	2.930	14	6126	15	0.464	28
15	Uttarakhand	12288	2.728	15	6896	14	0.561	12
16	Orissa	8055	1.788	16	4320	16	0.536	18
17	Jammu and Kashmir	7075	1.571	17	3146	20	0.445	32
18	Assam	6382	1.417	18	3521	18	0.552	14
19	Himachal Pradesh	6308	1.400	19	3452	19	0.547	15
20	Chandigarh (UT)	5983	1.328	20	3624	17	0.606	7
21	Chhattisgarh	4504	1.000	21	1703	23	0.378	35
22	Puducherry (UT)	4504	1.000	21	2357	21	0.523	21
23	Bihar	4410	0.979	23	1986	22	0.450	31
24	Jharkhand	3999	0.888	24	1549	24	0.387	34
25	Meghalaya	1765	0.392	25	1035	25	0.586	9
26	Manipur	1532	0.340	26	732	28	0.478	27
27	Goa	1280	0.284	27	848	27	0.663	4
28	Tripura	1019	0.226	28	427	30	0.419	33
29	Arunachal Pradesh	914	0.203	29	583	29	0.638	6
30	Sikkim	884	0.196	30	850	26	0.962	2

31	Nagaland	708	0.157	31	342	32	0.483	26
32	Mizoram	538	0.119	32	288	33	0.535	19
33	Andaman and Nicobar Islands (UT)	519	0.115	33	387	31	0.746	3
34	Dadra and Nagar Haveli (UT)	39	0.009	34	13	35	0.333	36
35	Daman and Diu (UT)	25	0.006	35	15	34	0.600	8
36	Lakshadweep (UT)	6	0.001	36	8	36	1.333	1

Legend: A = Article; C = Citation; C/P = Citation/Paper

Among 36 states and union territories of India, top 10 states based on research papers/articles & citations are: 'Tamil Nadu' (1st rank) published 57823 (12.827%) papers & received 30235 citations, followed by 'Maharashtra' (2nd rank) with 50564 (11.225%) papers & received 26955 citations, 'Karnataka' (3rd rank) with 42425 (9.419%) papers & received 24062 citations, 'Uttar Pradesh' (4th rank) with 41645 (9.245%) papers and received 22987 citations, 'Delhi' (5th rank) with 34276 (7.609%) papers and received 22667 citations, 'West Bengal' (6th rank) with 22805 (5.063%) papers & received 10352 citations, 'Telangana' (7th rank) with 19565 (4.344%) papers & received 10065 citations 'Gujarat' (8th rank) with 17506 (3.886%) papers & received 10121 citations, 'Andhra Pradesh' (9th rank) with 17173 (3.812%) papers & received 7920 citations, and 'Rajasthan' (10th rank) with 16231 (3.603%) papers & received 8860 citations.

Fig. 3.1 Research Papers and Citations of Indian States

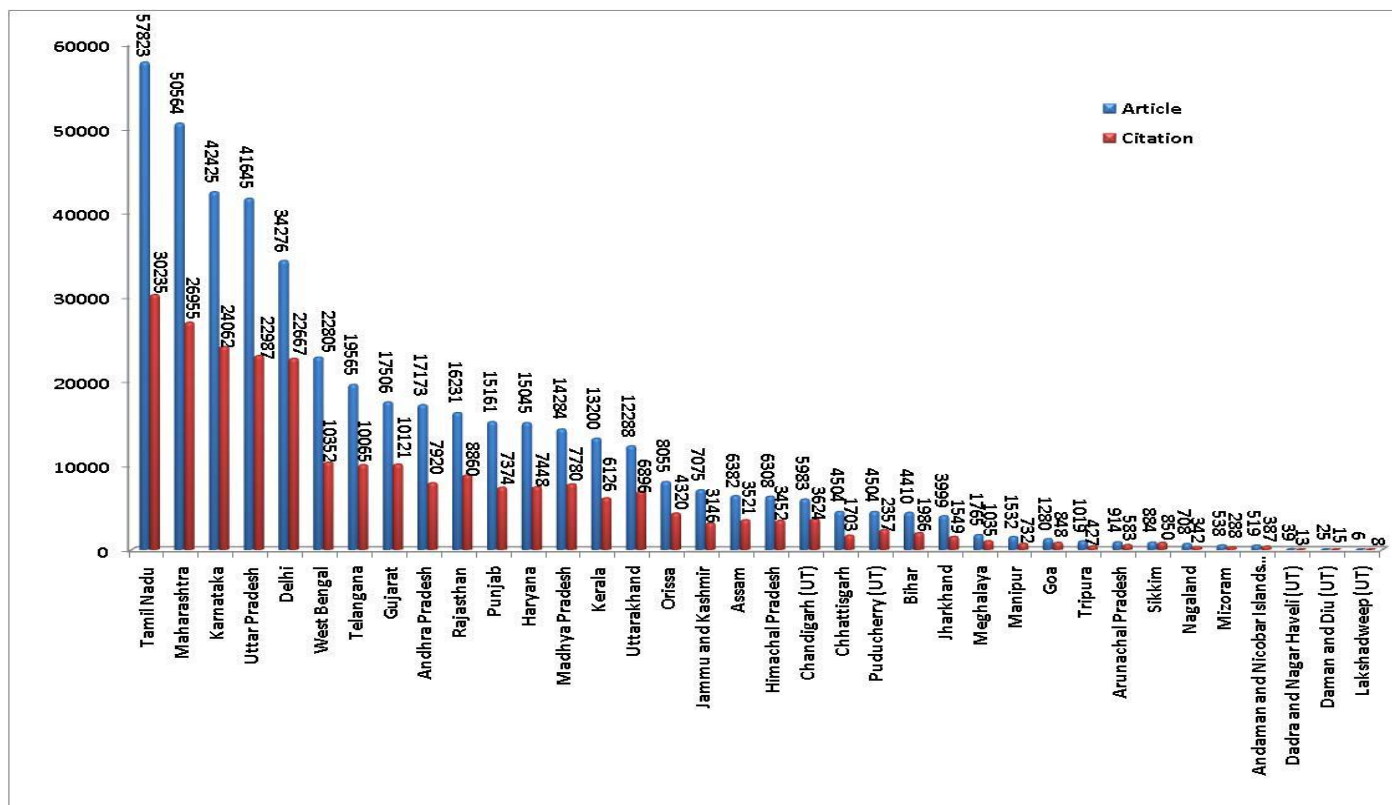


Table 3.2: Distribution of Articles Contribution in Group of Top Contributing Indian States

No of States	1-5 (13.889%)	1-10 (27.778%)	1-15 (41.667%)	1-20 (55.556%)	1-25 (69.444%)	1-36 (100%)
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Articles Contribution %	50.36	71.045	86.580	94.084	98.343	100
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Table 3.2 shows that top 05 (13.889%) states contribution is 50.336% to all states & UTs total; top 10 (27.778%) states contribution is 71.045% to all states & UTs total; top 15 (61.667%) states contribution is 86.580% to all states & UTs total; top 25 (69.444%) states contribution is 98.343% to all states & UTs total and rest states and union territories contribution is less than 2% to all states contribution.

Table 3.3: Rank Order of States Based on Institutions count, vis-à-vis to their Articles, Citations, Articles/Institute and Citations/Institute										
States	Institute Count	Rank IC	Article	Rank A	Citations	Rank C	A/Inst	Rank A/Inst	C/Inst	Rank C/Inst
Maharashtra	1995	1	65540	2	35781	2	32.852	25	17.935	24
Tamil Nadu	1540	2	75984	1	39345	1	49.34	8	25.549	10
Karnataka	1101	3	53080	3	30243	3	48.211	9	27.469	7
Uttar Pradesh	1020	4	49166	4	26927	5	48.202	10	26.399	9
Delhi	769	5	42181	5	29331	4	54.852	6	38.142	2
Telangana	767	6	23952	7	12041	8	31.228	26	15.699	28
West Bengal	763	7	29601	6	13931	6	38.796	15	18.258	23
Gujarat	662	8	21961	8	13351	7	33.174	23	20.168	19
Andhra Pradesh	614	9	21842	9	10053	10	35.573	19	16.373	27
Madhya Pradesh	566	10	17413	11	9499	11	30.765	27	16.783	26
Kerala	502	11	15328	14	7309	15	30.534	28	14.56	29
Rajasthan	452	12	18871	10	10571	9	41.75	13	23.387	14
Haryana	384	13	17145	13	8757	12	44.648	12	22.805	15
Punjab	338	14	17254	12	8302	13	51.047	7	24.562	13
Orissa	285	15	9883	16	5355	16	34.677	21	18.789	20
Uttarakhand	236	16	13882	15	7872	14	58.822	4	33.356	4
Bihar	222	17	5238	21	2527	22	23.595	33	11.383	32
Assam	195	18	7481	18	4118	17	38.364	16	21.118	17
Chhattisgarh	179	19	5069	22	1864	23	28.318	31	10.413	33
Himachal Pradesh	149	20	6745	19	3689	19	45.268	11	24.758	11
Jammu and Kashmir	131	21	8042	17	3588	20	61.389	3	27.389	8
Jharkhand	121	22	4391	24	1660	24	36.289	18	13.719	30
Chandigarh (UT)	83	23	6301	20	3831	18	75.916	1	46.157	1
Puducherry (UT)	83	23	4849	23	2545	21	58.422	5	30.663	6
Manipur	50	25	1749	26	877	28	34.98	20	17.54	25
Goa	48	26	1308	27	884	26	27.25	32	18.417	21
Meghalaya	48	26	1825	25	1077	25	38.021	17	22.438	16
Tripura	40	28	1152	28	480	30	28.8	29	12	31
Sikkim	26	29	892	30	882	27	34.308	22	33.923	3
Arunachal Pradesh	23	30	901	29	566	29	39.174	14	24.609	12

Andaman and Nicobar Islands (UT)	19	31	544	32	400	31	28.632	30	21.053	18
Mizoram	16	32	530	33	293	33	33.125	24	18.313	22
Nagaland	11	33	702	31	338	32	63.818	2	30.727	5
Dadra and Nagar Haveli (UT)	2	34	30	34	13	34	15	34	6.5	34
Daman and Diu (UT)	2	34	19	35	13	34	9.5	35	6.5	34

Legend: A = Article; C = Citation; C/P = Citation/Paper; A/Inst = Article/Institute; C/Inst = Citation/institute; IC = Institute Count

Table 3.3 shows that among 36 Indian states and union territories; top 10 states based on number of institutes are: 'Maharashtra' 1st rank with 1995 institutes, 'Tamil Nadu' 2nd rank with 1540 institutes, 'Karnataka' 3rd rank with 1101 institutes, 'Uttar Pradesh' 4th rank with 1020 institutes, 'Delhi' 5th rank with 769 institutes, 'Telangana' 6th rank with 767 institutes, 'West Bengal' 7th rank with 763 institutes, 'Gujarat' 8th rank with 662 institutes, 'Andhra Pradesh' 9th rank with 614 institutes, and 'Madhya Pradesh' 10 rank with 566 institutes.

Chapter 4

Indian Institute of Technology (IITs): Research Papers Based Performance

Table 4.1: IITs Published 10 and > 10 Articles

SN	IITs	Articles	IITs wise % of Research Papers	Citations	IITs wise % of Citations	C/P
1	IIT Kharagpur	1273	16.627	628	17.953	0.493
2	IIT Delhi	1206	15.752	887	25.357	0.735
3	IIT Roorkee	1201	15.687	535	15.294	0.445
4	IIT Madras	916	11.964	271	7.747	0.296
5	IIT Bombay	871	11.377	375	10.720	0.431
6	IIT Kanpur	619	8.085	203	5.803	0.328
7	IITISM Dhanbad	517	6.753	158	4.517	0.306
8	IIT Varanasi	467	6.100	231	6.604	0.495
9	IIT Guwahati	377	4.924	169	4.831	0.448
10	IIT Hyderabad	73	0.954	14	0.400	0.192
11	IIT Bhubaneswar	37	0.483	13	0.372	0.351
12	IIT Patna	25	0.327	4	0.114	0.160
13	IIT Indore	24	0.313	3	0.086	0.125
14	IIT Gandhinagar	19	0.248	4	0.114	0.211
15	IIT Ropar	16	0.209	2	0.057	0.125

Legend: C/P = Citation/Paper

Among 23 IITs, 15 IITs have contributed > or = 10 articles are: 'IIT Kharagpur' 1273 (16.627% to IITs total) articles, 'IIT Delhi' 1206 (15.752%) articles, 'IIT Roorkee' 1201 (15.687%) articles, 'IIT Madras' 916 (11.964%) articles, 'IIT Bombay' 871 (11.377%) articles, 'IIT Kanpur' 619 (8.085%) articles, 'IITISM Dhanbad' 517 (6.753%) articles, 'IIT Varanasi' 467 (6.100%) articles, 'IIT Guwahati' 377 (4.924%) articles, 'IIT Hyderabad' 73 (0.954%) articles, 'IIT Bhubaneswar' 37 (0.483%) articles, 'IIT Patna' 25 (0.327%)

articles, 'IIT Indore' 24 (0.313%) articles, 'IIT Gandhinagar' 19 (0.248%) articles, and 'IIT Ropar' 16 (0.209%) articles.

Fig. 4.1 Top 15 IITs Research Papers and Citations

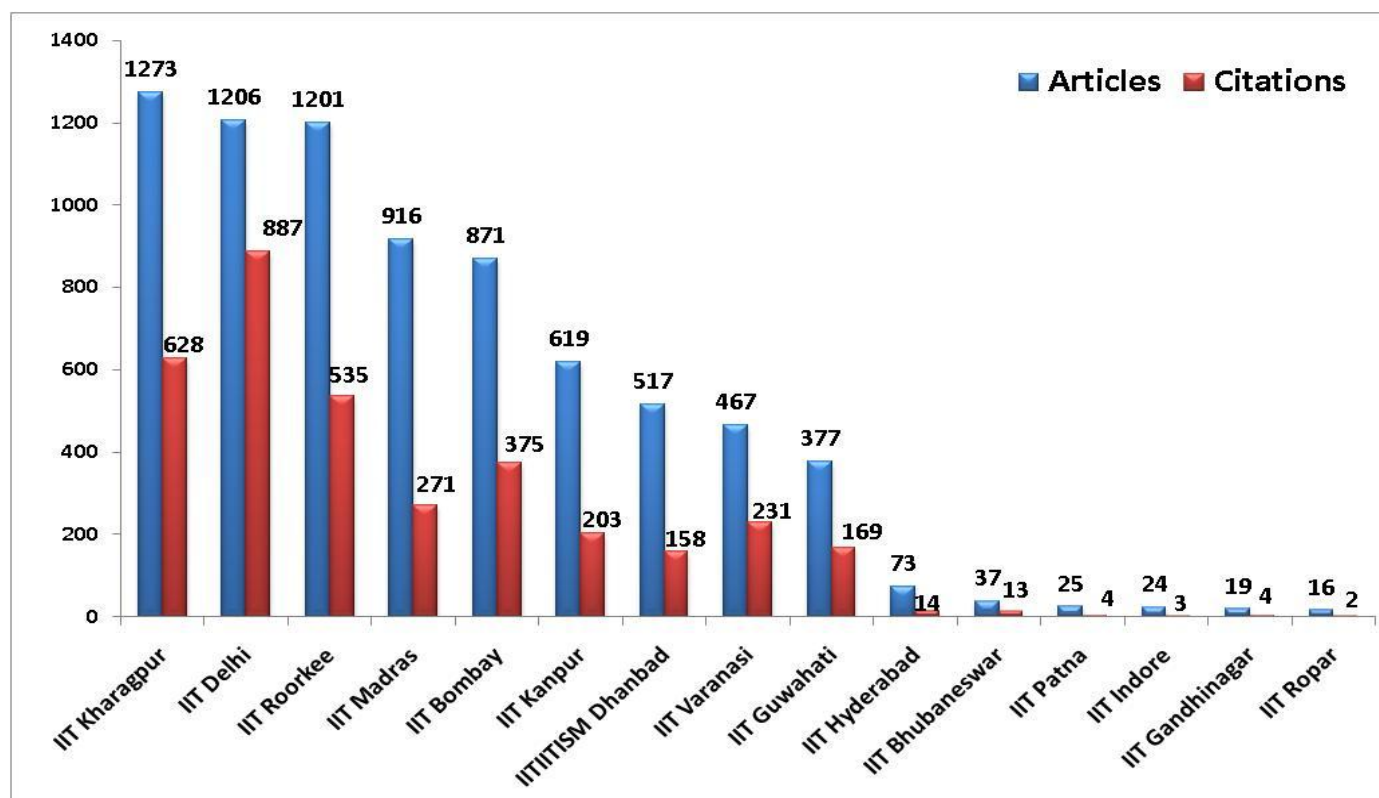


Table 4.2: IITs wise Count of Top Authors based on Articles Published						
IITs	Author	Author Count	Article	IITs wise % of Research Papers	Citations	IITs wise % of Citations
IIT Delhi	Singh Bhim	24	28	25.016	9	38.085
	Yadav Surendra S		25		12	
	Das A		23		18	
	Kothari V K		22		15	
	Vasudevan Padma		22		21	
	Sharma Satyawati		21		25	
	Gupta Deepti		20		19	
	Jain P K		20		9	
	Singh Kamlesh		18		11	
	Behera B K		17		12	
	Naik S N		17		31	
	Deshmukh S G		16		12	
	Koul Shiban K		15		4	
	Kumar M Jagadesh		15		4	
	Mohanty U C		15		16	
	Ishtiaque S M		13		3	
	Basu Ananjan		12		3	
	Ganguli Ashok K		12		2	
	Gupta N K		12		1	
	Shankar Ravi		12		5	
	Sushil		12		72	
	Bhal Kanika T		11		5	
	Hanmandlu M		10		11	
	Khera Reetika		10		38	
	Total	24	398		358	
IIT Roorkee	Kumar Pradeep	25	28	21.119	21	15.532
	Kumar Praveen		28		4	
	Garg R D		24		14	

	Rangnekar Santosh		16		9	
	Jain Madhu		15		9	
	Kumar Vinod		15		9	
	Garg P K		13		1	
	Singh Bhupinder		13		3	
	Singh S P		13		3	
	Chakrapani G J		12		16	
	Chandra Satish		12		1	
	Majumder C B		12		1	
	Mondal Arun		12		2	
	Ghosh P K		11		1	
	Kundu Sananda		11		2	
	Sawant V A		11		4	
	Agrawal Rajat		10		10	
	Chandra K		10		0	
	Kumar P		10		2	
	Pal K		10		10	Continued
	Rastogi Rajat		10		2	
	Sharma Apurbba Kumar		10		0	Continue on next page
	Singh Sandeep		10		7	
	Singh Yogendra		10		4	
	Tripathi S K		10		11	
	Total		336		146	
IIT Madras	Viswanathan B		31		11	
	Rao B N		27		3	
	Balasubramaniam Krishnan		24		2	
	Dodagoudar G R		23		9	
	Menon Devdas		21		4	
	Rao G Appa		19		3	
	Prasad A Meher		15		2	
	Santhanam Manu		13		2	
	Sengupta Amlan K	17	13	16.97	5	7.234
	Chidambaram M		11		2	
	Kumar G Suresh		11		3	
	Robinson R G		11		3	
	Swarup K S		11		0	
	Boominathan A		10		8	
	Ganesan V		10		1	
	Muraleedharan V R		10		8	
	Sundararajan T		10		2	
	Total		270		68	
IIT Kharagpur	Suar Damodar		24		18	
	Pradhan S C		20		9	
	Goswami T K	15	14	11.942	29	15.957
	Gupta Anil K		14		10	
	Mitra Analava		14		30	

	Adhikari Basudam		11		0	
	Behera M D		11		8	
	Choudhary RNP		11		2	
	Mamtani Manish A		11		12	
	Bhattacharya D		10		18	
	Ghosh Parthasarathi		10		1	
	Goel Sudha		10		6	
	Nandi T K		10		0	
	Pradhan Rabindra Kumar		10		1	
	Srivastav P P		10		6	
	Total		190		150	
IIT Bombay	Atrey M D		36		5	
	Kotha Sambasivarao		17		1	
	Singh T N		16		4	
	Jothiprakash V	11	15	9.868	10	10.106
	Balakrishna Maravanji S		11		3	
	Banerjee Santanu		11		17	Continued
	Ravi B		11		Continue on next page	
	Gupta Meenakshi		10		0	
	Padhi Puja		10		1	
	Saraswati Pratul Kumar		10		31	
	Syamal Arun		10		9	
	Total		157		95	
IITISM Dhanbad	Singh Gurdeep		43		16	
	Paul Biswajit		16		4	
	Maiti S K	6	11	6.411	1	3.404
	Rai Arvind Kumar		11		4	
	Singh Prasoon Kumar		11		4	
	Kumar V		10		3	
	Total		102		32	
IIT Kanpur	Balasubramaniam R		25		55	
	Ghosh A K	4	19	4.274	2	6.809
	Rai Durgesh C		13		5	
	Goswami Debabrata		11		2	
	Total		68		64	
IIT Varanasi	Kumar Rajesh		12		7	
	Srivastava Pradeep	4	11	2.703	5	1.596
	Dwivedi B N		10		0	
	Sharma Neeraj		10		3	
	Total		43		15	
IIT Guwahati	Goyal Arun		17		4	
	Saikia Arupjyoti	2	10	1.697	8	1.277
	Total		27		12	

Table 4.2 shows IIT wise number of articles, authors with names, citations & % share. Rank order based on articles counts of 'Authors' who have published > or = 10 articles are: 'IIT Delhi' 24 authors published 398 (25.016%) articles, 'IIT Roorkee' 25 authors published 336 (21.110%) articles, 'IIT Madras' 17 authors published 270 (16.970%) articles, 'IIT Kharagpur' 15 authors published 190 (11.942%) articles, 'IIT Bombay' 11 authors published 157 (9.868%) articles, 'IITISM Dhanbad' 6 authors published 102 (6.411%) articles, 'IIT Kanpur' 4 authors published 68 (4.274%) articles, 'IIT Varanasi' 4 authors published 43 (2.703%) articles, 'IIT Guwahati' 2 authors published 27 (1.697%) articles.

Table 4.3: IIT wise Top Journals based on Article Published						
IITs	Journals Name	Number of Journals	Article	IITs wise % of Papers	Citation	IITs wise % of Citations
IIT Roorkee	CURRENT SCIENCE		58	18.429	68	15.152
	INDIAN HIGHWAYS		48		6	
	JOURNAL OF GEOLOGICAL SOCIETY OF INDIA		37		22	
	JOURNAL OF STRUCTURAL ENGINEERING		34		1	
	IETE JOURNAL OF RESEARCH		28		10	
	INDIAN CONCRETE JOURNAL		28		12	
	JOURNAL OF THE INDIAN SOCIETY OF REMOTE SENSING		28		23	
	INTERNATIONAL JOURNAL OF ENGINEERING SCIENCE AND TECHNOLOGY		23		0	
	SADHANA - ACADEMY PROCEEDINGS IN ENGINEERING SCIENCES		22		8	
	BULLETIN OF MATERIALS SCIENCE		21		5	
	JOURNAL OF EARTH SYSTEM SCIENCE		21		15	
	INDIAN GEOTECHNICAL JOURNAL		20		7	

	JOURNAL OF SCIENTIFIC & INDUSTRIAL RESEARCH		20		9	
	DEFENCE SCIENCE JOURNAL		19		4	
	OPSEARCH		19		4	
	GLOBAL BUSINESS REVIEW		18		17	
	HIMALAYAN GEOLOGY		17		7	
	INTERNATIONAL JOURNAL OF INFORMATION PROCESSING		17		1	
	JOURNAL OF THE INSTITUTION OF ENGINEERS (INDIA): CIVIL ENGINEERING DIVISION BOARD		17		6	
	HYDROLOGY JOURNAL		16		3	
	INDIAN JOURNAL OF PURE & APPLIED PHYSICS		16		10	
	INDIAN JOURNAL OF CHEMICAL TECHNOLOGY		15		11	
	JOURNAL ON MECHANICAL ENGINEERING		14		0	
	IETE TECHNICAL REVIEW		13		11	
	JOURNAL OF ENVIRONMENTAL SCIENCE & ENGINEERING		13		3	Continued
	JOURNAL OF THE INSTITUTION OF ENGINEERS (INDIA): ELECTRICAL ENGINEERING DIVISION BOARD		13		1	Continue on next page
	PRAMANA- JOURNAL OF PHYSICS		13		1	
	GLOBAL JOURNAL OF FLEXIBLE SYSTEMS MANAGEMENT		12		31	
	INDIAN FOUNDRY JOURNAL		12		3	
	INDIAN JOURNAL OF ENGINEERING & MATERIALS SCIENCES		12		2	
	INDIAN JOURNAL OF RADIO & SPACE PHYSICS		12		3	
	INDIAN JOURNAL OF SCIENCE AND TECHNOLOGY		12		10	
	JOURNAL OF GEOMATICS		12		1	
	JOURNAL OF INDIAN WATER WORKS ASSOCIATION		12		1	
	JOURNAL OF WIND AND ENGINEERING		12		1	
	INDIAN WELDING JOURNAL		11		1	
	PROCEEDINGS OF THE INDIAN NATIONAL SCIENCES ACADEMY - PART A: PHYSICAL SCIENCES		10		2	
Total		37	725		320	

IIT Delhi	INDIAN JOURNAL OF FIBRE & TEXTILE RESEARCH		122		115	
	GLOBAL JOURNAL OF FLEXIBLE SYSTEMS MANAGEMENT		59		150	
	JOURNAL OF SCIENTIFIC & INDUSTRIAL RESEARCH		55	17.514	60	28.93
	IETE JOURNAL OF RESEARCH		52		25	
	CURRENT SCIENCE		48		104	
	ECONOMIC AND POLITICAL WEEKLY		45		65	
	PROCEEDINGS OF THE INDIAN NATIONAL SCIENCES ACADEMY - PART A: PHYSICAL SCIENCES		36		0	
	DEFENCE SCIENCE JOURNAL		31		11	
	JOURNAL OF CHEMICAL SCIENCE		26		3	
	IETE TECHNICAL REVIEW		24		9	
	SADHANA - ACADEMY PROCEEDINGS IN ENGINEERING SCIENCES		24		1	
	INDIAN CHEMICAL ENGINEER		20		1	
	ADVANCES IN VIBRATION ENGINEERING		19		4	
	ASIAN JOURNAL OF CHEMISTRY		15		8	
	BULLETIN OF MATERIALS SCIENCE		15		9	
	JOURNAL OF THE INSTITUTION OF ENGINEERS (INDIA): ELECTRICAL ENGINEERING DIVISION BOARD		14		1	
	IETE JOURNAL OF EDUCATION		13		5	
	INDIAN CONCRETE JOURNAL (THE)		13		10	
	INDIAN JOURNAL OF PURE & APPLIED PHYSICS		13		12	
	VIKALPA: JOURNAL FOR DECISION MAKERS		13		13	
	INDIAN GEOTECHNICAL JOURNAL		12		1	
	INDIAN JOURNAL OF ENVIRONMENTAL PROTECTION		10		2	
	JOURNAL OF THE INSTITUTION OF ENGINEERS (INDIA): SERIES B		10		2	
Total		23	689		611	
IIT Kharagpur	CURRENT SCIENCE		68	16.268	54	18.229
	JOURNAL OF FOOD SCIENCE AND TECHNOLOGY		40		43	
	JOURNAL OF GEOLOGICAL SOCIETY OF INDIA		36		70	

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	JOURNAL OF MINES METALS & FUELS	35	3
	BULLETIN OF MATERIALS SCIENCE	31	5
	INDIAN JOURNAL OF CRYOGENICS	31	1
	JOURNAL OF EARTH SYSTEM SCIENCE	26	29
	SADHANA - ACADEMY PROCEEDINGS IN ENGINEERING SCIENCES	25	6
	JOURNAL OF AGRICULTURAL ENGINEERING	22	10
	JOURNAL OF CHEMICAL SCIENCE	21	2
	JOURNAL OF AEROSPACE SCIENCES AND TECHNOLOGIES	20	7
	INDIAN JOURNAL OF PHYSICS	19	13
	INDIAN GEOTECHNICAL JOURNAL	17	10
	PROCEEDINGS OF THE INDIAN NATIONAL SCIENCES ACADEMY - PART A: PHYSICAL SCIENCES	17	4
	PSYCHOLOGICAL STUDIES	17	14
	IETE JOURNAL OF RESEARCH	16	2
	INDIAN MINING & ENGINEERING JOURNAL	16	0
	OPSEARCH	16	5
	INDIAN FOUNDRY JOURNAL	15	7
	INTERNATIONAL JOURNAL OF CHEMICAL SCIENCES	15	0
	BEVERAGE AND FOOD WORLD	13	4
	INDIAN HIGHWAYS	13	3
	PRAMANA- JOURNAL OF PHYSICS	13	3
	INDIAN JOURNAL OF ENGINEERING & MATERIALS SCIENCES	12	2
	INTERNATIONAL JOURNAL OF AGRICULTURE, ENVIRONMENT AND BIOTECHNOLOGY	12	7
	ENVIRONMENT AND ECOLOGY	11	4
	JOURNAL OF HUMAN ECOLOGY	11	48
	JOURNAL OF STRUCTURAL ENGINEERING	11	0
	JOURNAL OF THE INDIAN CHEMICAL SOCIETY	11	4
	INDIAN CONCRETE JOURNAL	10	2
	JOURNAL OF SCIENTIFIC & INDUSTRIAL RESEARCH	10	15
	JOURNAL OF THE INDIAN SOCIETY OF REMOTE SENSING	10	8

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Continue on next page

Total		32	640		385		
IIT Madras	JOURNAL OF STRUCTURAL ENGINEERING		77	13.498	9	7.055	
	INDIAN CONCRETE JOURNAL		50		25		
	JOURNAL OF CHEMICAL SCIENCE		43		8		
	INDIAN GEOTECHNICAL JOURNAL		42		11		
	SADHANA - ACADEMY PROCEEDINGS IN ENGINEERING SCIENCES		37		5		
	INDIAN JOURNAL OF CHEMISTRY - SECTION A		32		11		
	JOURNAL OF AEROSPACE SCIENCES AND TECHNOLOGIES		31		11		
	JOURNAL OF NON-DESTRUCTIVE TESTING & EVALUATION		28		2		
	CURRENT SCIENCE		27		12		
	DEFENCE SCIENCE JOURNAL		21		4		
	INDIAN CHEMICAL ENGINEER		20		4		
	ECONOMIC AND POLITICAL WEEKLY		18		9		
	ADVANCES IN VIBRATION ENGINEERING		16		8		
	INDIAN JOURNAL OF ENGINEERING & MATERIALS SCIENCES		16		2		
					Continued		
JOURNAL OF EARTH SYSTEM SCIENCE		14		Continue on next page			
BULLETIN OF MATERIALS SCIENCE		13		6			
IETE TECHNICAL REVIEW		13		8			
INDIAN HIGHWAYS		11		3			
JOURNAL OF THE INSTITUTION OF ENGINEERS (INDIA): CIVIL ENGINEERING DIVISION BOARD		11		4			
PROCEEDINGS OF THE INDIAN NATIONAL SCIENCES ACADEMY - PART A: PHYSICAL SCIENCES		11		1			
Total		20	531		149		
IIT Bombay	CURRENT SCIENCE		64	12.176	58	12.642	
	JOURNAL OF CHEMICAL SCIENCE		58		14		
	INDIAN JOURNAL OF CRYOGENICS		42		5		
	JOURNAL OF EARTH SYSTEM SCIENCE		39		57		
	JOURNAL OF GEOLOGICAL SOCIETY OF INDIA		37		50		

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	SADHANA - ACADEMY PROCEEDINGS IN ENGINEERING SCIENCES		32		5	
	PRAMANA- JOURNAL OF PHYSICS		24		5	
	INDIAN GEOTECHNICAL JOURNAL		22		3	
	ECONOMIC AND POLITICAL WEEKLY		19		15	
	INDIAN JOURNAL OF CHEMISTRY SECTION B - ORGANIC INCLUDING MEDICINAL		18		0	
	JOURNAL OF THE INDIAN CHEMICAL SOCIETY		18		6	
	JOURNAL OF AEROSPACE SCIENCES AND TECHNOLOGIES		14		3	
	PROCEEDINGS OF THE INDIAN NATIONAL SCIENCES ACADEMY - PART A: PHYSICAL SCIENCES		14		4	
	IETE JOURNAL OF RESEARCH		13		1	
	BULLETIN OF MATERIALS SCIENCE		11		6	
	INDIAN FOUNDRY JOURNAL		11		14	
	INDIAN JOURNAL OF CHEMISTRY - SECTION A		11		6	
	INDIAN JOURNAL OF ENVIRONMENTAL PROTECTION		11		4	
	INDIAN JOURNAL OF INDUSTRIAL RELATIONS		11		9	
	JOURNAL OF THE INDIAN SOCIETY OF REMOTE SENSING		10		2	
	Total	20	479		267	
IIT Kanpur	CURRENT SCIENCE		69		48	
	PRAMANA- JOURNAL OF PHYSICS		43		5	
	JOURNAL OF CHEMICAL SCIENCE		36		11	
	INDIAN JOURNAL OF HISTORY OF SCIENCE		23		35	
	BULLETIN OF MATERIALS SCIENCE		22		2	
	JOURNAL OF AEROSPACE SCIENCES AND TECHNOLOGIES		20		0	
	INDIAN JOURNAL OF CHEMISTRY - SECTION A		19		5	
	SADHANA - ACADEMY PROCEEDINGS IN ENGINEERING SCIENCES		19		0	
	DIFFERENTIAL EQUATIONS AND DYNAMICAL SYSTEMS		15		6	
	DEFENCE SCIENCE JOURNAL		13		3	

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	PROCEEDINGS OF THE INDIAN ACADEMY OF SCIENCES: MATHEMATICAL SCIENCES		12		1	
	PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, INDIA, SECTION A - PHYSICAL SCIENCES		12		6	
	INDIAN CONCRETE JOURNAL		11		5	
	JOURNAL OF THE INDIAN SOCIETY OF REMOTE SENSING		10		10	
Total		14	324		137	
IITISM Dhanbad	JOURNAL OF MINES METALS & FUELS		78	6.151	25	4.498
	INDIAN MINING & ENGINEERING JOURNAL		36		6	
	JOURNAL OF GEOLOGICAL SOCIETY OF INDIA		24		11	
	INDIAN JOURNAL OF ENVIRONMENTAL PROTECTION		22		1	
	CURRENT SCIENCE		18		24	
	JOURNAL OF EARTH SYSTEM SCIENCE		15		7	
	INDIAN JOURNAL OF SCIENCE AND TECHNOLOGY		13		11	
	INTERNATIONAL JOURNAL OF ENGINEERING SCIENCE AND TECHNOLOGY		13		4	
	INDIAN JOURNAL OF MARKETING		12			
	JOURNAL OF INDIAN GEOPHYSICAL UNION		11		1	
Total		10	242		95	
IIT Guwahati	JOURNAL OF CHEMICAL SCIENCE		19	3.94	3	3.788
	INDIAN JOURNAL OF PHYSICS		17		8	
	INTERNATIONAL JOURNAL OF CHEMICAL SCIENCES		17		1	
	IETE JOURNAL OF RESEARCH		16		3	
	IETE TECHNICAL REVIEW		16		34	
	CURRENT SCIENCE		13		19	
	ECONOMIC AND POLITICAL WEEKLY		13		4	
	CURRENT TRENDS IN BIOTECHNOLOGY AND PHARMACY		12		1	
	INDIAN GEOTECHNICAL JOURNAL		11		2	
	SADHANA - ACADEMY PROCEEDINGS IN ENGINEERING SCIENCES		11		2	

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	PRAMANA- JOURNAL OF PHYSICS		10		3	
Total		11	155		80	
IIT Varanasi	BULLETIN OF MATERIALS SCIENCE		23		5	
	INTERNATIONAL JOURNAL OF ENGINEERING SCIENCE AND TECHNOLOGY		23		6	
	CURRENT SCIENCE		15		3	
	ASIAN JOURNAL OF CHEMISTRY		11		3	
	JOURNAL OF SCIENTIFIC & INDUSTRIAL RESEARCH		11		6	
	INDIAN JOURNAL OF CHEMICAL TECHNOLOGY		10		7	
	INDIAN JOURNAL OF PHYSICS		10		27	
	INDIAN MINING & ENGINEERING JOURNAL		10		1	
	JOURNAL OF MINES METALS & FUELS		10		1	
	PRAMANA- JOURNAL OF PHYSICS		10		2	
Total		10	133		61	
IIT Hyderabad	JOURNAL OF CHEMICAL SCIENCE	1	16	0.407	7	0.331
Total		1	16		7	

Table 4.3 shows IIT wise name and number of journals published 10 or more articles are: 'IIT Roorkee' have published 10 and more than 10 articles in 37 journals with 18.429% & 15.152% share of articles and citations, followed by 'IIT Delhi' have published 10 and more than 10 articles in 23 journals with 17.514% & 28.930% share of articles and citations, 'IIT Kharagpur' have published 10 and more than 10 articles in 32 journals with 16.268% & 18.229% share of articles and citations, 'IIT Madras' have published 10 and more than 10 articles in 20 journals with 13.498% & 7.055% share of articles and citations, 'IIT Bombay' have published 10 and more than 10 articles in 20 journals with 12.176% & 12.642% share of articles and citations, 'IIT Kanpur' have published 10 and more than 10 articles in 14 journals with 8.236% & 6.487% share of articles and citations, 'IITISM Dhanbad' have published 10 and more than 10 articles in 10 journals with 6.151% & 4.498% share of articles and citations, 'IIT Guwahati' have published 10 and more than 10 articles in 11 journals with 3.940% & 3.788% share of articles and citations, 'IIT Varanasi' have published 10 and more than 10 articles in 10 journals with 3.381% and 2.888% share of articles and citations, and 'IIT Hyderabad' have published 10 and < 10 articles in 01 journal with 0.407% and 0.331% share of articles and citations.

Table 4.4: Top 20 Subject Categories of IITs Based on Articles Published						
Subjects	IITs	Number of Institute	Articles	IITs wise % of Papers	Citations	IITs wise % of Citations
Engineering Science and Technology	IIT Bhubaneswar		489	26.455	100	13.985
	IIT Bombay		488		109	
	IIT Delhi		384		90	
	IIT Guwahati		331		87	
	IIT Hyderabad		262		51	
	IIT Kanpur		146		33	
	IIT Kharagpur		139		26	
	IIT Madras		134		10	
	IIT Roorkee		127		52	
	IIT Varanasi		20		4	
	IITISM Dhanbad		16		3	
Total		11	2536		565	
Chemistry	IIT Bombay		130	8.752	31	5.446
	IIT Delhi		123		22	

	IIT Guwahati		118		26	
	IIT Hyderabad		109		20	
	IIT Kanpur		86		17	
	IIT Kharagpur		71		32	
	IIT Madras		70		44	
	IIT Roorkee		66		5	
	IIT Varanasi		46		16	
	IITISM Dhanbad		20		7	
Total		10	839		220	
General Science and Technology	IIT Delhi		184	8.471	186	14.381
	IIT Roorkee		130		96	
	IIT Kharagpur		121		78	
	IIT Kanpur		102		54	
	IIT Bombay		96		64	
	IIT Madras		78		33	
	IITISM Dhanbad		42		35	
	IIT Varanasi		32		10	
	IIT Guwahati		27		25	
Total		9	812		581	
Earth and Geological Science	IIT Delhi		260	8.325	11	11.139
	IITISM Dhanbad		183		53	
	IIT Kharagpur		158		119	
	IIT Roorkee		151		74	
	IIT Bombay		128		132	
	IIT Madras		62		20	
	IIT Varanasi		50		11	
	IIT Kanpur		26		12	
	IIT Guwahati		14		18	
Total		9	798		450	Continued
Material Science	IITISM Dhanbad		135	5.039	Continue on next page	
	IIT Kharagpur		120		18	2.500
	IIT Varanasi		71		10	
	IIT Roorkee		42		8	
	IIT Kanpur		36		5	
	IIT Madras		36		8	
	(IIT Delhi		23		13	
	IIT Bombay		20		6	
Total		8	483		101	
Physics	IIT Bombay		73	4.684	25	4.851
	IIT Delhi		63		20	
	IIT Guwahati		59		20	
	IIT Kanpur		57		15	
	IIT Kharagpur		47		32	
	IIT Madras		43		36	
	IIT Roorkee		39		17	
	IIT Varanasi		35		12	

	IITISM Dhanbad		33		19	
Total		9	449		196	
Environmental Science	IIT Bombay		85	3.703	75	4.158
	IIT Delhi		66		33	
	IIT Guwahati		57		11	
	IIT Kanpur		50		28	
	IIT Kharagpur		28		7	
	IIT Madras		20		3	
	IIT Roorkee		19		8	
	IIT Varanasi		17		2	
	IITISM Dhanbad		13		1	
Total		9	355		168	
Biological Science	IIT Bombay		62	3.568	44	5.817
	IIT Delhi		59		77	
	IIT Guwahati		52		65	
	IIT Kanpur		37		2	
	IIT Kharagpur		36		9	
	IIT Madras		30		7	
	IIT Roorkee		29		19	
	IIT Varanasi		21		6	
	IITISM Dhanbad		16		6	
Total		9	342		235	
Social Science	IIT Delhi		79	3.359	81	4.53
	IIT Kharagpur		61		35	
	IIT Bombay		52		21	
	IIT Madras		43		16	
	IIT Guwahati		34		14	
	IIT Kanpur		29		9	
	IIT Roorkee		24		7	
Total		7	322		183	Continued
Management	IIT Delhi		118	3.119	Continue on next page	
	IIT Kharagpur		49		23	6.337
	IIT Roorkee		49		42	
	IIT Bombay		29		11	
	IIT Madras		24		5	
	IITISM Dhanbad		17		0	
	IIT Kanpur		13		3	
Total		7	299		256	
Mathematics	IIT Roorkee		52	2.128	19	1.089
	IIT Kanpur		45		16	
	IIT Kharagpur		32		5	
	IIT Bombay		26		1	
	IIT Madras		22		2	
	IIT Varanasi		15		0	
	IIT Delhi		12		1	
Total		7	204		44	

Statistics	IIT Bombay		51	2.013	19	1.089
	IIT Delhi		43		16	
	IIT Kanpur		32		5	
	IIT Kharagpur		24		1	
	IIT Madras		20		2	
	IIT Roorkee		12		1	
	IIT Varanasi		11		0	
Total		7	193		44	
Health Science	IIT Bombay		44	1.951	64	3.985
	IIT Delhi		34		12	
	IIT Kanpur		33		48	
	IIT Kharagpur		22		5	
	IIT Madras		20		15	
	IIT Roorkee		18		4	
	IIT Varanasi		16		13	
Total		7	187		161	
Pharmacology and Pharmaceutical Science	IIT Bombay		63	1.836	85	3.688
	IIT Delhi		23		23	
	IIT Guwahati		19		20	
	IIT Kharagpur		18		2	
	IIT Madras		16		3	
	IIT Roorkee		14		4	
	IIT Varanasi		12		2	
	IITISM Dhanbad		11		10	
Total		8	176		149	
Agriculture	IIT Kharagpur		83	1.836	21	1.238
	IIT Roorkee		36		3	
	IIT Delhi		23		19	
	IIT Bombay		20		5	
	IIT Madras		14		2	
Total		5	176		50	Continued
Computer Science and Technology	IIT Delhi		56	1.794	Continue on next page	
	IIT Guwahati		27		8	0.792
	IIT Kharagpur		22		4	
	IIT Madras		22		4	
	IIT Roorkee		19		3	
	IIT Varanasi		15		6	
	IITISM Dhanbad		11		0	
Total		7	172		32	
Astronomy, Astrophysics, Space and Geodesy	IIT Bombay		36	1.523	15	0.891
	IIT Delhi		30		9	
	IIT Kanpur		23		1	
	IIT Kharagpur		21		3	
	IIT Madras		13		5	
	IIT Roorkee		13		3	
	IIT Varanasi		10		0	

Total		7	146		36	
Textile	IIT Delhi		137	1.429	117	2.896
Total		1	137		117	
Energy and Fuel Science	IIT Kharagpur		81	1.346	25	0.718
	IIT Varanasi		38		3	
	IITISM Dhanbad		10		1	
Total		3	129		29	
Business and Marketing	IIT Bombay		38	1.325	25	1.485
	IIT Delhi		29		14	
	IIT Kharagpur		25		14	
	IIT Roorkee		21		5	
	IITISM Dhanbad		14		2	
Total		5	127		60	
Economics	IIT Bombay		23	1.168	7	0.619
	IIT Delhi		22		8	
	IIT Kanpur		19		2	
	IIT Kharagpur		17		2	
	IIT Madras		17		1	
	IITISM Dhanbad		14		5	
Total		6	112		25	

In ICI, 49 subject categories are there and accordingly subject wise spread and work done by number of IITs and share of their articles & citations are: 'Engineering Science and Technology' spread is in 11 IITs with 26.455% & 13.985% share of research papers and citations, 'Chemistry' spread is in 10 IITs with 8.752% & 5.446% share of articles and citations, 'General Science and Technology' spread is in 09 IITs with 8.471% & 14.381% share of articles and citations, 'Earth and Geological Science' spread is in 09 IITs with 8.325% and 11.139% share of articles and citations, 'Material Science' spread is in 08 IITs with 5.039% & 2.500% share of articles and citations, 'Physics' spread is in 09 IITs with 4.684% & 4.851% share of articles and citations, 'Environmental Science' spread is in 09 IITs with 3.703% and 4.158% share of articles and citations, 'Biological Science' spread is in 09 IITs with 3.568% and 5.817% share of articles and citations, 'Social Science' spread is in 07 IITs with 3.359% and 4.530% share of articles and citations, 'Management' spread is in 07 IITs with 3.119% and 6.337% share of articles and citations, 'Mathematics' spread is in 07 IITs with 2.128% and 1.089% share of articles and citations, 'Statistics' spread is in 07 IITs with 2.013% and 1.089% share of articles and citations, 'Health Science' spread is in 07 IITs with 1.951% and 3.985% share of articles and citations, 'Pharmacology and Pharmaceutical Science' spread is in 08 IITs with 1.836% and 3.688% share of articles and citations, 'Agriculture' spread is in 05 IITs with 1.836% and 1.238% share of articles and citations, 'Computer Science and Technology' spread is in 07 IITs with 1.794% and 0.792% share of articles and citations, 'Astronomy, Astrophysics, Space and Geodesy' spread is in 07 IITs with 1.523% and 0.891% share of articles and citations, 'Energy and Fuel Science' spread is in 03 IITs with 1.346% and 0.718% share of articles and Citations, 'Business and Marketing' spread is in 05 IITs with 1.325% and 1.485% share of articles and citations, 'Economics' spread is in 06 IITs with 1.168% and 0.619% share of articles and citations.

Chapter 5

National Institute of Technology (NITs): Research Papers Based Performance

Table 5.1: NITs Published 10 and > 10 Research Papers						
SN	NITs	Articles	NITs wise % of Research Papers	Citations	NITs wise % of Citations	C/P
1	NIT Rourkela	354	8.897	119	11.280	0.3362
2	NIT Tiruchirappalli	326	8.193	101	9.573	0.3098
3	NIT Kurukshetra	311	7.816	95	9.005	0.3055
4	MANIT Bhopal	310	7.791	117	11.090	0.3774

5	NIT Karnataka	292	7.339	94	8.910	0.3219
6	NIT Durgapur	256	6.434	97	9.194	0.3789
7	NIT Warangal	252	6.333	47	4.455	0.1865
8	SVNIT Surat	249	6.258	44	4.171	0.1767
9	VNIT Nagpur	229	5.755	38	3.602	0.1659
10	MNNIT Allahabad	200	5.026	39	3.697	0.1950
11	MNIT Jaipur	185	4.649	26	2.464	0.1405
12	NIT Calicut	167	4.197	44	4.171	0.2635
13	BRANIT Jalandhar	161	4.046	34	3.223	0.2112
14	NIT Hamirpur	155	3.895	65	6.161	0.4194
15	NIT Raipur	154	3.870	30	2.844	0.1948
16	NIT Jamshedpur	90	2.262	8	0.758	0.0889
17	NIT Agartala	86	2.161	10	0.948	0.1163
18	NIT Srinagar	64	1.608	18	1.706	0.2813
19	NIT Silchar	61	1.533	18	1.706	0.2951
20	NIT Patna	44	1.106	3	0.284	0.0682
21	NIT Manipur	14	0.352	4	0.379	0.2857

Legend: C/P = Citation/Paper

Table 5.1 shows that 21 NITs out of 31 have published < and = 10 articles and accordingly their rank order is: 'NIT Rourkela' 354 (8.897%) articles, 'NIT Tiruchirappalli' 326 (8.193%) articles, 'NIT Kurukshetra' 311 (7.816%) articles, 'MANIT Bhopal' 310 (7.791%) articles, 'NIT Karnataka' 292 (7.339%) articles, 'NIT Durgapur' 256 (6.434%) articles, 'NIT Warangal' 252 (6.333%) articles, 'SVNIT Surat' 249 (6.258%) articles, 'VNIT Nagpur' 229 (5.755%) articles, 'MNNIT Allahabad' 200 (5.026%) articles with, 'MNIT Jaipur' 185 (4.649%) articles, 'NIT Calicut' 167 (4.197%) articles, 'BRANIT Jalandhar' 161 (4.046%) articles, 'NIT Hamirpur' 155 (3.895%) articles, 'NIT Raipur' 154 (3.870%) articles, 'NIT Jamshedpur' 90 (2.262%) articles, 'NIT Agartala' 86 (2.161%) articles, 'NIT Srinagar' 64 (1.608%) articles, 'NIT Silchar' 61 (1.533%) articles, 'NIT Patna' 44 (1.106%) articles and 'NIT Manipur' 14 (0.352%) articles.

Fig. 5.1 Top 21 NITs Research Papers and Citations

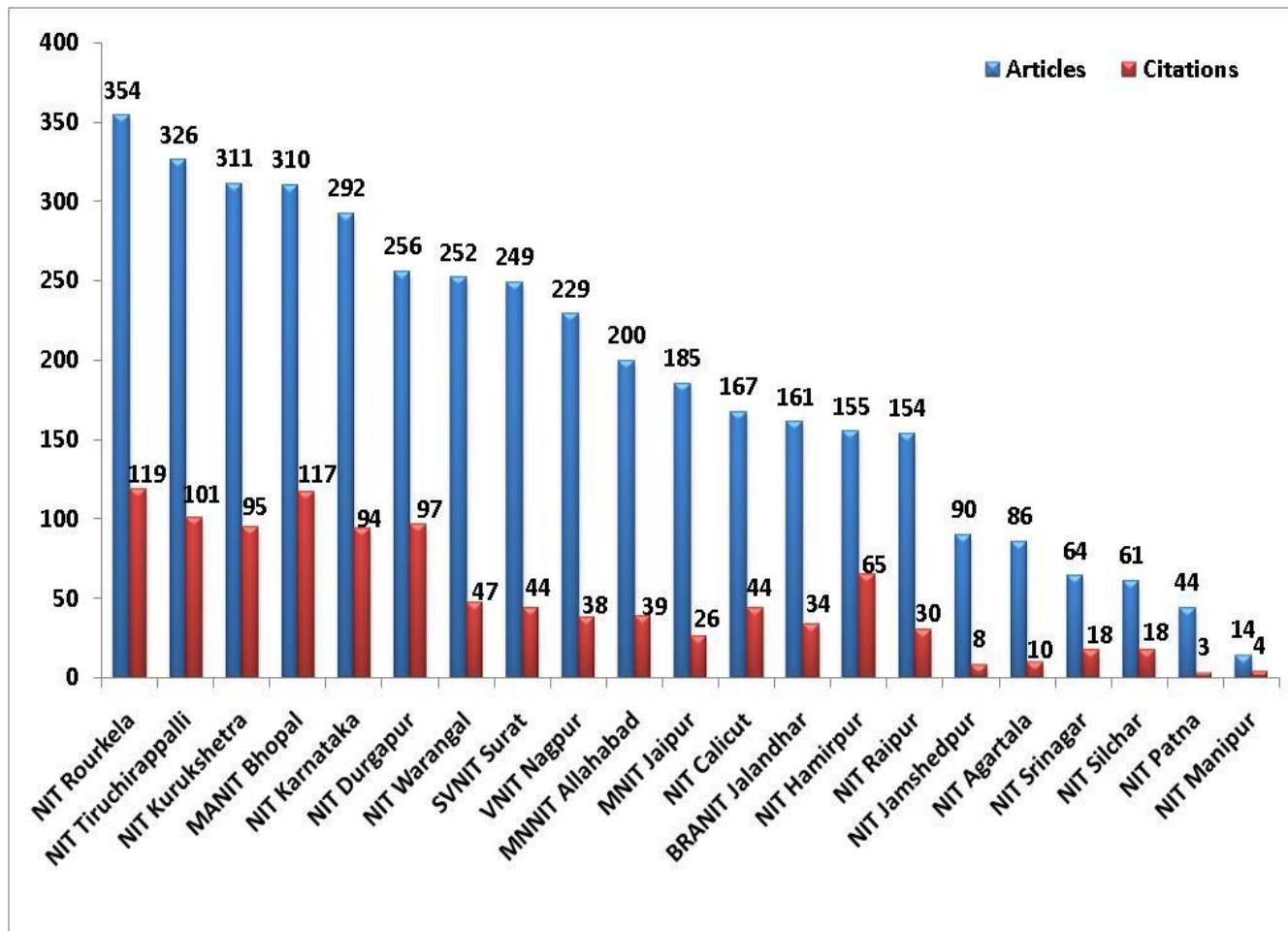


Table 5.2: NIT Wise Top Authors Based on Articles Published

NITs	Author	Author Count	Article	NITs wise % share of Research Papers	Citations	NITs wise % share of Citations
NIT Rourkela	Das Sarat Kumar		21	15.882	9	14.623
	Jayanthu S		15		2	
	Mishra Subash Chandra		13		3	
	Panigrahi S		12		13	
	Roy G K		10		1	
	Tripathy D P		10		3	
Total		6	81		31	
NIT Kurukshetra	Chakarvarti S K		17	12.745	5	12.264
	Chauhan R P		14		3	
	Khanduja Dinesh		12		7	
	Kumar D		12		8	
	Tewari P C		10		3	
Total		5	65		26	
NIT Calicut	Ganesan N		21	12.549	11	16.038
	Indira P V		12		7	
	Kuzhiveli Biju T		11		0	
	Selvam V K					
	Manicka		10		12	
	Selvaraju N		10		4	
Total		5	64		34	
NIT Tiruchirappalli	Anantharaman N		14	9.608	9	11.321
	Asokan P		13		14	
	Kumanan S		11		1	
	Shanmugam S		11		0	
Total		4	49		24	
MNIT Jaipur	Chaurasia S P		16	7.647	1	1.415
	Gupta A B		13		2	
	Sharma Ashok		10		0	
Total		3	39		3	
VNIT Nagpur	Gupta Rajesh		15	7.451	3	2.358
	Thote N R		12		1	
	Wasewar Kailas L		11		1	
Total		3	38		5	
MANIT Bhopal	Dixit Savita		13	7.255	21	15.566
	Pardasani K R		13		9	
	Suresh S		11		3	
Total		3	37		33	

NITs	Author	Author Count	Article	NITs wise % share of Research Papers	Citations	NITs wise % share of Citations
NIT Raipur	Keshav Amit		12	6.471	3	1.887
	Pradhan Manoj		11		0	
	Verma M K		10		1	
Total		3	33		4	
MNNIT Allahabad	Dutta P K		12	4.706	7	3.774
	Srivastava R K		12		1	
Total		2	24		8	
NIT Durgapur	Sahoo S		21	4.118	12	5.66
Total		1	21		12	
SVNIT Surat	Channiwala S A		10	3.922	3	1.415
	Solanki C H		10		0	
Total		2	20		3	
NIT Hamirpur	Singha A S		16	3.137	27	12.736
Total		1	16		27	
NIT Agartala	Ghoshal Dibyendu		13	2.549	1	0.472
Total		1	13		1	
BRANIT Jalandhar	Mehra Rohit		10	1.961	1	0.472
Total		1	10		1	

Table 5.2 shows an account of NIT wise name and number of authors published < & = 10 papers. These are: 'NIT Rourkela' 06 authors published 81 (15.882%) articles, received 31 (14.623%) citations, 'NIT Kurukshetra' 05 authors published 65 (12.745%) articles, received 26 (12.264%) citations, 'NIT Calicut' 05 authors 64 (12.549%) articles, and received 34 (16.038%) citations, 'NIT Tiruchirappali' 04 authors published 49 (9.608%) articles, and received 24 (11.321%) citations, 'MNIT Jaipur' 03 authors published 39 (7.647%) articles, and received 03 (1.415%) citations, 'VNIT Nagpur' 03 authors published 38 (7.451%) articles, and received 05 (2.358%) citations, 'MANIT Bhopal' 03 authors published 37 (7.255%) articles, and received 33 (15.566%) citations, 'NIT Raipur' 03 authors published 33 (6.471%) articles, and received 04 (1.887%) citations, 'MNNIT Allahabad' 02 authors published 24 (4.706%) articles, and received 08 (3.774%) citations, 'NIT Durgapur' 01 author published 21 (4.118%) articles, and received 12 (5.660%) citations, 'SVNIT Surat' 02 authors published 20 (3.922%) articles, and received 03 (1.415%) citations, 'NIT Hamirpur' 01 author published 16 (3.137%) articles, and received 27 (12.736%) citations, 'NIT Agartala' 01 author published 13 (2.549%) articles, and received 01 (0.472%) citation, and 'BRANIT Jalandhar' 01 author published 10 (1.961%) articles, and 01 (0.472%) citation.

Table 5.3: NIT wise Top Journals based on Articles published

NITs	Journals	Number of journals	Article	NITs wise Journals % of Papers	Citation	NITs wise Journals % of Citations
NIT Tiruchirappalli	INDIAN JOURNAL OF ENGINEERING & MATERIALS SCIENCES	8	24	13.176	1	12.5
	INTERNATIONAL JOURNAL OF APPLIED ENGINEERING RESEARCH		17		2	
	INTERNATIONAL JOURNAL OF CHEMTECH RESEARCH		14		0	
	INTERNATIONAL JOURNAL OF ENGINEERING SCIENCE AND TECHNOLOGY		12		8	
	INTERNATIONAL JOURNAL OF MATERIALS SCIENCES		12		9	
	JOURNAL OF SCIENTIFIC & INDUSTRIAL RESEARCH		12		7	
	MANUFACTURING TECHNOLOGY TODAY		11		2	
	W R I JOURNAL		10		0	
Total		8	112		29	
MANIT Bhopal	INDIAN JOURNAL OF SCIENCE AND TECHNOLOGY	4	42	11.882	10	18.966
	INTERNATIONAL JOURNAL OF CHEMTECH RESEARCH		29		17	
	INTERNATIONAL JOURNAL OF ENGINEERING SCIENCE AND TECHNOLOGY		18		11	
	INTERNATIONAL JOURNAL ON COMPUTER SCIENCE AND ENGINEERING		12		6	
Total		4	101		44	
NIT Rourkela	BULLETIN OF MATERIALS SCIENCE		47	11.176	9	14.655
	INDIAN JOURNAL OF PHYSICS		18		14	

	INDIAN MINING & ENGINEERING JOURNAL		16		6	Continued
	JOURNAL OF MINES METALS & FUELS		14		5	Continue on next page
Total		4	95		34	
NIT Karnataka	INDIAN FOUNDRY JOURNAL		18	10.118	0	5.603
	INDIAN HIGHWAYS		15		1	
	INDIAN JOURNAL OF CHEMICAL TECHNOLOGY		15		6	
	INTERNATIONAL JOURNAL OF INFORMATION PROCESSING		15		1	
	JOURNAL OF CENTRAL POWER RESEARCH INSTITUTE		13		5	
	JOURNAL OF MINES METALS & FUELS		10		0	
Total		6	86		13	
VNIT Nagpur	INDIAN MINING & ENGINEERING JOURNAL		23	8.471	4	7.759
	JOURNAL OF ENVIRONMENTAL SCIENCE & ENGINEERING		23		2	
	JOURNAL OF INDIAN WATER WORKS ASSOCIATION		15		12	
	JOURNAL ON FUTURE ENGINEERING AND TECHNOLOGY		11		0	
Total		4	72		18	
NIT Kurukshetra	ASIAN JOURNAL OF CHEMISTRY		22	8.353	12	11.207
	INDIAN JOURNAL OF PURE & APPLIED PHYSICS		22		6	
	INTERNATIONAL JOURNAL OF APPLIED ENGINEERING RESEARCH		14		6	

	INTERNATIONAL JOURNAL OF ENGINEERING SCIENCE AND TECHNOLOGY		13		2	
Total		4	71		26	Continued
NIT Calicut	INDIAN JOURNAL OF CRYOGENICS		26	7.176	0	5.603
	JOURNAL OF SCIENTIFIC & INDUSTRIAL RESEARCH		14		0	
	JOURNAL OF STRUCTURAL ENGINEERING		11		2	
	JOURNAL OF THE INSTITUTION OF ENGINEERS (INDIA)		10		3	
Total		5	61		13	
SVNIT Surat	INDIAN JOURNAL OF CRYOGENICS		23	6.353	0	1.293
	INTERNATIONAL JOURNAL OF APPLIED ENGINEERING RESEARCH		16		2	
	JOURNAL OF CENTRAL POWER RESEARCH INSTITUTE		15		1	
Total		3	54		3	
NIT Raipur	INDIAN JOURNAL OF SCIENCE AND TECHNOLOGY		21	5.529	4	4.31
	INDIAN MINING & ENGINEERING JOURNAL		16		5	
	INTERNATIONAL JOURNAL OF CHEMTECH RESEARCH		10		1	
Total		3	47		10	
NIT Warangal	IETE JOURNAL OF EDUCATION		12	3.882	1	5.172
	INDIAN JOURNAL OF CHEMISTRY SECTION B		11		10	
	INDIAN JOURNAL OF SCIENCE AND TECHNOLOGY		10		1	
Total		3	33		12	
MNIT Jaipur	INDIAN FOUNDRY JOURNAL		16	3.765	1	0.862
	NATURE ENVIRONMENT &		16		1	

Continue on next page

	POLLUTION TECHNOLOGY					
Total		2	32		2	
NIT Durgapur	INDIAN JOURNAL OF SCIENCE AND TECHNOLOGY		13	3.059	6	2.586
	PHYSICS EDUCATION		13		0	Continued
Total		2	26		Continue on next page	
NIT Jamshedpur	INDIAN JOURNAL OF SCIENCE AND TECHNOLOGY		15	3.059	0	1.724
	JOURNAL OF METALLURGY AND MATERIALS SCIENCE		11		4	
Total		2	26		4	
NIT Agartala	INDIAN JOURNAL OF SCIENCE AND TECHNOLOGY		12	1.412	1	0.431
Total		1	12		1	
NIT Hamirpur	BULLETIN OF MATERIALS SCIENCE	1	10	1.176	15	6.466
Total		1	10		15	

Table 5.3 gives NIT wise number of top journals with names based on articles, citations & % share thereof: 'NIT Tiruchirappalli' 08 journals have 13.176% & 12.500% share of articles & citations, 'MANIT Bhopal' 04 journals have 11.882% & 18.966% share of articles and citations, 'NIT Rourkela' 04 journals have 11.176% & 14.655% share of articles & citations, 'NIT Karnataka' 06 journals have 10.118% & 5.603% share of articles & citations, 'VNIT Nagpur' 04 journals have 8.471% & 7.759% share of articles & citations, 'NIT Kurukshetra' 04 journals have 8.353% & 11.207% share of articles & citations, 'NIT Calicut' 05 journals have 7.176% & 5.603% share of articles & citations, 'SBNIT Surat' 03 journals have 6.353% & 1.293% share of articles and citations, 'NIT Raipur' 03 journals have 5.529% & 4.310% share of articles & citations, 'NIT Warangal' 03 journals have 3.882% & 5.172% share of articles & citations, 'MNIT Jaipur' 02 journals have 3.765% & 0.862% share of articles and citations, 'NIT Durgapur' 02 journals have 3.059% & 2.586% share of articles & citations, 'NIT Jamshedpur' 02 journals have 3.059% & 1.724% share of articles & citations, 'NIT Agartala' 01 journal has 1.412% & 0.431% share of articles & citations and 'NIT Hamirpur' 01 journal has 1.176% & 6.466% share of articles & citations.

Table 5.4: NITs Performance Based on Subject Wise Articles						
Subjects	NITs	No of NITs	Article	NITs wise % of Research Papers	Citations	NITs wise % of Citations
Engineering Science and Technology	VNIT Nagpur	20	175	41.925	31	30.832
	NIT Tiruchirappalli		170		48	
	MANIT Bhopal		159		56	
	NIT Rourkela		157		34	
	NIT Karnataka		146		26	
	NIT Kurukshetra		141		28	
	SVNIT Surat		141		8	
	NIT Warangal		114		21	
	NIT Calicut		112		32	
	NIT Durgapur		84		28	
	NIT Hamirpur		82		10	
	MNIT Jaipur		76		10	
	NIT Raipur		69		6	
	MNNIT Allahabad		63		12	
	BRANIT Jalandhar		60		12	
	NIT Jamshedpur		40		3	
	NIT Silchar		31		0	
	NIT Agartala		28		6	
	NIT Srinagar		20		5	
	NIT Patna		14		2	
Total		20	1882		378	
Chemistry	BRANIT Jalandhar	20	62	12.787	22	19.494
	MNIT Jaipur		53		34	
	MANIT Bhopal		51		22	
	MNNIT Allahabad		46		25	
	NIT Agartala		44		22	
	NIT Calicut		41		4	
	NIT Durgapur		39		51	
	NIT Hamirpur		35		7	
	NIT Jamshedpur		34		6	
	NIT Karnataka		30		6	
	NIT Kurukshetra		28		9	
	NIT Patna		28		4	
	NIT Raipur		18		21	
	NIT Rourkela		16		3	
	NIT Tiruchirappalli		16		1	

	NIT Warangal		12		0	
	SVNIT Surat		11		0	
	VNIT Nagpur		10		2	
Total		18	574		239	
Material Science	MANIT Bhopal		97	7.752	32	8.238
	MNNIT Allahabad		43		8	
	NIT Hamirpur		37		4	Continued
	NIT Jamshedpur		29		4	
	NIT Karnataka		24		Continue on next page	
	NIT Kurukshetra		22		2	
	NIT Raipur		20		25	
	NIT Rourkela		19		0	
	NIT Tiruchirappalli		17		0	
	NIT Warangal		15		9	
	SVNIT Surat		14		8	
	VNIT Nagpur		11		1	
Total		12	348		101	
General Science and Technology	BRANIT Jalandhar		42	6.46	45	11.011
	MANIT Bhopal		29		7	
	MNNIT Allahabad		26		19	
	NIT Agartala		23		10	
	NIT Calicut		23		6	
	NIT Durgapur		22		4	
	NIT Jamshedpur		21		13	
	NIT Karnataka		20		2	
	NIT Kurukshetra		17		11	
	NIT Raipur		16		1	
	NIT Rourkela		15		7	
	NIT Tiruchirappalli		14		5	
	NIT Warangal		12		4	
	SVNIT Surat		10		1	
Total		14	290		135	
Computer Science and Technology	BRANIT Jalandhar		31	4.923	7	2.936
	MANIT Bhopal		29		9	
	MNNIT Allahabad		25		0	
	NIT Calicut		22		4	
	NIT Durgapur		21		2	
	NIT Hamirpur		19		3	
	NIT Karnataka		18		0	
	NIT Kurukshetra		18		0	
	NIT Rourkela		16		5	
	NIT Tiruchirappalli		11		3	
	SVNIT Surat		11		3	
Total		11	221		36	
Environmental Science	BRANIT Jalandhar		27	4.433	3	4.976

	MNIT Jaipur		25		12	
	MANIT Bhopal		22		17	
	MNNIT Allahabad		21		6	
	NIT Durgapur		21		8	
	NIT Karnataka		19		1	
	NIT Kurukshetra		15		0	
	NIT Rourkela		14		5	
	NIT Tiruchirappalli		13		7	
	SVNIT Surat		11		1	Continued
	VNIT Nagpur		11			Continue on next page
Total		11	199		61	
Earth and Geological Science	NIT Karnataka		78	4.366	25	3.426
	NIT Kurukshetra		38		3	
	NIT Raipur		32		8	
	NIT Rourkela		28		5	
	NIT Warangal		10		0	
	VNIT Nagpur		10		1	
Total		6	196		42	
Physics	BRANIT Jalandhar		33	3.653	19	4.894
	MNIT Jaipur		31		16	
	MNNIT Allahabad		20		7	
	NIT Durgapur		19		2	
	NIT Hamirpur		14		1	
	NIT Kurukshetra		12		3	
	NIT Rourkela		12		2	
	NIT Silchar		12		10	
	NIT Warangal		11		0	
Total		9	164		60	
Biological Science	MNIT Jaipur		18	2.361	12	3.1
	MANIT Bhopal		16		3	
	MNNIT Allahabad		14		4	
	NIT Durgapur		13		1	
	NIT Karnataka		12		1	
	NIT Raipur		12		8	
	NIT Rourkela		11		7	
	NIT Tiruchirappalli		10		2	
Total		8	106		38	
Mathematics	MNIT Jaipur		30	1.96	2	1.631
	NIT Durgapur		15		6	
	NIT Kurukshetra		12		10	
	NIT Rourkela		11		2	
	NIT Warangal		10		0	
	SVNIT Surat		10		0	
Total		6	88		20	
Statistics	MNIT Jaipur		30	1.916	2	1.631
	NIT Durgapur		14		6	
	NIT Kurukshetra		11		10	

	NIT Rourkela		11		2	
	NIT Warangal		10		0	
	SVNIT Surat		10		0	
Total		6	86		20	
Management	BRANIT Jalandhar		24	1.47	7	1.55
	MANIT Bhopal		11		2	
	NIT Durgapur		11		0	
	NIT Kurukshetra		10		7	
	NIT Tiruchirappalli		10		3	
Total		5	66		19	Continued
Energy and Fuel Science	NIT Karnataka		19	0.98	14	1.142
	NIT Rourkela		14		0	
	VNIT Nagpur		11		0	
Total		3	44		14	
Pharmacology and Pharmaceutical Science	MANIT Bhopal		34	0.98	30	2.61
	NIT Rourkela		10		2	
Total		2	44		32	
Education	NIT Durgapur		17	0.958	1	0.408
	NIT Kurukshetra		15		1	
	NIT Warangal		11		3	
Total		3	43		5	
Library and Information Science	NIT Durgapur		18	0.847	0	0.163
	NIT Karnataka		10		1	
	NIT Tiruchirappalli		10		1	
Total		3	38		2	
Textile	BRANIT Jalandhar		26	0.579	5	0.408
Total		1	26		5	
Water	VNIT Nagpur		23	0.512	2	0.163
Total		1	23		2	
Pollution	MNIT Jaipur		16	0.356	1	0.082
Total		1	16		1	
Health Science	NIT Rourkela		13	0.29	2	0.163
Total		1	13		2	
Arts and Humanities	NIT Tiruchirappalli		11	0.245	5	0.408
Total		1	11		5	
Business and Marketing	NIT Durgapur		11	0.245	9	0.734
Total		1	11		9	

Table 5.4 gives an account of top 10 subjects spread, number of articles, and citations received to NITs are: 'Engineering Science and Technology' spread is in 20 NITs out of 31 with 41.925% & 30.832% share of articles and citations followed by 'Chemistry' spread is in 18 NITs with 12.787% & 19.494% share of articles and citations, 'Material Science' spread is in 12 NITs with 7.752% & 8.238% share of articles and citations, 'General Science and Technology' spread is in 14 NITs with 6.460% & 11.011% share of articles

& citations, 'Computer Science and Technology' spread is in 11 NITs with 4.923% & 2.936% share of articles & citations, 'Environmental Science' is in 11 NITs with 4.433% & 4.976% share of articles & citations. Rests of the subjects as per ICI have contribution from less than 10 NITs as shown in respective table.

Chapter 6

Indian Institute of Management (IIMs): Research Papers Based Performance

Table 6.1: IIMs Published 10 and > 10 Articles						
SN	IIMs	Articles	IIMs wise % of Research Papers	Citations	IIMs wise % of Citations	C/P
1	IIM Ahmedabad	229	28.589	137	37.127	0.598
2	IIM Lucknow	110	13.733	66	17.886	0.600
3	IIM Calcutta	133	16.604	53	14.363	0.398
4	IIM Bangalore	102	12.734	39	10.569	0.382
5	IIM Kozhikode	78	9.738	37	10.027	0.474
6	IIM Indore	80	9.988	24	6.504	0.300
7	IIM Rohtak	15	1.873	7	1.897	0.467
8	IIM Raipur	15	1.873	3	0.813	0.200
9	IIM Ranchi	11	1.373	0	0.000	0.000

Legend: C/P = Citation/Paper

09 IIMs have contributed 10 and >10 articles are: 'IIM Ahmadabad' 229 (28.589%) articles, 'IIM Calcutta' 133 (16.604%) articles, 'IIM Lucknow' 110 (13.733%) articles, 'IIM Bangalore' 102 (12.734%) articles, 'IIM Indore' 80 (9.988%) articles, 'IIM Kozhikode' 78 (9.738%) articles, 'IIM Rohtak' 15 (1.873%) articles, 'IIM Raipur' 15 (1.873%) articles, 'IIM Ranchi' 11 (1.373%) articles.

Fig. 6.1 Top 09 Productive IIMs Research Papers and Citations

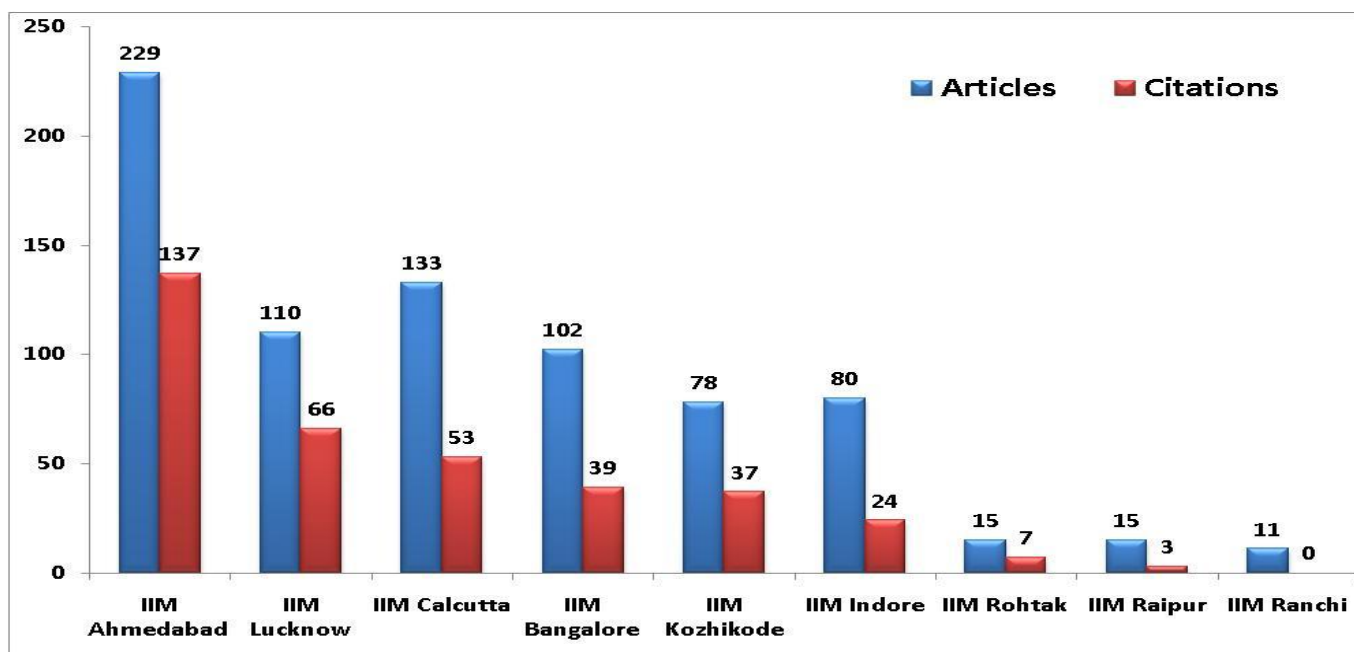


Table 6.2 shows that 04 authors of IIM Ahmadabad and 01 each from IIM Calcutta and IIM Indore have received 10 and > 10 citations to their papers.

Table 6.3: IIMs Wise Top Journals based on Articles Published				
Journal Name	IIMs	Articles	IIMs wise % of Research Papers	Citation
ECONOMIC AND POLITICAL WEEKLY	IIM Ahmedabad	52	18.102	40
	IIM Bangalore	36		11
	IIM Calcutta	33		31
	IIM Kozhikode	10		10
	IIM Lucknow	8		9
	IIM Indore	3		0
	IIM Rohtak	3		1
Total		145		102
VIKALPA: JOURNAL FOR DECISION MAKERS	IIM Ahmedabad	45	11.735	25
	IIM Bangalore	17		5
	IIM Lucknow	11		12
	IIM Calcutta	8		3
	IIM Indore	6		11
	IIM Ranchi	2		0
	IIM Kozhikode	1		0
	IIM Raipur	1		0
	IIM Rohtak	1		0
	IIM Tiruchirappalli	1		0
	IIM Udaipur	1		0
Total		94		56
INDIAN JOURNAL OF INDUSTRIAL RELATIONS	IIM Lucknow	18	6.117	15
	IIM Ahmedabad	8		2
	IIM Indore	7		2

	IIM Bangalore	4		2
	IIM Calcutta	4		0
	IIM Kozhikode	4		1
	IIM Ranchi	3		0
	IIM Rohtak	1		0
Total		49		22
DECISION	IIM Calcutta	22	5.993	3
	IIM Raipur	6		1
	IIM Indore	5		0
	IIM Kozhikode	5		9
	IIM Kashipur	4		1
	IIM Ahmedabad	2		0
	IIM Lucknow	2		0
	IIM Ranchi	1		0
	IIM Rohtak	1		0
Total		48		14
IIM KOZHIKODE SOCIETY AND MANAGEMENT REVIEW	IIM Kozhikode	18	3.745	2
	IIM Bangalore	6		0
	IIM Calcutta	3		0
	IIM Ahmedabad	1		0
	IIM Indore	1		0
	IIM Lucknow	1		0
Total		30		2
Journal Name	IIMs	Articles	IIMs wise % of Research Papers	Citation
GLOBAL BUSINESS REVIEW	IIM Indore	7	3.246	0
	IIM Lucknow	5		4
	IIM Ahmedabad	4		1
	IIM Calcutta	4		6
	IIM Kozhikode	2		2
	IIM Kashipur	1		0
	IIM Ranchi	1		0
	IIM Rohtak	1		0
	IIM Shillong	1		0
Total		26		13
OPSEARCH	IIM Calcutta	10	2.747	0
	IIM Ahmedabad	3		1
	IIM Kozhikode	3		2
	IIM Indore	2		0
	IIM Lucknow	2		0
	IIM Bangalore	1		0
	IIM Raipur	1		0
Total		22		3
INDIAN JOURNAL OF AGRICULTURAL ECONOMICS	IIM Ahmedabad	10	1.998	4
	IIM Lucknow	4		2
	IIM Indore	1		0
	IIM Kozhikode	1		0
Total		16		6

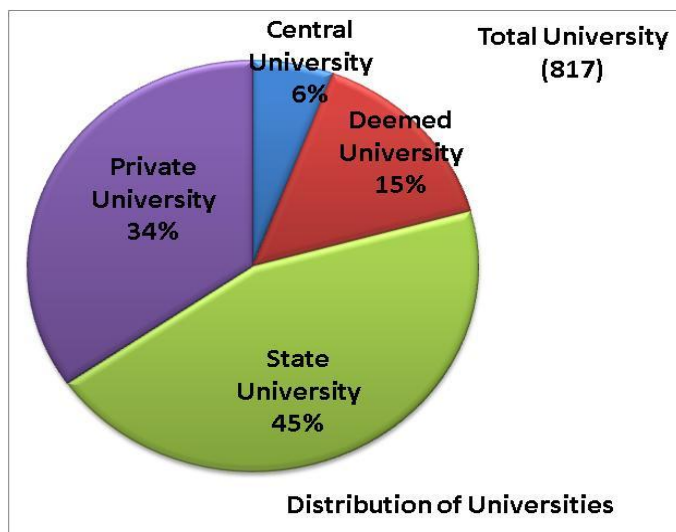
JOURNAL OF HUMAN VALUES	IIM Calcutta	5	1.873	4
	IIM Ahmedabad	4		2
	IIM Bangalore	2		3
	IIM Kozhikode	2		4
	IIM Indore	1		1
	IIM Lucknow	1		1
Total		15		15
PRODUCTIVITY	IIM Ahmedabad	3	1.748	1
	IIM Calcutta	3		0
	IIM Indore	3		0
	IIM Bangalore	1		0
	IIM Kozhikode	1		0
	IIM Lucknow	1		0
	IIM Ranchi	1		0
	IIM Tiruchirappalli	1		0
Total		14		1

10 top journals based on number of articles published in are: 'Economical and Political Weekly' 145 (18.102%) articles, 'VIKALP: Journal for Decision Makers' 94 (11.735%) articles, 'Indian Journal of Industrial Relations' 49 (6.117%) articles, 'Decision' 48 (5.993%) articles, 'IIM Kozhikode Society and Management Review' 30 (3.745%) articles, 'Global Business Review' 26 (3.246%) articles, 'OPSEARCH' 22 (2.747%) articles, 'Indian Journal of Agricultural Economics' 16 (1.998%) articles, 'Journal of Human Values' 15 (1.873%) articles, and 'Productivity' 14 (1.748%) articles.

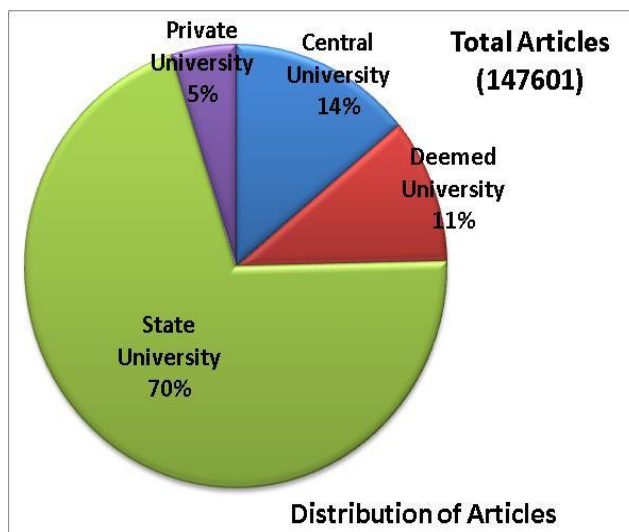
Public Universities in India: Central, States, Deemed and Private Universities

In modern India, public university system started from 1857 with the establishment of 'Calcutta University', 'Madras University' and 'Bombay University' in the same year by the British Government. Thereafter, as usual in slow pace other public universities came in existence and up to 1947 while India achieved independence, there were only 21 public universities in the country. In India, education as a subject is in the domain of central and state legislature; therefore, both are responsible for its overall control, regulation and growth. As of now there are 817 universities in the country. The category wise numbers of universities are: 47 central universities, 365 state universities, 122 deemed universities, and 283 private universities. This report presents brief account of academic performance of each one separately. The research performance indicators of each category are presented in respective tables.

Types of Universities and Their Research Productivity



Source: UGC Site



Source: Indian citation Index (ICI)

Total universities are 817 and percentage share of central, deemed, state and private universities are 6%, 15%, 45%, and 34% respectively. All these universities total papers are 147601. The above graphs show that central universities are 6% of total, contributes 14% articles, deemed universities are 15%, contributes 11% articles, state universities are 45% of total and contributes 70% articles, private universities are 34% of total and contributes 5% articles of total. Here, the percentage share of articles of universities is based on the number of universities contribution available in ICI database. If the number of total papers are divided based on actual number of universities available on UGC site, the % share of papers of different types of universities will be further less. Hence, based on above graphs, the performance of private universities is relatively the lowest and not corresponding to their number 283. Here, it can be concluded that the ecosystem of private universities is not appropriate for scholarly work/activities.

Chapter 7

Central Universities: Research Productivity Performance

Table 7.1: 20 Top Central Universities Based on Articles Published

Total Universities = 47, Productive Universities = 44; Number of Articles of 44 Universities = 15405, Citations = 9075

SN	Central University	Articles	Rank A	University wise % of Research Papers	Citations
1	University of Delhi (UD)	1690	1	10.970	693
2	Banaras Hindu University (BHU)	1521	2	9.873	630
3	Aligarh Muslim University (AMU)	1404	3	9.114	712
4	Jawaharlal Nehru University (JNU)	1165	4	7.562	216
5	University of Allahabad (UA)	960	5	6.232	745
6	Hemwati Nandan Bahuguna Garhwal University (HNBGU)	802	6	5.206	888
7	Dr. Harisingh Gour University (HGU)	740	7	4.804	423
8	Jamia Millia Islamia (JMI)	696	8	4.518	384
9	Pondicherry University (PU)	659	9	4.278	390

10	University of Hyderabad (UH)	645	10	4.187	890
11	Assam University (AU)	629	11	4.083	972
12	Manipur University (MU)	617	12	4.005	338
13	North Eastern Hill University (NEHU)	565	13	3.668	106
14	Visva Bharati University (VBU)	529	14	3.434	150
15	Nagaland University (NU)	476	15	3.090	237
16	Babasaheb Bhimrao Ambedkar University (BBAU)	311	16	2.019	271
17	Indira Gandhi National Open University (IGNOU)	289	17	1.876	120
18	Tezpur University (TU)	285	18	1.850	284
19	Tripura University (TU)	254	19	1.649	241
20	Mizoram University (MU)	202	20	1.311	123

Legend: A = Articles

Table 7.1 gives an account of top 20 universities based on number of articles published are: ‘University of Delhi’ 1690 (10.970%) articles, ‘Banaras Hindu University’ 1521 (9.873%) articles, ‘Aligarh Muslim University’ 1404 (9.114%) articles, ‘Jawaharlal Nehru University’ 1165 (7.562%) articles, ‘University of Allahabad’ 960 (6.232%) articles, ‘Hemwati Nandan Bahuguna Garhwal University’ 802 (5.206%) articles, ‘Dr. Harisingh Gour University’ 740 (4.804%) articles, ‘Jamia Millia Islamia’ 696 (4.518%) articles, ‘Pondicherry University’ 659 (4.278%) articles, ‘University of Hyderabad’ 645 (4.187%) articles, ‘Assam University (AU)’ 629 (4.083%) articles, ‘Manipur University’ 617 (4.005%) articles, ‘North Eastern Hill University’ 565 (3.668%) articles, ‘Visva Bharati University’ 529 (3.434%) articles, ‘Nagaland University’ 476 (3.090%) articles, ‘BBAU’ 311 (2.019%) articles, ‘IGNOU’ 289 (1.876%) articles, ‘Tezpur University’ 285 (1.850%) articles, ‘Tripura University’ 254 (1.649%) articles, ‘Mizoram University’ 202 (1.311%) articles.

Table 7.2: Distribution of Articles in Group of Top Universities

No of Central Universities	1-5 (11.36%)	1-10 (22.73%)	1-15 (34.09%)	1-20 (45.46%)	1-25 (56.82%)	1-44 (100%)
Articles Share %	43.752	66.745	85.024	93.729	97.079	100

Table 7.2 shows that top 05 (11.36%) central universities contributed 43.752% articles to total, top 10 (22.73%) central universities contributed 66.745% articles, top 15 (34.09%) central universities contributed 85.024% articles, top 20 (45.46%) central universities contributed 93.729% papers to central universities total, top 25 (56.82%) central universities contributed 97.079% articles, and rest about 44% central universities contributed less than 3% articles to central universities total.

Fig. 7.1: Top 20 Central Universities - Articles and Citations

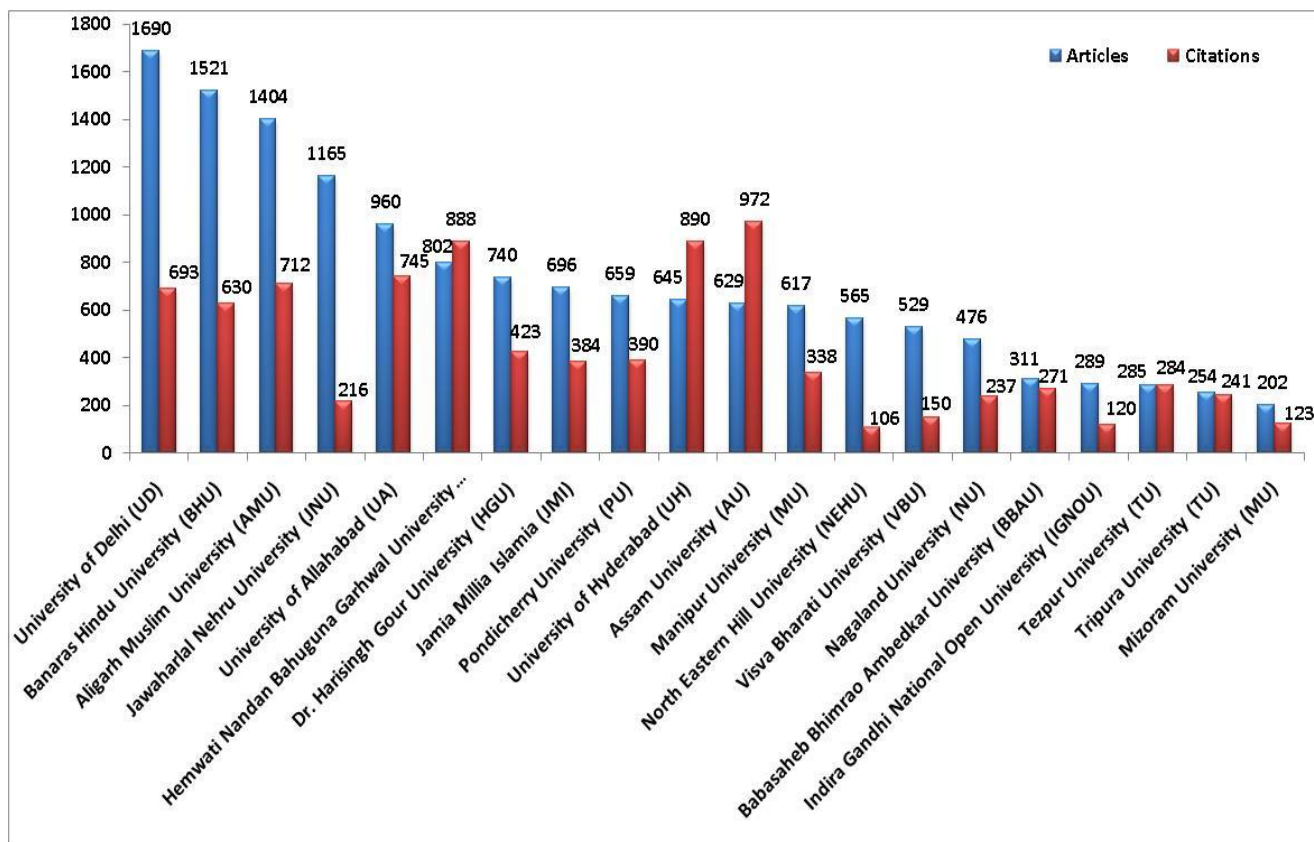


Table 7.3: Top 50 Authors of Central Universities

SN	Author Name	Central University	Articles	Author wise % of Papers	Citations
1	Singh A K	Nagaland University (NU)	76	5.191	82
2		Banaras Hindu University (BHU)			
3	Singh T K	Manipur University (MU)	66	4.508	54
4	Kumar Sanjay	Babasaheb Bhimrao Ambedkar University (BBAU)	57	3.893	22
5	Ram R B	Babasaheb Bhimrao Ambedkar University (BBAU)	54	3.689	28
6	Dutta B K	Assam University (AU)	49	3.347	50
7	Kar Devashish	Assam University (AU)	45	3.074	43
8	Meena M L	Babasaheb Bhimrao Ambedkar University (BBAU)	43	2.937	20
9	Ashfaq Ahmad	Aligarh Muslim University (AMU)	42	2.869	4

10	Chattopadhyaya M C	University of Allahabad (UA)	40	2.732	19
11	Shukla D N	University of Allahabad (UA)	36	2.459	10
12	Ray D C	Assam University (AU)	33	2.254	4
13	Todaria N P	Hemwati Nandan Bahuguna Garhwal University (HNBGU)	32	2.186	24
14	Bhasin M K	University of Delhi (UD)	31	2.117	82
15	Das Ashesh Kumar	Assam University (AU)	31	2.117	30
16	Ramanathan A L	Jawaharlal Nehru University (JNU)	30	2.049	40
17	Gambhir R K	Manipur University (MU)	29	1.981	0
18	Lal Rup	University of Delhi (UD)	28	1.913	23
19	Vidyarthi V K	Nagaland University (NU)	28	1.913	12
20	Dasgupta Rajib	Jawaharlal Nehru University (JNU)	27	1.844	35
21	Narain Satya	University of Allahabad (UA)	27	1.844	16
22	Sharma Amod	Nagaland University (NU)	27	1.844	9
23	Abbasi S A	Pondicherry University (PU)	26	1.776	10
24	Jha Alok	Banaras Hindu University (BHU)	26	1.776	15
25	Joshi S R	North Eastern Hill University (NEHU)	25	1.708	19
26	Paul S B	Assam University (AU)	25	1.708	28
27	Yadav Yogesh Chandra	Babasaheb Bhimrao Ambedkar University (BBAU)	25	1.708	8
28	Kumar Ashok	Hemwati Nandan Bahuguna Garhwal University (HNBGU)	24	1.639	48
29	Kumar G	University of Allahabad (UA)	24	1.639	13
30	Mohilal N	Manipur University (MU)	24	1.639	4
SN	Author	Central University	Articles	Author wise % of Papers	Citations
31	Pandey J D	University of Allahabad (UA)	24	1.639	6
32	Nath Arun Jyoti	Assam University (AU)	23	1.571	26
33	Sharma V B	Nagaland University (NU)	23	1.571	13
34	Singh V B	Nagaland University (NU)	23	1.571	40
35	Srivastava S D	Dr. Harisingh Gour University (HGU)	23	1.571	68
36	Srivastava U C	University of Allahabad (UA)	23	1.571	53
37	Patnaik Prabhat	Jawaharlal Nehru University (JNU)	22	1.503	20
38	Sharma C M	Hemwati Nandan Bahuguna Garhwal University (HNBGU)	22	1.503	25
39	Singh K P	University of Delhi (UD)	22	1.503	19
40	Yadava R N	Dr. Harisingh Gour University (HGU)	22	1.503	8

41	Chandra Subhash	Hemwati Nandan Bahuguna Garhwal University (HNBGU)	21	1.434	13
42	Deb Chitta Ranjan	Nagaland University (NU)	21	1.434	47
43	Dixit V K	Dr. Harisingh Gour University (HGU)	21	1.434	37
44	Sachdeva M P	University of Delhi (UD)	21	1.434	7
45	Saklani Sarla	Hemwati Nandan Bahuguna Garhwal University (HNBGU)	21	1.434	15
46	Shrivastava J P	University of Delhi (UD)	21	1.434	15
47	Singh Rana P	Babasaheb Bhimrao Ambedkar University (BBAU)	21	1.434	24
48	Lata Rubee	Babasaheb Bhimrao Ambedkar University (BBAU)	20	1.366	13
49	Naithani U C	Hemwati Nandan Bahuguna Garhwal University (HNBGU)	20	1.366	42
50	Singh P K	Manipur University (MU)	20	1.366	24

Table 7.4: Top 50 Journals Based on Articles of Central Universities

Number of Journals = 805; Number of Articles of total Journals = 15405, Citations = 9075

SN	Journal Name	Central University Count	Articles	Journal wise % of Research Papers	Citations
1	ECONOMIC AND POLITICAL WEEKLY	30	606	3.934	437
2	CURRENT SCIENCE	31	529	3.434	655
3	JOURNAL OF THE INDIAN CHEMICAL SOCIETY	18	296	1.921	273
4	ENVIRONMENT AND ECOLOGY	19	218	1.415	81
5	THE CRITERION: AN INTERNATIONAL JOURNAL IN ENGLISH	29	192	1.246	2
6	INDIAN JOURNAL OF PHYSICS	19	186	1.207	369
7	JOURNAL OF GEOLOGICAL SOCIETY OF INDIA	20	184	1.194	219

8	PRAMANA- JOURNAL OF PHYSICS	19	162	1.052	39
9	INDIAN JOURNAL OF CHEMISTRY SECTION B - ORGANIC INCLUDING MEDICINAL	16	159	1.032	113
10	INTERNATIONAL JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES	18	147	0.954	226
11	NATIONAL ACADEMY SCIENCE LETTERS	19	136	0.883	72
12	INDIAN JOURNAL OF PURE & APPLIED PHYSICS	18	122	0.792	84
13	INDIAN FORESTER	19	120	0.779	31
14	INDIAN JOURNAL OF LANDSCAPE SYSTEMS AND ECOLOGICAL STUDIES	11	120	0.779	6
15	ASIAN JOURNAL OF CHEMISTRY	18	117	0.759	50
16	PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, INDIA, SECTION B - BIOLOGICAL SCIENCES	19	117	0.759	70
17	JOURNAL OF CHEMICAL SCIENCE	16	116	0.753	30
18	JOURNAL OF ENVIRONMENTAL BIOLOGY	20	111	0.721	207
19	ASIAN JOURNAL OF RESEARCH IN SOCIAL SCIENCES AND HUMANITIES	26	110	0.714	8
20	INDIAN JOURNAL OF TRADITIONAL KNOWLEDGE	20	110	0.714	337
21	EASTERN ANTHROPOLOGIST (THE)	23	107	0.695	22
22	INDIAN JOURNAL OF CHEMISTRY - SECTION A: INORGANIC, BIO-INORGANIC, PHYSICAL, THEORETICAL & ANALYTICAL	13	105	0.682	74
23	JOURNAL OF THREATENED TAXA	16	104	0.675	83
24	INDIAN JOURNAL OF EXPERIMENTAL BIOLOGY	18	102	0.662	99
25	JOURNAL OF CHEMICAL AND PHARMACEUTICAL RESEARCH	22	101	0.656	120
26	PSYCHOLOGICAL STUDIES	11	89	0.578	38
27	TROPICAL ECOLOGY	19	85	0.552	239
28	BULLETIN OF MATERIALS SCIENCE	18	84	0.545	41
SN	Journal Name	Central University Count	Articles	Journal wise % of Research Papers	Citations
29	JOURNAL OF THE INDIAN ACADEMY OF APPLIED PSYCHOLOGY	11	84	0.545	40
30	INDIAN JOURNAL OF MICROBIOLOGY	12	82	0.532	69
31	JOURNAL OF EARTH SYSTEM SCIENCE	16	77	0.500	83
32	ANNALS OF PLANT PROTECTION SCIENCES	11	76	0.493	225
33	PHYSIOLOGY AND MOLECULAR BIOLOGY OF PLANTS	15	76	0.493	61
34	DESIDOC JOURNAL OF LIBRARY & INFORMATION TECHNOLOGY	16	75	0.487	71
35	INDIAN JOURNAL OF SCIENCE AND TECHNOLOGY	17	75	0.487	44

36	PROCEEDINGS OF THE INDIAN NATIONAL SCIENCES ACADEMY - PART A: PHYSICAL SCIENCES	14	75	0.487	19
37	PACIFIC BUSINESS REVIEW INTERNATIONAL	16	73	0.474	3
38	JOURNAL OF MYCOPATHOLOGICAL RESEARCH	11	72	0.467	13
39	TRENDS IN BIOSCIENCES	13	71	0.461	12
40	ANTHROPOLOGIST (THE)	12	70	0.454	87
41	INTERNATIONAL JOURNAL OF ECOLOGY AND ENVIRONMENTAL SCIENCES	13	70	0.454	43
42	ECOLOGY ENVIRONMENT & CONSERVATION	19	69	0.448	12
43	JOURNAL OF BIOSCIENCES	13	69	0.448	73
44	JOURNAL OF ECONOMIC AND TAXONOMIC BOTANY	15	68	0.441	35
45	MAN IN INDIA	16	67	0.435	4
46	JOURNAL OF INTERACADEMICA	11	66	0.428	3
47	INDIAN JOURNAL OF ENTOMOLOGY	14	64	0.415	42
48	INDIAN JOURNAL OF REGIONAL SCIENCE	14	64	0.415	5
49	JOURNAL OF FOOD SCIENCE AND TECHNOLOGY	9	63	0.409	43
50	JOURNAL OF PHARMACY RESEARCH	18	63	0.409	38

Table 7.5: Distribution of Articles in Group of Top Journals

No of Journal	1-25 (3.11%)	1-50 (6.21%)	1-75 (9.32%)	1-100 (12.42%)	1-805 (100%)
Articles Contribution %	28.413	40.273	49.049	55.826	100

Top 25 (3.11%) of 805 journals have 28.413% articles, 50 (6.21%) top journals have 40.273% articles, 75 (9.32%) journals have 49.049% articles, 100 (12.42%) of total 805 journals published 55.826% articles from central universities. It shows that ~45% papers of central universities published in remaining 705 (~82%) journals.

Table 7.6: Subject Wise Research Articles from Central Universities

Number of Subjects = 48; Number of Articles of total Subjects = 20742, Citations= 12025

SN	Subjects	University Count	Articles	Rank A	Subject wise % share of Papers	Citations
1	Biological Science	36	2601	1	12.540	1792
2	Social Science	41	2120	2	10.221	864
3	Chemistry	32	1504	3	7.251	848
4	Agriculture	31	1236	4	5.959	741
5	Environmental Science	31	1224	5	5.901	821
6	Health Science	32	1169	6	5.636	878

7	General Science and Technology	35	1044	7	5.033	880
8	Botany	30	950	8	4.580	625
9	Pharmacology and Pharmaceutical Science	30	807	9	3.891	967
10	Physics	30	670	10	3.230	543
11	Earth and Geological Science	29	592	11	2.854	411
12	Management	34	582	12	2.806	96
13	Engineering Science and Technology	34	455	13	2.194	70
14	Library and Information Science	31	449	14	2.165	251
15	Anthropology	27	405	15	1.953	129
16	Economics	33	405	15	1.953	153
17	Zoology	22	399	17	1.924	130
18	Psychology	27	360	18	1.736	161
19	Business and Marketing	35	359	19	1.731	72
20	Mathematics	27	343	20	1.654	65
21	Education	34	332	21	1.601	32
22	Statistics	27	332	21	1.601	62
23	Forestry	24	300	23	1.446	83
24	Arts and Humanities	32	268	24	1.292	11
25	Biotechnology	25	253	25	1.220	128
26	Others	29	245	26	1.181	381
27	Computer Science and Technology	29	195	27	0.940	33
28	History and Philosophy of Science and Knowledge	24	157	28	0.757	339
29	Material Science	20	132	29	0.636	44
30	Food and Beverage Science	16	119	30	0.574	62
31	Veterinary Science	15	96	31	0.463	44
32	Pollution	16	79	32	0.381	40
33	Dairying, Dairy, Animals and Animals Produce	13	74	33	0.357	29
34	Oceanography and Marine Science	13	73	34	0.352	57
35	Population Studies	21	56	35	0.270	19
SN	Subjects	University Count	Articles	Rank A	Subject wise % share of Papers	Citations
36	Fishery	11	50	36	0.241	50
37	Rural development	18	47	37	0.227	8
38	Toxicology	17	38	38	0.183	5
39	Astronomy, Astrophysics, Space and Geodesy	12	35	39	0.169	8
40	Domestic Science	9	35	39	0.169	16
41	Textile	6	32	41	0.154	19
42	Meteorology	11	30	42	0.145	7
43	Remote Sensing	12	28	43	0.135	46

44	Law	11	27	44	0.130	3
45	Water	13	19	45	0.092	1

Legend: A = Articles

Table 7.7: Subject Wise Distribution of Articles

No of Subjects	1-10 (20.83%)	1-20 (41.67%)	1-30 (62.50%)	1-40 (83.33%)	1-48 (100%)
Articles Contribution %	64.242	85.209	96.456	99.269	100

Table 7.6 reveals that top 10 (20.83%) subject categories out of total 48 of central universities have 64.242% papers; similarly, 30 (62.50%) top subject categories have 96.456% share of papers; 40 (83.33%) of subject categories of total 48 have 99.269% share of papers, and rest subject categories have less than 1% share of papers.

Chapter 8

Deemed Universities: Research Papers Productivity Based Performance

Table 8.1: Top 20 Deemed Universities Based on Articles

Total Universities = 122; Productive Universities = 99; Number of Articles of 99 Universities = 15624,
Citations = 7351

SN	Deemed University	Articles	Rank A	University wise % of Research Papers	Citations
1	Indian Institute of Science (IIS)	1363	1	8.724	750
2	Sam Higginbottom Institute of Agriculture, Technology and Sciences (SHIATS)	1001	2	6.407	671
3	Jamia Hamdard University (JHU)	937	3	5.997	434
4	Forest Research Institute (FRI)	801	4	5.127	371
5	Birla Institute of Technology (BIT)	605	5	3.872	370
6	Banasthali University (BU)	577	6	3.693	366
7	K L University (KLU)	561	7	3.591	279
8	Indian School of Mines (ISM)	517	8	3.309	253
9	Institute of Chemical Technology (ICT)	453	9	2.899	249
10	Gurukula Kangri Vishwavidyalaya (GKV)	425	10	2.720	225
11	Birla Institute of Technology and Science (BITS)	386	11	2.471	158
12	Tata Institute of Social Sciences (TISS)	350	12	2.240	145
13	Manipal University (MU)	329	13	2.106	140
14	PRIST University (PRISTU)	320	14	2.048	140
15	GITAM University (GITAMU)	300	15	1.920	135
16	Tata Institute of Fundamental Research (TIFR)	282	16	1.805	130
17	The Gandhigram Rural Institute (GRI)	280	17	1.792	113
18	Dayalbagh Educational Institute (DEI)	274	18	1.754	108
19	Karunya University (KU)	262	19	1.677	101
20	Dr. M G R Educational and Research Institute University (MGRERIU)	254	20	1.626	96

Legend: A = Article

Fig. 8.1: Top 20 Deemed Universities Articles & Citations

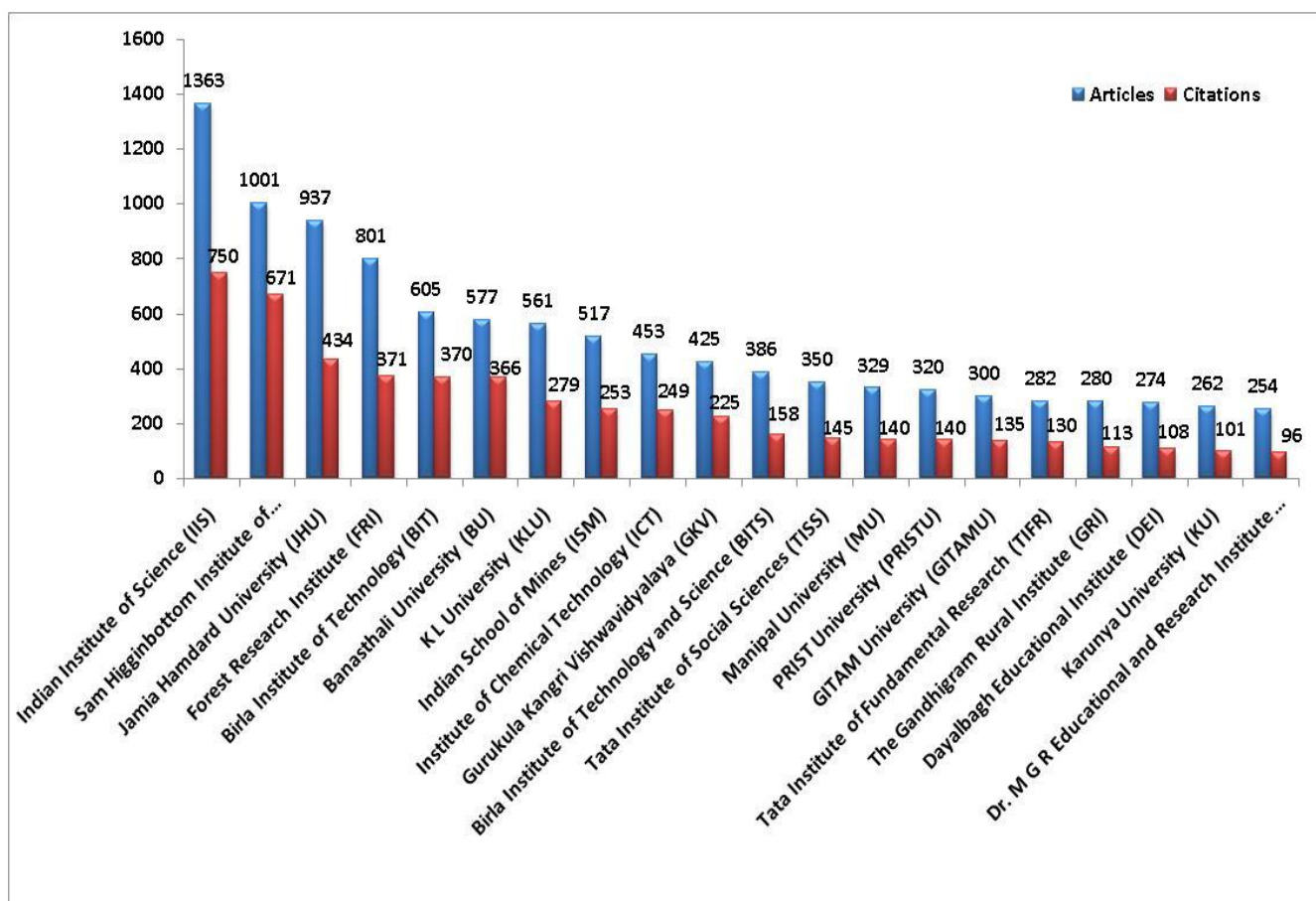


Table 8.2: Distribution of 'Articles' in Group of Top Deemed Universities

No of Deemed Universities	1-10 (10.10%)	1-20 (20.20%)	1-30 (30.30%)	1-40 (40.40%)	1-50 (50.50%)	1-99 (100%)
Articles Share %	43.752	66.745	85.024	93.729	91.859	100

10 (10.10%) top Deemed universities of 99 have contributed 43.752% articles; 20 top Deemed universities, i.e. 20.20% of 99 have contributed 66.745% articles; 30 top Deemed universities, i.e. 30.30% of 99 have contributed 85.024% articles; 40 top Deemed universities, i.e. 40.40% of 99 have contributed 93.729% articles; 50 top Deemed universities, i.e. 50.50% of 99 have contributed 91.859% articles.

Chapter 9

State Universities: Research Productivity Performance

Table 9.1: 20 Top State University Based on Articles Published Total Universities = 365; Productive Universities = 283; Number of Articles of 283 Universities = 103946, Citations = 58911					
SN	State University	Articles	Rank A	University wise % share of Papers	Citations
1	Punjab Agricultural University (PAU)	4583	1	4.409	2879
2	Tamil Nadu Agricultural University (TNAU)	3794	2	3.650	2141
3	Annamalai University (AU)	3740	3	3.598	2637
4	Chaudhary Charan Singh Haryana Agricultural University (CCSHAU)	2835	4	2.727	1726
5	University of Agricultural Sciences Dharwad (UAS Dharwad)	2497	5	2.402	2006
6	University of Agricultural Sciences Bangalore (UAS Bangalore)	2147	6	2.065	907
7	Bidhan Chandra Krishi Vishwavidyalaya(BCKV)	1977	7	1.902	1048
8	Anna University (AU)	1736	8	1.670	591
9	Jadavpur University (JU)	1710	9	1.645	1046
10	Acharya N G Ranga Agricultural University (ANGRAU)	1697	10	1.633	1125
11	University of Calcutta (UC)	1613	11	1.552	1005
12	King George's Medical University (KGMU)	1528	12	1.470	1029
13	Andhra University (AU)	1512	13	1.455	837
14	University of Mysore (UM)	1496	14	1.439	911
15	University of Rajasthan (UR)	1462	15	1.406	1120
16	Govind Ballabh Pant University of Agriculture and Technology (GBPUAT)	1444	16	1.389	1017
17	Dr. Yashwant Singh Parmar University of Horticulture and Forestry (YSPUHF)	1441	17	1.386	794
18	Dr. Panjabrao Deshmukh Krishi Vidyapeeth (PDKV)	1227	18	1.180	557
19	Mahatma Phule Krishi Vidyapeeth (MTPKV)	1217	19	1.171	609
20	Chandra Shekhar Azad University of Agriculture and Technology (CSAUAT)	1200	20	1.154	886

Legend: A = Article

Fig. 9.1: 20 Top State University Based on 'Articles' & 'Citations'

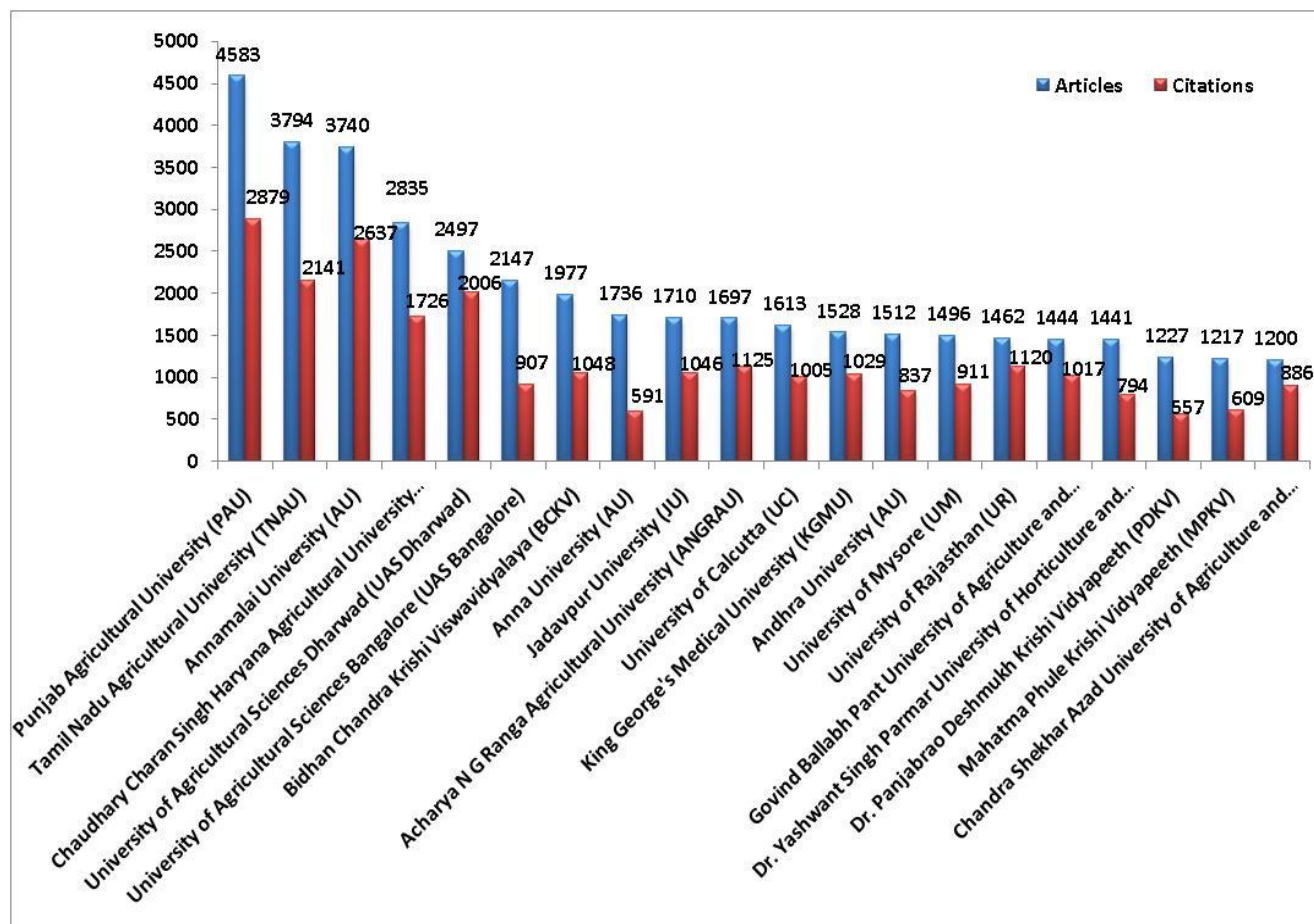


Table 9.2: Distribution of 'Articles' Share in Group of State Universities

No of State Universities	1-10 (3.53%)	1-20 (7.07%)	1-30 (10.60%)	1-40 (14.13%)	1-50 (17.67%)	1-283 (100%)
Articles Share %	25.702	39.305	49.272	57.663	64.929	100

10 top state universities, i.e. 3.53% of total 283 state universities have contributed 25.702% articles to state universities total; 20 top state universities, i.e. 7.07% of total 283 contributing universities have 39.305% articles to state universities total; 50 top state universities, i.e. 17.67% of 283 contributing universities have 64.929% articles to state universities total. Rest 233 (~82%) state universities have about 35% share of research articles which means their relative performance is below average.

Chapter 10

Private Universities: Research Productivity Performance

Table 10.1: Top 20 Private Universities based on Articles

Total Universities = 283; Productive Universities = 156; Number of Articles of 156 Universities = 7289;
Citations = 2401

SN	Private University	Articles	Rank A	University wise % of Papers	Citations
1	S R M University (SRMU)	911	1	12.498	272
2	Lovely Professional University (LPU)	696	2	9.549	209
3	Manipal University (MU)	329	3	4.514	113
4	Jaipur National University (JNU)	323	4	4.431	254
5	Presidency University (PU)	287	5	3.937	155
6	Shri Jagdishprasad Jhabarmal Tibrewala University (SJJTU)	254	6	3.485	53
7	Amity University (AU)	224	7	3.073	65
8	Singhania University (SU)	224	7	3.073	47
9	Maharishi Markandeshwar University (MMU)	219	9	3.005	75
10	Integral University (IU)	214	10	2.936	112
11	Mahatma Gandhi University (MGU)	204	11	2.799	98
12	Mewar University (MU)	132	12	1.811	18
13	Suresh Gyan Vihar University (SGVU)	128	13	1.756	80
14	Indian Institute of Public Health (IIPH)	128	13	1.756	78
15	Shobhit University (SU)	120	15	1.646	122
16	Jodhpur National University (JNU)	111	16	1.523	60
17	University of Petroleum and Energy Studies (UPES)	111	16	1.523	24
18	Chandigarh University (CU)	99	18	1.358	22
19	Jaypee University of Information Technology (JUIT)	97	19	1.331	32
20	NIMS University (NIMSU)	97	19	1.331	29

Legend: A = Article

Private universities are 283 in number and out of these 156 (55%) universities have contribution in ICI database and rest 45% universities have no contribution published in journals indexed in ICI. Among top 20 private universities, first 17 have > than 100 articles and rest have less than 100 articles. Also, none of the private university has > than 1000 articles during 10 years report period. Over all, data reveals relatively poor research performance.

Fig. 10.1: Top 20 Private Universities based on Articles & Citations

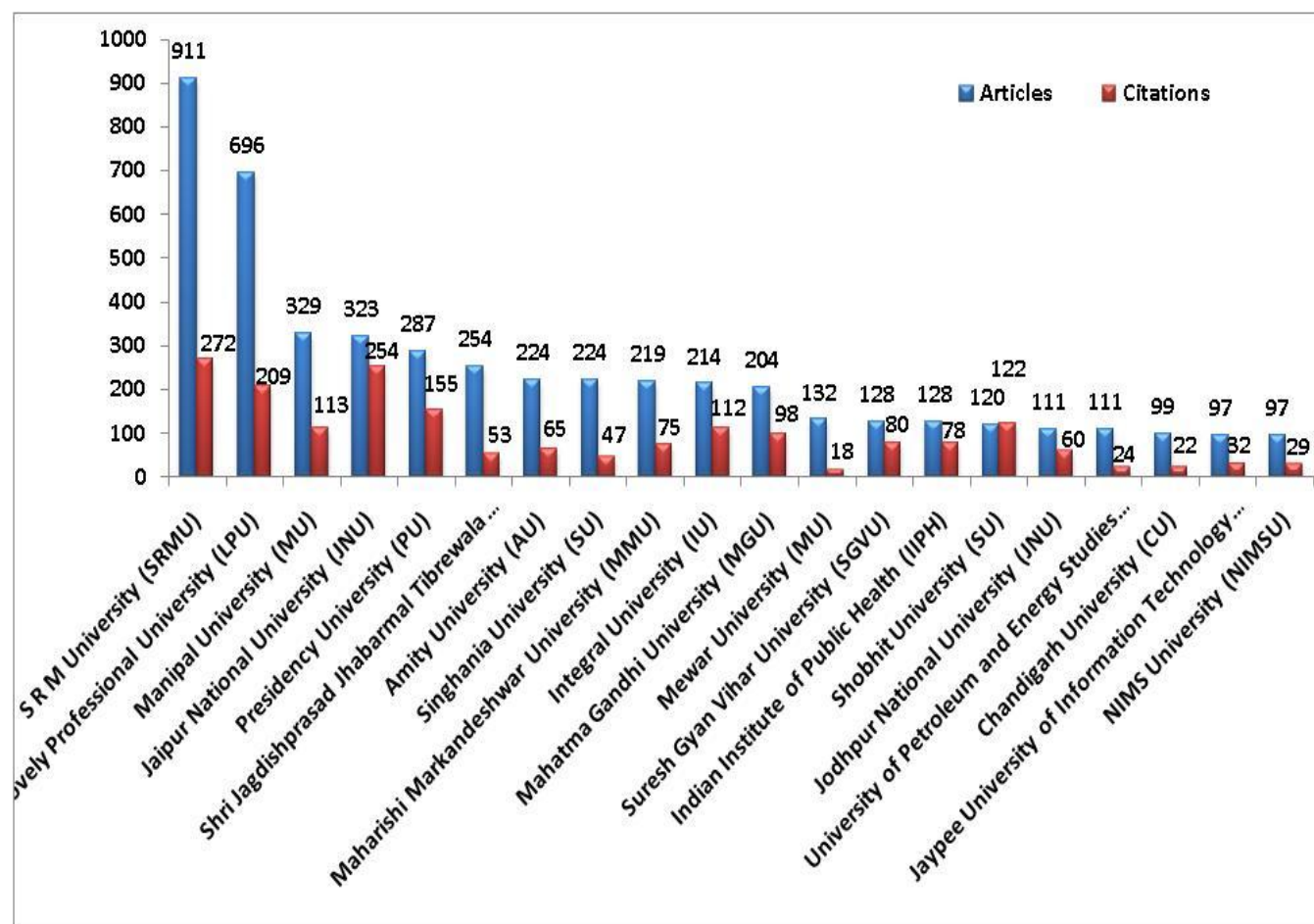


Table 10.2: Distribution of 'Articles' in Group of Top Private Universities

No of State Universities	1-10 (6.41%)	1-20 (12.82%)	1-30 (19.23%)	1-40 (25.64%)	1-50 (32.05%)	1-156 (100%)
Articles Share %	50.501	67.334	77.583	83.605	87.762	100

10 (6.41%) top contributing private universities have published 50.501% articles; 20 (12.82%) top contributing private universities have published 67.334% articles; 30 (19.23%) top contributing private universities have published 77.583% articles; 40 (25.64%) top contributing private universities have published 83.605% articles; 50 (32.05%) top contributing private universities have published 87.762% articles. Rest of the private universities, i.e. 68% of 156, have about 12.34% papers share which indicated very dismal performance.

Table 10.2: Top Authors of Private Universities Published 10 and >10 Articles

SN	Author	Private University	Articles	University wise % of Papers	Citations
1	Bhandari Anil	Jaipur National University (JNU)	49	5.976	8
2		Jodhpur National University (JNU)			21
3	Singh Ranjit	Shobhit University (SU)	22	2.683	34
4	Patil Shankargouda	M S Ramaiah University of Applied Sciences (MSRUAS)	21	2.561	5
5	Subbarao D	Maharishi Markandeshwar University (MMU)	20	2.439	0
6	Malik C P	Jaipur National University (JNU)	19	2.317	13
7	Gupta Deepak	Maharishi Markandeshwar University (MMU)	18	2.195	16
8	Ravichandran P T	S R M University (SRMU)	18	2.195	5
9	Shrivastava B	Jaipur National University (JNU)	17	2.073	15
10	Ghosh S N	Presidency University (PU)	16	1.951	4
11	Hegde B M	Manipal University (MU)	16	1.951	2
12	Prasad Dwarika	Lovely Professional University (LPU)	16	1.951	3
13	Rai S Padmalatha	Manipal University (MU)	16	1.951	9
14	Shrivastava Birendra	Jaipur National University (JNU)	16	1.951	8
15	Kumar Ashish	Lovely Professional University (LPU)	15	1.829	15
16	Rao Roopa S	M S Ramaiah University of Applied Sciences (MSRUAS)	15	1.829	4
17	Arunachalam Kantha D	S R M University (SRMU)	14	1.707	13
18	Gupta Stuti	Jaipur National University (JNU)	14	1.707	11
19	Merugu Ramchander	Mahatma Gandhi University (MGU)	14	1.707	10
20	Ponnusamy S	S R M University (SRMU)	14	1.707	0
21	Gopinath P M	Manipal University (MU)	13	1.585	13
22	Juliet A Vimala	S R M University (SRMU)	13	1.585	1
23	Lokhande R S	Jaipur National University (JNU)	13	1.585	4
24	Parashar Bharat	Manav Bharti University (MBU)	13	1.585	3
25	Prasad Kantipudi MVV	R K University (RKU)	13	1.585	0
26	Siddiqui N A	University of Petroleum and Energy Studies (UPES)	13	1.585	8
27	Vijayakumar K	S R M University (SRMU)	13	1.585	3
28	Annadurai R	S R M University (SRMU)	12	1.463	1
29	Gupta Ritu	Shri Venkateshwara University (SVU)	12	1.463	0
30	Kansal Lavish	Lovely Professional University (LPU)	12	1.463	7
31	Maiya Arun G	Manipal University (MU)	12	1.463	0

32	Nithya T G	S R M University (SRMU)	12	1.463	21
SN	Author	Private University	Articles	University wise % of Papers	Citations
33	Roy A B	Presidency University (PU)	12	1.463	18
34	Saxena Deepak	Indian Institute of Public Health (IIPH)	12	1.463	4
35	Sharma C K	Teerthanker Mahaveer University (TMU)	12	1.463	0
36	Thakur R C	Lovely Professional University (LPU)	12	1.463	6
37	Bhattacharya H N	Presidency University (PU)	11	1.341	8
38	Binu V S	Manipal University (MU)	11	1.341	11
39	Harsoliya M S	Shri Jagdishprasad Jhabarmal Tibrewala University	11	1.341	4
40	Krishnan K Divya	S R M University (SRMU)	11	1.341	5
41	Rajkumar P R Kannan	S R M University (SRMU)	11	1.341	5
42	Ramamurthi K	S R M University (SRMU)	11	1.341	0
43	Sarker Debbarayan	Presidency University (PU)	11	1.341	8
44	Singh Brijendra	Shobhit University (SU)	11	1.341	10
45	Singhal Manmohan	Jaipur National University (JNU)	11	1.341	9
46	Thomas A P	Mahatma Gandhi University (MGU)	11	1.341	6
47	Yadav A K	Shobhit University (SU)	11	1.341	10
48	Augustine Dominic	M S Ramaiah University of Applied Sciences (MSRUAS)	10	1.220	5
49	Hussain Arshad	Integral University (IU)	10	1.220	4
50	Jana T K	Presidency University (PU)	10	1.220	3

Overall performance of private universities of India is not satisfactory, their number is 283 but research paper productivity, citations received, C/P is the lowest. This all indicates that privatization in higher education is not yielding expected results and probably not suiting to environment & culture of the country. Out of 283 private universities only 156 (55%) universities are contributing some fringe number of papers and rest 127 (45%) are not contributing any paper. This is very alarming situation, need immediate attention of regulatory and controlling bodies to look into and induct and inculcate required strength for overall improvement. They have huge infrastructure including land which have been taken on nominal charges from the government, so it should be utilized for the benefit of the society.

Chapter 11

Council of Scientific and Industrial Research (CSIR): Research Productivity Performance

Table 11.1: Top 10 CSIR's Institutes Research Productivity based on Articles and Citations

Total Number of Institutes/Labs = 39; Total Number of Articles = 7598; Total Number of Citations = 5547

SN	CSIR Institutes	Article	Institute wise % of Papers	Citation	Institute wise % of Citations	C/P	Rank C/P
1	CSIR - National Botanical Research Institute (CSIRNBRI)	614	8.031	576	10.341	0.938	5
2	CSIR - National Geophysical Research Institute (CSIRNGRI)	545	7.129	530	9.515	0.972	4
3	CSIR - Central Food Technological Research Institute (CSIRCFTRI)	491	6.422	519	9.318	1.057	2
4	CSIR - Indian Institute of Chemical Technology (CSIRIICT)	481	6.292	274	4.919	0.569	9
5	CSIR - National Physical Laboratory (CSIRNPL)	393	5.141	416	7.469	1.059	1
6	CSIR - Central Institute of Mining and Fuel Research (CSIRCIMFR)	362	4.735	104	1.867	0.287	10
7	CSIR - Central Institute of Medicinal and Aromatic Plants (CSIRCIMAP)	353	4.617	231	4.147	0.654	6
8	CSIR - Central Drug Research Institute (CSIRCDRI)	281	3.676	277	4.973	0.986	3
9	CSIR - Central Leather Research Institute (CSIRCLRI)	265	3.466	154	2.765	0.581	8
10	CSIR - National Environmental Engineering Research Institute (CSIRNEERI)	256	3.349	166	2.98	0.648	7

In CSIR system odd 39 laboratories and institutes are working in different R&D areas; the above table gives an account of top 10 laboratories/institutes research papers and citations received. Among these top 10 institutes/laboratories, NBRI is at 1st position with 614 (8.031% of total CSIR) papers and received 576(10.341%) citations; however, in case of citation/paper (C/P) which is one of the strong quality parameter, NBRI is at 5th position. Hence, among these top 10 institutes/laboratories, based on C/P, NPL is at 1st position with 1.059 C/P, contributed 393 ((5.141%) papers, and 416 citations followed by CFTRI with 1.0957 C/P, CDRI with 0.986 C/P, contributed 281 articles and received 277 citations, NGRI with 0,972 C/P contributed 545 articles and received 530 citations. If we prepare C/P based rank order of all CSIR institutes/laboratories, which would be different from the given order. In that case NISTADS stands at 1st position.

Fig. 11.1: Top 10 CSIR Research Institutes based Articles and Citations

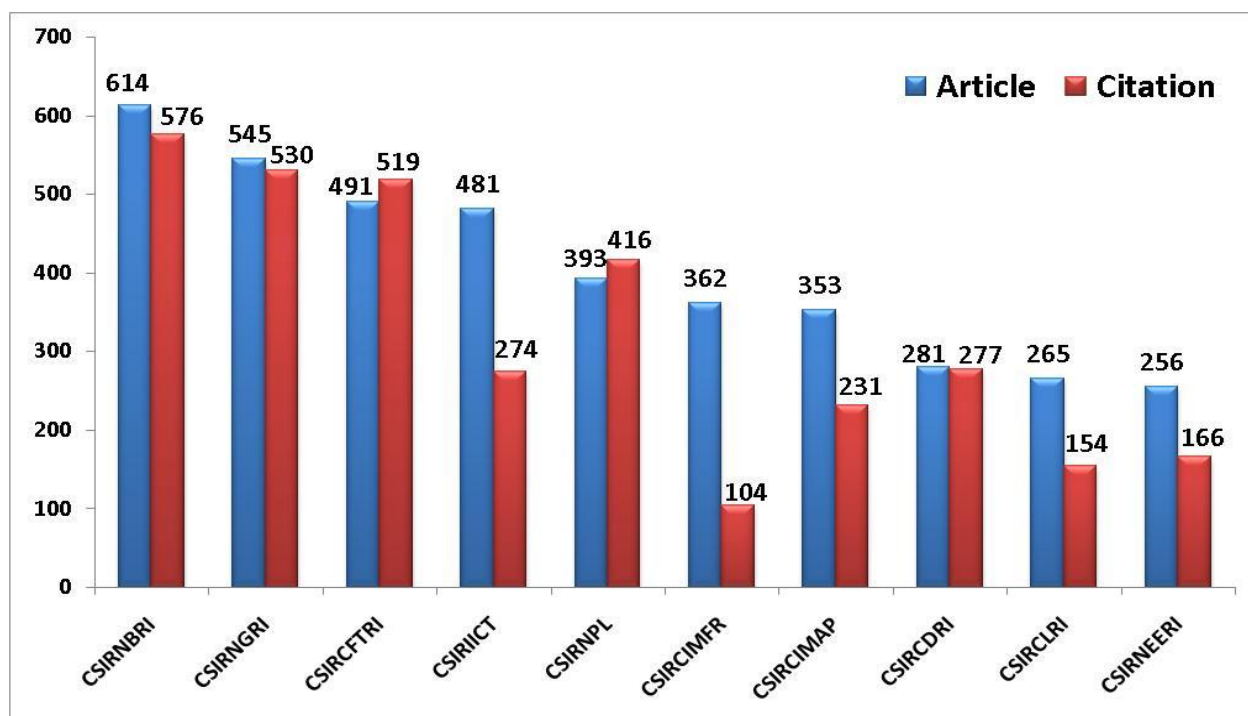


Table 11.2: Distribution of 'Articles' and 'Citations' in Group of Top CSIR Institutes

No of Institutes	1-5 (12.82%)	1-10 (25.64%)	1-15 (38.46%)	1-20 (51.28%)	1-39 (100%)
Articles Contribution %	33.015	52.858	67.560	77.868	100
Citations Received %	42.280	63.250	77.415	87.092	100

The distribution of articles share in order of top contributors, top 05 (12.82%) institutes of CSIR have 33.015% contribution of papers and 42.280% citations share; 10 (25.64%) top institutes of CSIR have 52.858% papers and 63.250% citations share of total; 15 (38.46%) top CSIR institutes have 67.560% paper and 77.415% citations share of total; 20 (51.28%) top CSIR institutes have 77.868% papers and 87.092% citations share of total. The rest of CSIR institutes, i.e. about 49% have relatively lesser share of papers and citations.

Chapter 12

Indian Council of Medical Research (ICMR): Research Productivity Performance

Table 12.1: ICMR Research Productivity Based on Articles and Citations
Total Number of Institute = 32; Productive Institutes = 27; Total Number of Articles = 2383;
Total No. of Citations = 3297

SN	ICMR	Articles	Institute wise % of Papers	Citation	Institute wise % of Citations	C/P	Rank C/P
1	Indian Council of Medical Research (ICMR)	271	11.235	876	26.417	3.230	1
2	ICMR - National Institute of Malaria Research (ICMRNIMR)	182	7.546	253	7.63	1.390	2
3	ICMR - National Institute for Research in Tuberculosis (ICMRNIRT)	180	7.463	250	7.539	1.389	3
4	ICMR - National Institute of Immunohaematology (ICMRNIIH)	173	7.172	108	3.257	0.624	9
5	ICMR - Vector Control Research Centre (ICMRVCRC)	166	6.882	166	5.006	1.000	7
6	ICMR - National Institute of Nutrition (ICMRNIN)	158	6.551	197	5.941	1.247	5
7	ICMR - National JALMA Institute of Leprosy and Other Mycobacterial Diseases (ICMRNJALMAILMD)	111	4.602	102	3.076	0.919	8
8	ICMR - National Institute of Virology (ICMRNIV)	104	4.312	141	4.252	1.356	4
9	ICMR - National Institute of Occupational Health (ICMRNIOH)	98	4.063	104	3.136	1.061	6
10	ICMR - National Institute for Research in Reproductive Health (ICMRNIRRH)	88	3.648	53	1.598	0.602	10

10 top ICMR Institutes/laboratories based on research papers counts are: ICMR HQ produced 271 (11.235%) articles in total, followed by 'National Institute of Malaria Research' 182 (7.546%) articles, 'National Institute for Research in Tuberculosis' 180 (7.463%) articles, 'National Institute of Immunohaematology' 173 (7.112%) articles, and Vector Control Research Centre' 166 (6.882%) articles, 'National Institute of Nutrition' 158 (6.551%) articles, 'National JALMA Institute of Leprosy and Other Mycobacterial Diseases' 111 (4.602%) articles, 'National Institute of Virology, 104 ((4.312%) articles, 'National

Institute of Occupational Health' 98 (4.063%) articles and 'National Institute for Research in Reproductive Health' 88 (3.648%) articles of total.

05 top ICMR institutes based on C/P are: 'National Centre for Disease Informatics and Research' with 4.444 C/P, followed by ICMR HQ with 3.230 C/P, 'Centre for Research in Medical Entomology' with 2.344 C/P, 'Desert Medicine Research Centre' with 1.761 C/P, and 'National Institute of Cancer Prevention and Research' with 1.648 C/P.

Fig.12.1. ICMR Top 10 Research Institutes Articles and Citations

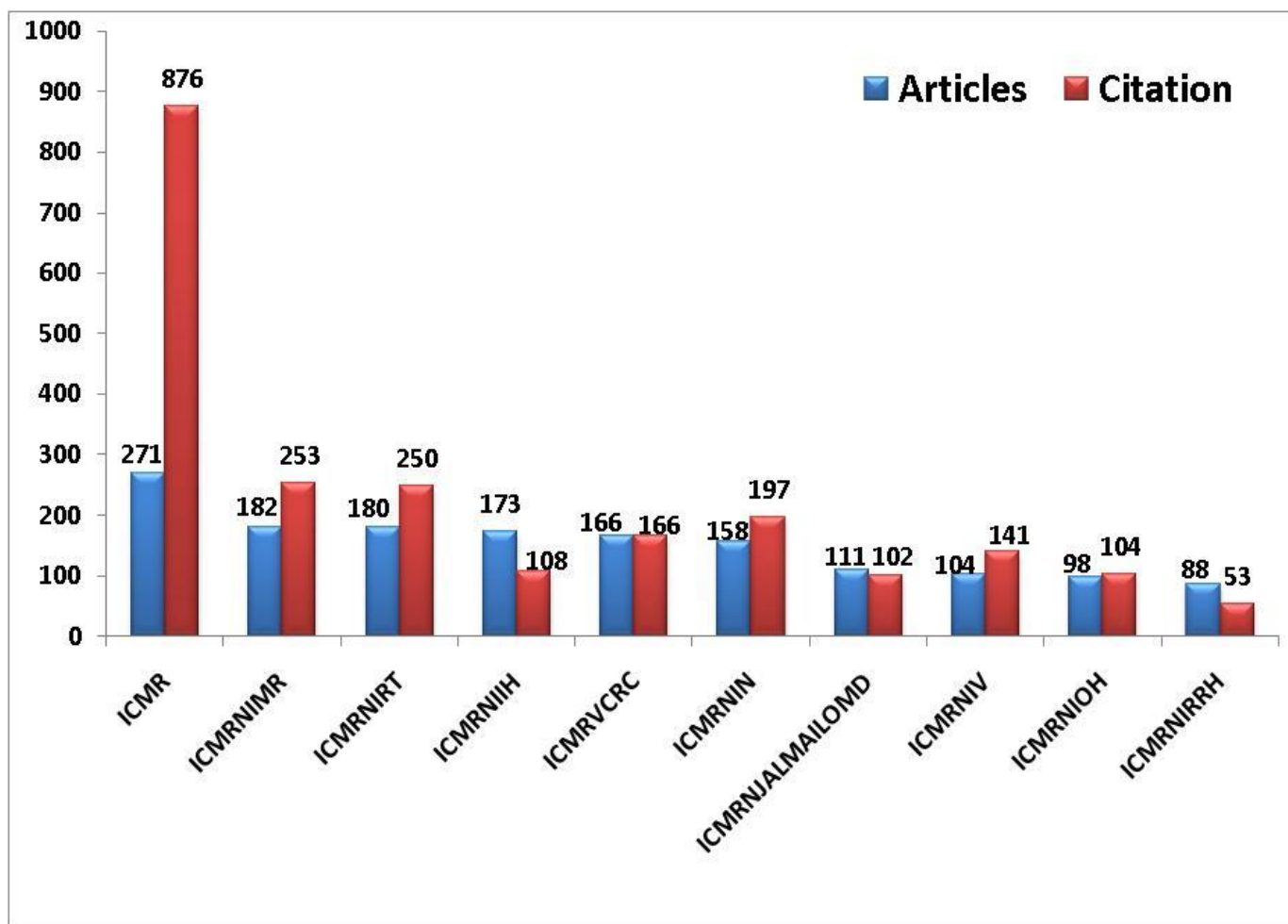


Table 12.2: Distribution of 'Articles' and 'Citations' in Group of ICMR Institutes

No of Institutes	1-5 (12.52%)	1-10 (37.04%)	1-15 (55.56%)	1-20 (74.07%)	1-27 (100%)
Articles Contribution %	40.299	63.474	80.141	91.874	100
Citation Received %	52.533	69.632	82.841	93.577	100

Top 05 (12.52%) institutes of ICMR contributed 40.299% share of papers and received 52.533% citations; 10 (37.04%) institutes have 63.474% papers and 69.632% citations share; 15 (55.56%) institutes have 80.141% papers and 82.841% citations share; 20 (74.07%) institutes of ICMR have 91.874% papers and 93.577% citations share of total; and rest of the institutes have very fringe contribution of papers and citations.

Chapter 13

Department of Science and Technology (DST): Research Productivity Performance

Table 13.1: DST Research Productivity based on Articles and Citations

Total Number of Institutes = 23; Productive Institutes = 23; Total Number of Articles = 2536;

Total Number of Citation = 2179

SN	INSTITUTE	Articles	Institute wise % of Papers	Citations	Institute wise % of Citations	C/P	Rank C/P
1	Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST)	521	20.544	362	16.613	0.695	5
2	Birbal Sahni Institute of Palaeobotany (BSIP)	420	16.562	550	25.241	1.309	2
3	Wadia Institute of Himalayan Geology (WIHG)	321	12.658	489	22.441	1.523	1
4	Indian Association for the Cultivation of Science (IACS)	213	8.399	184	8.444%)	0.864	3
5	Agharkar Research Institute (ARI)	198	7.808	149	6.838	0.753	4
6	Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR)	151	5.954	84	3.855	0.556	9
7	Bose Institute (BI)	147	5.797	88	4.039	0.599	8
8	Indian Institute of Astrophysics (IIA)	123	4.85	49	2.249	0.398	10
9	Indian Institute of Geomagnetism (IIG)	121	4.771	79	3.626	0.653	6
10	Institute of Advanced Study in Science and Technology (IASST)	75	2.957	47	2.157	0.627	7

In top 10 institutes of DST, 'Sree Chitra Tirunal Institute for Medical Sciences and Technology' occupies 1st position with 521 (20.544%) articles share, 362 (16.13%) citation share, followed by 'Birbal Sahni Institute of Palaeobotany' with 420 (16.562%) articles share, 550 (25.241%) citation share; 'Wadia Institute of Himalayan Geology' with 321 (12.658%) articles share, 489 (22,441%) citation share; 'Indian

Association for the Cultivation of Science' with 213 (8.399%) articles share, 184 (8.444%) citations share; 'Agharkar Research Institute' with 198 (7.808%) articles share, 149 (6.838%) citations share; 'Jawaharlal Nehru Centre for Advanced Scientific Research' with 151 (5.954%) articles share, 84 (3.855%) citation share; 'Bose Institute' with 147 (5.797%) articles share, 88 (4.039%) citations share; 'Indian Institute of Astrophysics' with 123 (4.85%) articles share, 49 (2.249%) citations share; 'Indian Institute of Geomagnetism' with 121 (4.771%) articles share, 79 (3.626%) citations share; 'Institute of Advanced Study in Science and Technology' with 75 (2.957%) articles share, and 47 (2.157%) citations share. Rests of the institutes are contributing lesser than these top 10 institutes.

Fig. 13.1: Top 10 DST Institutes based Articles and Citations

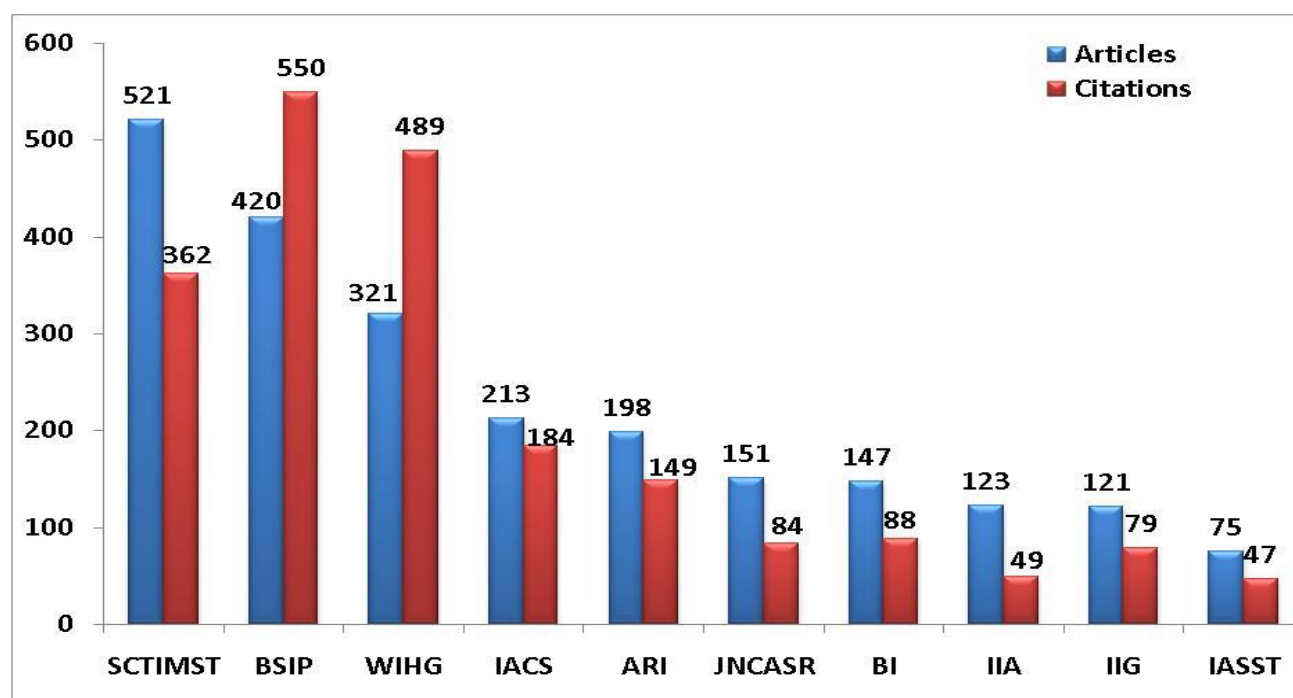


Table 13.2: Distribution of 'Articles' and 'Citations' in Number of DST Institutes

No of Institutes	1-5 (21.74%)	1-10 (43.48%)	1-15 (65.22%)	1-20 (86.96%)	1-23 (100%)
Articles Contribution %	65.970	90.300	98.659	99.882	100
Citation Received %	79.578	95.503	99.816	100	100

Top 05 (21.74%) institutes have 65.970% articles and 79.578% citations share; 10 (43.48%) top DST institutes have 90.300% articles/papers and 95.503% citations share of total; 15 (65.22%) institutes have

98.659% articles/papers and 99.816% citations share; 20 (86.96%) institutes have 99.882% articles/papers and 100% citations share, and rest have almost nil contribution of papers and citations.

Chapter 14

Defence Research and Development Organization (DRDO): Research Productivity Performance

Table 14.1: Top 10 DRDO Laboratories Based on Articles and Citations

Total Number of Institutes = 49; Number of Productive Institutes = 49; Total Number of Articles = 2098;

Total Number of Citations = 1184

SN	DRDO Labs/Institutes	Articles	Institute wise % of Papers	Citations	Institute wise % of Citations	C/P	Rank C/P
1	DRDO - Defence Research and Development Establishment (DRDODRDE)	193	9.199	190	16.047	0.984	3
2	DRDO - Defence Food Research Laboratory (DRDODFRL)	183	8.723	194	16.385	1.060	2
3	DRDO - Institute of Nuclear Medicine and Allied Sciences (DRDOINMAS)	155	7.388	185	15.625	1.194	1
4	DRDO - Defence Institute of High Altitude Research (DRDODIHAR)	125	5.958	108	9.122	0.864	5
5	DRDO - Defence Institute of Bio Energy Research (DRDODIBER)	115	5.481	57	4.814	0.496	6
6	DRDO - Defence Research and Development Laboratory (DRDODRDL)	111	5.291	35	2.956	0.315	8
7	DRDO - Defence Institute of Advanced Technology (DRDODIAT)	101	4.814	20	1.689	0.198	9
8	DRDO - Defence Research Laboratory (DRDODRL)	95	4.528	93	7.855	0.979	4
9	Defence Research and Development Organisation (DRDO)	86	4.099	37	3.125	0.430	7

10	DRDO - Defence Metallurgical Research Laboratory (DRDODMRL)	81	3.861	9	0.76	0.111	10
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DRDO has 49 research institutes and laboratories working in different areas of their interest. Among these 49 institutes/laboratories, 10 top are as listed above in Table 14.1 which shows institute wise number of articles produced and % share, citations number received and % share thereof, and C/P values based rank order.

Fig.14.1: 10 Top DRDO Institutes/Laboratories Articles and Citations

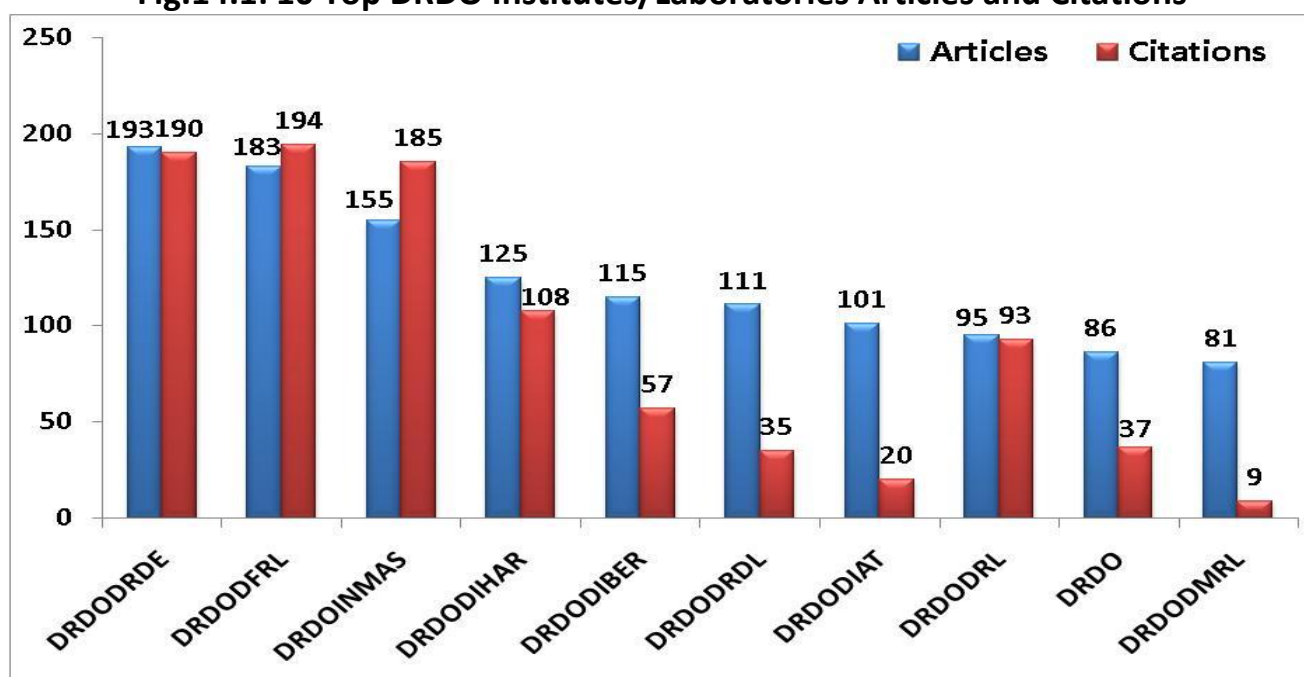


Table 14.2: Distribution of 'Articles' and 'Citations' in Number of DRDO Institutes/Laboratories

No of Institutes	1-5 (10.20%)	1-10 (20.41%)	1-15 (30.61%)	1-20 (40.82%)	1-49 (100%)
Articles Contribution %	36.749	59.342	73.308	80.553	100
Citation Received %	65.034	83.108	89.611	93.074	100

The distribution of articles in top order of institutes is: 05 (10.20%) top laboratories have 36.749% articles share; 10 top (20.41%) laboratories have 59.342% share of articles; 20 top (40.82%) laboratories have 80.353% share of articles. Similarly, 05 top (10.20%) DRDO laboratories citation share is 65.034%; 10 top (20.41%) DRDO laboratories citations share is 83.108%; 20 top (40.82%) DRDO laboratories citations share is 93.074%.

Chapter 15

Indian Council of Agricultural Research (ICAR): Research Productivity Performance

Table 15.1: ICAR 10 Institutes Research Productivity Based on Articles and Citations

Total ICAR Institutes =101; Productive Institutes = 100; Total Number of Articles = 32307;

Total Number of Citations = 25651

SN	ICAR Institutes	Articles	Institute wise % of Papers	Citations	Institute wise % of Citations	C/P	Rank C/P
1	ICAR - Indian Agricultural Research Institute (ICARIARI)	4849	15.009	4827	18.818	1.000	2
2	ICAR - Indian Veterinary Research Institute (ICARIVRI)	2695	8.342	1490	5.809	0.550	10
3	ICAR - National Dairy Research Institute (ICARNDRI)	2127	6.584	1319	5.142	0.620	7
4	ICAR - Research Complex for N E H Region (ICARRCNEHR)	1099	3.402	888	3.462	0.810	4
5	ICAR - National Bureau of Plant Genetic Resources (ICARNBPGR)	845	2.616	491	1.914	0.580	8
6	ICAR - Indian Institute of Horticultural Research (ICARIHR)	785	2.43	444	1.731	0.570	9
7	ICAR - Central Potato Research Institute (ICARCPRI)	658	2.037	740	2.885	1.130	1
8	ICAR - Indian Grassland and Fodder Research Institute (ICARIGFRI)	601	1.86	469	1.828	0.780	5
9	ICAR - Central Arid Zone Research Institute (ICARCAZRI)	568	1.758	440	1.715	0.780	5
10	ICAR - Indian Institute of Soil and Water Conservation (ICARIISWC)	528	1.634	446	1.739	0.850	3

The ICAR institutes are 101 in number but productive institutes as per ICI database is 100. The institute wise top 10 institutes articles produced, citations received, C/P value, percentage share thereof and rank order based on these is shown above in Table 15.1. 05 top ICAR institutes based on articles are: 'IARI' 4849 (15.009%) articles; 'IVRI' 2695 (8.342%) articles; 'NDRI' 2127 (6.584%) articles; 'ICAR – Research Complex for NEH Region' 1099 (3.402%) articles; 'NBPGRI' 845 (2.616%) articles, and rest have lesser number of articles. 05 top ICAR institutes based on citations are: 'IARI' 4827 (18.818%) citations; 'IVRI' 1490 (5.809%) citations; 'NDRI' 1319 (5.142%) citations; 'ICAR – Research Complex for NEH Region' 888 (3.462%) citations; 'NBPGRI' 491 (1.914%) citations, and rest of the institutes have lesser citations than these 05 institutes.

Citations per paper (C/P) reveal citations density to denote the quality of work/papers done. Based on C/P 05 top ranking institutes of ICAR are: 'NIAEPR' with 2.35 C/P; 'NBAIM' 1.60 C/P; 'IISS' 1.45 C/P; 'DWR' 1.38 C/P; 'NBAGR' 1.36 C/P.

Fig.15.1: Top 10 ICAR Institutes/Laboratories Articles and Citations

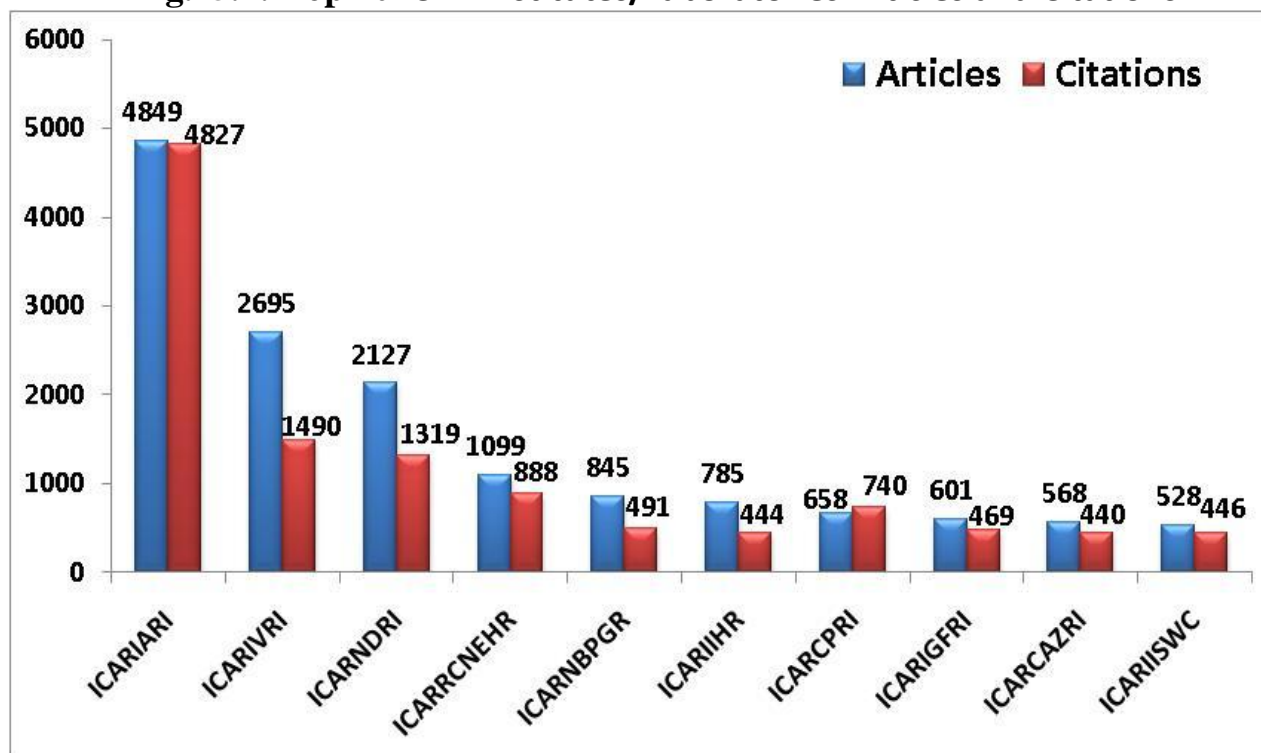


Table 15.2: Distribution of 'Articles' and 'Citations' in Number of ICAR Institutes

No of Institutes	1-15	1-30	1-45	1-60	1-100
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	(15%)	(30%)	(45%)	(60%)	(100%)
Articles Contribution %	53.283	69.750	81.441	90.042	100
Citation Received %	54.707	72.999	84.293	92.702	100

15 top institutes have produced 53.283% articles to ICAR total and the same have received 54.707% citations; 30 institutes have published 69.750% articles and received 72.999% citations; 45 institutes have published 81.441% articles with 84.293% citations; 60 institutes have published 90.042% articles and received 92.702% citations.

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The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering industry, Government, and civil society, through advisory and consultative processes.

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CII charts change by working closely with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for industry through a range of specialized services and strategic global linkages. It also provides a platform for consensus-building and networking on key issues.

Extending its agenda beyond business, CII assists industry to identify and execute corporate citizenship programmes. Partnerships with civil society organizations carry forward corporate initiatives for integrated and inclusive development across diverse domains including affirmative action, healthcare, education, livelihood, diversity management, skill development, empowerment of women, and water, to name a few.

As a developmental institution working towards India's overall growth with a special focus on India@75 in 2022, the CII theme for 2017-18, **India@75: Inclusive. Ahead. Responsible** emphasizes Industry's role in partnering Government to accelerate India's growth and development. The focus will be on key enablers such as job creation; skill development and training; affirmative action; women parity; new models of development; sustainability; corporate social responsibility, governance and transparency.

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