Scientific Publications of Jadavpur University, West Bengal: Scientometric Analysis

Jiaur Rahaman[1] and Dr. Biswajit Das[2]

Abstract

[The present study analyses the scientific productivity of Jadavpur University for the study period from 2002 to 2021 using the SCOPUS database. The retrieved data has been analyzed on the following parameters; document-wise distribution of the publication, authorship pattern, Collaborative indices, most preferred journals, times series analysis, and Bradford's law test. Journal articles are the most preferred form of publication type of documents by the Jadavpur University. The highest growth rate of the Jadavpur University was found 0.28 with 450 publications during the year 2003. It is observed from the study that the relative growth rate has increased and the doubling time has decreased during the study. Time series analysis calculation proved that there is a positive growth in the research output of Jadavpur University publications.]

Keywords: Scientometrics; Exponential Growth Rate; Co-Author Index; Bradford Law; Time series analysis

1. Introduction

The Bibliometrics and Scientometrics indices are used for the quantitative and qualitative performance of the research. These indices evaluate the literal growth of the particular subunits of literature. The growth and isolation of the subject are used as an Observing gadget for the universities and other government concerns. These indices also are used in a literal style of expansion development and nature. It helps also to take the essential decision and scientific principles of the country. These indices help to notice the ranking of authors, Institutions, Universities, and countries. It also helps strong and weak spaces of the research so that any institution or university can change its principles.

Research is currently the main movement. The information from the exploration yield assists the Administration with settling on significant choices about the areas where research will be upheld. It assists Universities and college specialists with understanding their situation on research usefulness all around the world and domestically.

2. Literature Review

(Sevukan & Sharma, 2008) analyzed the research output of central universities to which he found that the majority of research work was published in journal articles, he used the bibliometrics technique to analyze the data. The results indicate that the growth of literature in biotechnology has steadily increased from 15 articles in 1997 to 43 articles in 2006 and the author has published their research work in a collaborative way rather than in a single pattern.

(Kumar et al., 2015)published a paper entitled bibliometric analysis of the research publications of Gujarat University. The study is based on the SCOPUS database from 2004 to 2013. The study revealed that most of the publications were journal articles. The paper also analyzed the publication trend of Gujarat University and found that from 2008 onwards there was a steady increase in the number of publications. The other aspects that were identified in the paper were the most prolific authors, collaborative authorship patterns and trends, most preferred publications, and so on. The collaboration was found to be the highest in the year 2012 at 0.70 based on the modified collaboration coefficient.

---

[1] Ph. D. Research Scholar, *Department of Library and Information Science, Annamalai University, Annamalainagar, jia.amugeo@gmail.com*

[2] University Librarian, *University of Gour Banga, West Bengal and Co-Guide (Research Supervisor) of Jiaur Rahaman[1] , biswajit@myself.com*

(Sadik Batcha, 2019) published a paper entitled "Research Output Analysis of Most Productive Universities of Tamil Nadu, India: A Scientometric Analysis. The study found research trends, characteristics growth, and collaboration pattern in published literature. the average citation per paper observed is 12.18%. The USA and South Korea are found to be the most preferred collaborative countries. The CAGR calculated for six universities is 9.76.

(Rahaman, 2022)published a paper entitled "Scientometric Assessment of the Research Productivity of Calcutta University, West Bengal". The study analyses the growth rate of research publications at West Bengal University in terms of publications, CAI, DCI, subject-wise distribution, and Bradford's law. The findings of the study reveal that the CAI value has increased from 70.45 to 112.17 in more than three authors' patterns. Journal of AUTOPHAGY is the most-cited journal.

(Thirumagal, 2020)investigated collaborative works and authors' contributions to Madurai Kamaraj University. The dataset was downloaded from WoS from 2010 to 2019 for 10 years. A total of 2312 records of publications were authored by 3513 authors. The data were downloaded in plain text format and analyzed with Bibexcel and MS Excel Sheet. The result shows that majority of the publication contributed by multiple authors' collaboration over the study span. The study used the Pajek software tool to create the network map.

(Muneem et al., 2020)observed the historical trends in Penn State College of Medicine publications and compares them to the trends of Hershey Medical Center publications, especially rates between them to other national and international institution's collaboration. The researcher used the Scopus database for the study and analyzed 31,856 total publications. The results show that despite PSCOM's international collaboration being nearly three times higher than HMC.

(Vieira & Gomes, 2009) compared the reference databases of Web of Science and Scopus from the point of view of a typical comprehensive university from two Portuguese universities, Coimbra and Lisbon. The result shows that Most of the documents referenced only in Web of Science were proceeding-like without citations that did not appear in the Scopus database as an overall reference to the conference proceedings was made without a descriptor of each contribution.

(Deka, 2020) analyzed the research output of Dibrugarh University from 1989 to 2020. The data was extracted from the Web of Science database. The study results that the university's research publications were increased day by day in different dimensions. The year 2019 was the most productive year with 100 publications of the university. The chemistry department was a significant department for research productivity during the study period.

(Pattanashetti & Harinarayana, 2017)observed the research output from India, Japan, and South Korea on different parameters including growth, collaboration indices, and activity index of mechanical engineering. The study analyzed the articles published by India, Japan, and South Korea, and is restricted to articles indexed in the Web of Science for the period 2000 to 2014. The findings show that there was a decline in Japanese publications in mechanical engineering, whereas the other two countries (India and South Korea) have recorded an increasing trend. There has been an increasing trend towards collaboration in almost all fields of science and technology.

(Elangovan & Jeyshankar, 2018) studied the research trends in AIIMS based on the data retrieved from Scopus from 2007-to 2016. Out of 14410 articles retrieved, 2141 articles were highest published in 2016. The study identified the top 20 most preferred journals by the faculties of AIIMS, Indian Journal of Pediatrics has the highest 364 articles published. There were 95.47% (n=2468) journals least preferred by the faculties which published research output between 1 – 20 articles. The research output published by the AIIMS faculties found the topmost prolific authors as Kumar, R (840), followed by Kumar, A (619), and Sharma, S (462).

3. Objectives

The main objectives of the study are-
- To identify document-wise publications of Jadavpur University;
- To find out the growth rate of published documents;
- Analyze the co-authorship index and collaborative measures in publications;
- To prepare a ranked list of most-cited journals preferred by Jadavpur University;
- To test the applicability of Bradford's Law of scattering;

4. Methodology

To conduct the study, the research data was retrieved from the SCOPUS database on June 3, 2021,and were used as a data source for the study.The 20 years is chosen to get sufficient results of studies productiveness to investigate facts to get a clear photograph of studies output. The retrieved data has been recorded and interpreted using bibexcel (software tool for Scientometric analysis) and Microsoft Excel for further details analysis to meet the objective of the study.

4.1 Exponential Growth Rate - It can be used to predict future publication of any species of University. This formula is used globally to predict the human population. If you know the period of publication i.e., the number of years through which the growth rate is to be calculated and the original publication, you can calculate the exponential growth rate with ease. The formula for calculating exponential growth is given as:

$N(t) = N(0) e^{rt}$

where N(t) is the population when the time elapsed is "t" years

N(0) is the initial population

"r" is the growth rate

"t" is the number of years

"e" is the natural base of logarithms whose value is 2.711828.

5. Results & Discussions

5.1 Document-wise distribution of published materials of the Jadavpur University

Table No. 1

Document-wise distribution of published materials of the Jadavpur University

Sl. No.	Document Type	No. of Records	%
1	Article	16857	69.00
2	Conference Paper	5900	24.15
3	Book Chapter	804	3.29
4	Review	508	2.08
5	Editorial	116	0.47
6	Book	85	0.35
7	Erratum	68	0.28
8	Note	36	0.15
9	Letter	34	0.14
10	Short Survey	7	0.03
11	Article in Press	10	0.04
12	Retracted	2	0.01
13	Data Paper	3	0.01
	Grand Total	24430	100.00

Table 1 shows the distribution of publications in various types of documents published by Jadavpur University researchers. Journal articles are the most preferred form of publication type of documents by the Jadavpur University. More than 69 percent of the documents were published as journal articles by JadavpurUniversity. The other forms of publications such as conference proceedings, reviews, letters, meetings, and editorial items were published below 30 percent.

5.2 Exponential Growth Rates of Jadavpur University

Table No. 2

Exponential Growth Rates of Jadavpur University

Sl. No.	Year	No. of Records	Exponential Growth Rate
1	2002	341	-
2	2003	450	0.28
3	2004	508	0.12

4	2005	621	0.20
5	2006	718	0.15
6	2007	807	0.12
7	2008	963	0.18
8	2009	1101	0.13
9	2010	1216	0.10
10	2011	1388	0.13
11	2012	1490	0.07
12	2013	1526	0.02
13	2014	1638	0.07
14	2015	1710	0.04
15	2016	1789	0.05
16	2017	1817	0.02
17	2018	1954	0.07
18	2019	1835	-0.06
19	2020	1913	0.04
20	2021	645	-1.09

Table 2 shows the Exponential Growth Rate of the publications published by the Jadavpur University research scientists. During the study of 20 years (2002-21), the highest growth rate of the Jadavpur University was found at 0.28 with 450 publications during the year 2003, followed by 0.20 with 621 publications in 2005, and the lowest growth rate of -1.09 was found in the year 2021.

Table No. 3
Relative Growth Rate (RGR) & Doubling Time (Dt.)

Year	No. of Articles	Cum.	w1	w2	RGR	Mean	DT	Mean
2002	341	941		6.847				
2003	450	1391	6.109	7.238	1.129		0.614	
2004	508	1899	6.230	7.549	1.319		0.526	
2005	621	2520	6.431	7.832	1.401		0.495	
2006	718	3238	6.576	8.083	1.506	**1.396**	0.460	**0.411**
2007	807	4045	6.693	8.305	1.612		0.430	
2008	963	5008	6.870	8.519	1.649		0.420	
2009	1101	6109	7.004	8.718	1.714		0.404	
2010	1216	7325	7.103	8.899	1.796		0.386	
2011	1388	8713	7.236	9.073	1.837		0.377	
2012	1490	10203	7.307	9.230	1.924		0.360	
2013	1526	11729	7.330	9.370	2.039		0.340	
2014	1638	13367	7.401	9.501	2.099		0.330	
2015	1710	15077	7.444	9.621	2.177		0.318	
2016	1789	16866	7.489	9.733	2.244	**2.388**	0.309	**0.299**
2017	1817	18683	7.505	9.835	2.330		0.297	
2018	1954	20637	7.578	9.935	2.357		0.294	
2019	1835	22472	7.515	10.020	2.505		0.277	
2020	1913	24385	7.556	10.102	2.545		0.272	
2021	645	25030	6.469	10.128	3.659		0.189	

Table 3 revealed the Relative Growth Rate and Doubling Time for the publication productivity of Jadavpur University. It indicates that the RGR increased from 1.129 in the year 2002 to 3.659 in the year 2021. The mean relative growth rate for the first ten years (2002 to 2011) is 1.396. For the next ten years (2012 to 2021) the growth rate increased double to 2.388. During the period 2012 to 2021, the relative growth rate was high compared to other years.

The doubling time decreased from 0.614 in the year 2002 to 0.189 in the year 2021. The Mean doubling time for the first ten years (2002 to 2011) was 0.411 and it was decreased to 0.299. In the second ten years (2012 to 2021). It is observed from the table that the relative growth rate has increased and the doubling time has decreased during the study.

5.4 Collaborative Indices of published Literature from Jadavpur University
Table No. 4
Collaborative Indices of published Literature from Jadavpur University

Year	Authorship Pattern					Total Authors	Collaborative Indices		
	1	2	3	4	> 5		C.I	D.C	C.C
2002	17	74	110	82	58	341	3.26	0.95	0.64
2003	34	110	128	90	88	450	3.20	0.91	0.62
2004	24	116	166	83	119	508	3.31	0.93	0.64
2005	26	133	191	136	135	621	3.36	0.93	0.65
2006	30	139	231	136	182	718	3.42	0.92	0.66
2007	31	135	240	166	235	807	3.54	0.91	0.67
2008	35	176	286	211	255	963	3.49	0.90	0.67
2009	61	224	315	216	285	1101	3.40	0.84	0.65
2010	39	241	353	281	302	1216	3.47	0.89	0.66
2011	77	236	391	326	358	1388	3.47	0.81	0.66
2012	57	288	435	313	397	1490	3.47	0.85	0.66
2013	51	286	449	336	404	1526	3.50	0.86	0.67
2014	77	314	471	340	436	1638	3.45	0.81	0.66
2015	63	318	513	334	482	1710	3.50	0.84	0.66
2016	78	323	522	381	485	1789	3.49	0.81	0.66
2017	84	325	516	365	527	1817	3.51	0.79	0.66
2018	54	335	539	403	623	1954	3.62	0.86	0.68
2019	72	294	518	367	584	1835	3.60	0.82	0.67
2020	52	338	554	383	586	1913	3.58	0.86	0.68
2021	11	97	194	122	221	645	3.69	0.97	0.69
Grand Total	**973**	**4502**	**7122**	**5071**	**6762**	**24430**	**3.47**	**87.24**	**0.66**

Table 4 provided the calculated collaborative indices for Jadavpur University. The highest CI is 3.69 in the year 2021, and the lowest CI is 3.20 in the year 2003. The mean CI during the period of the study 2002-2021 was 3.47. The highest DC is 0.97 in the year 2021 and the lowest DC is 0.79 in the year 2017. The mean DC during the period of the study 2002-2021 was 87.24. The highest CC is 0.69 in the year 2021 and the lowest CC is 0.62 in the year 2003. The mean CC during the period of the study 2002-2021 was 0.66.

5.5 Citation distribution of Jadavpur University

Table No. 5

Citation distribution of Jadavpur University

Range of Citations	Jadavpur University Records	
	Record	%
Zero	5175	21.18
1	2728	11.17
2	1974	8.08
3	1536	6.29
4	1207	4.94
5	1075	4.40
6—10	3575	14.63
11—50	5972	24.45
51—100	845	3.46
101—150	191	0.78
151—200	69	0.28
201—250	32	0.13
251—300	22	0.09
> 300	29	0.12

Table 5 shows that Jadavpur University's 5175 articles received zero citations. 2728 articles received 1 citation, 1974 articles received 2 citations, 1536 articles received 3 citations, 1207 articles received 4 citations, 1075 articles received 5 citations, 3575 articles received 6-10 citations, 5972 articles received 11-50 citations, for more than 100 citations received by 260 articles, more than 200 citations received by 54 articles and more than 300 citations received by 29 articles.

5.6 Year-wise Co-Author Index of Jadavpur University

Table No. 6

Year-wise Co Author Index of Jadavpur University

YEAR	1	CAI	2	CAI	3	CAI	> 4	CAI	Total
2002	17	125.17	74	117.76	110	110.65	140	84.76	341
2003	34	189.70	110	132.65	128	97.57	178	81.67	450
2004	24	118.62	116	123.91	166	112.09	202	82.09	508
2005	26	105.12	133	116.22	191	105.50	271	90.10	621
2006	30	104.91	139	105.05	231	110.36	318	91.44	718
2007	31	96.45	135	90.78	240	102.01	401	102.59	807
2008	35	91.25	176	99.18	286	101.87	466	99.91	963
2009	61	139.11	224	110.40	315	98.14	501	93.95	1101
2010	39	80.53	241	107.55	353	99.58	583	98.98	1216
2011	77	139.29	236	92.27	391	96.63	684	101.74	1388
2012	57	96.05	288	104.89	435	100.14	710	98.38	1490
2013	51	83.91	286	101.70	449	100.93	740	100.12	1526
2014	77	118.03	314	104.02	471	98.63	776	97.81	1638
2015	63	92.50	318	100.91	513	102.91	816	98.52	1710
2016	78	109.47	323	97.97	522	100.09	866	99.94	1789
2017	84	116.07	325	97.06	516	97.41	892	101.35	1817

2018	54	69.39	335	93.03	539	94.62	1026	108.41	1954
2019	72	98.52	294	86.94	518	96.83	951	107.00	1835
2020	52	68.25	338	95.88	554	99.34	969	104.58	1913
2021	11	42.82	97	81.61	194	103.17	343	109.79	645
Grand Total	**973**		**4502**		**7122**		**11833**		**24430**

Table 6 shows the year-wise Co-Authorship Index of Jadavpur University publications during the period of the study 2002-2021. For this analysis the Co-Authorship Index values for publications having a single author, two authors, three authors, and more than three authors.

In single author, the highest Co-Authorship Index value found 189.70 in the year 2003, after the year 2003 the CAI value continuously decreased. In two authors, it shows that the Co-Authorship Index value decreased from 117.76 in the year 2002 to 81.61 in the year 2021, except in 2003 and 2004 in this year the Co-Authorship Index value was increased. In three authors, most of the Co-Authorship Index value is below average except for some years. On the other hand, more than three authors'Co-Authorship Index value increased from 84.76 in the year to 109.79 in the year 2021. The positive trend of the pattern is shown in more than three authors' publications of J. U.

5.7 Time Series Analysis of Publications from Jadavpur University

Table No. 7   Time Series Analysis of Publications from Jadavpur University

Year	Articles (Y)	X	X2	X*Y	Trend Value
2002	341	-10	100	-3410	533
2003	450	-9	81	-4050	602
2004	508	-8	64	-4064	671
2005	621	-7	49	-4347	740
2006	718	-6	36	-4308	809
2007	807	-5	25	-4035	877
2008	963	-4	16	-3852	946
2009	1101	-3	9	-3303	1015
2010	1216	-2	4	-2432	1084
2011	1388	-1	1	-1388	1153
2012	1490	1	1	1490	1290
2013	1526	2	4	3052	1359
2014	1638	3	9	4914	1428
2015	1710	4	16	6840	1497
2016	1789	5	25	8945	1566
2017	1817	6	36	10902	1634
2018	1954	7	49	13678	1703
2019	1835	8	64	14680	1772
2020	1913	9	81	17217	1841
2021	645	10	100	6450	1910
2030		19			2529
2035		24			2873
2040		29			3217
	24430		**770**	**52979**	

Straight line equation

Yc = a+bX

a= ∑y/N = 1222

b= ∑XY/∑X 2 = 69

Estimated literature in 2025 is when X = 2030-2011 = 19   2529

Estimated literature in 2030 is when X = 2035– 2011 = 24   2873

Estimated literature in 2030 is when X = 2040– 2011 = 29   3217

With the help of the time series analysis formula, it makes future predictions about the research productivity of Jadavpur University. The predicted value of research output for the year 2030 is 2529, 2035 is 2873, and 2040 is 3217. Thus, the calculation proved that there is a positive growth in the research output of Jadavpur University publications.

Table No. 8
Most preferred journals for publishing by authors of Jadavpur University

Rank	Journal Name	Articles	Citations	h-index
1	IEEE Transactions on Evolutionary Computation	12	6615	11
2	Polyhedron	283	5641	36
3	Inorganic Chemistry	94	4069	39
4	RSC Advances	217	3785	29
5	International Journal of Advanced Manufacturing Technology	98	3371	33
6	Autophagy	3	3160	2
7	Dalton Transactions	141	3159	32
8	International Journal of Electrical Power and Energy Systems	54	3111	33
9	Journal of Physical Chemistry B	58	2834	34
10	Inorganica Chimica Acta	171	2783	29
11	Sensors and Actuators, B: Chemical	65	2628	27
12	Applied Soft Computing Journal	67	2609	32
13	Journal of Ethnopharmacology	47	2381	26
14	Tetrahedron Letters	67	2263	27
15	Langmuir	49	2093	25
16	Expert Systems with Applications	45	1883	24
17	Crystal Growth and Design	52	1778	25
18	Information Sciences	32	1727	19
19	Energy	44	1725	25
20	Materials and Design	21	1615	16
21	New Journal of Chemistry	144	1598	20
22	ACS Applied Materials and Interfaces	29	1500	19
23	Chemometrics and Intelligent Laboratory Systems	9	1493	9
24	Applied Surface Science	73	1489	23
25	Cryst Eng Comm	69	1425	22
26	Phytotherapy Research	37	1400	22
27	Phytomedicine	15	1211	12
28	Journal of Materials Processing Technology	22	1195	17
29	Journal of Colloid and Interface Science	32	1186	18
30	Journal of Hazardous Materials	20	1175	13
31	European Physical Journal C	59	1163	20
32	ISA Transactions	27	1163	16

33	QSAR and Combinatorial Science	15	1149	13
34	Colloids and Surfaces A: Physicochemical and Engineering Aspects	57	1089	21
35	Electric Power Components and Systems	38	1080	19
36	IEEE Transactions on Systems, Man, and Cybernetics Part A:Systems and Humans	8	1043	8
37	Engineering Applications of Artificial Intelligence	25	991	14
38	European Journal of Inorganic Chemistry	43	975	20
39	Energy Conversion and Management	32	971	16
40	International Journal of Pharmaceutics	10	959	8
41	IEEE Transactions on Dielectrics and Electrical Insulation	48	949	20
42	International Journal of Heat and Mass Transfer	40	940	19
43	Solar Energy Materials and Solar Cells	14	940	12
44	Dyes and Pigments	4	929	4
45	Separation and Purification Technology	18	928	13
46	Journal of Applied Physics	56	925	19
47	IEEE Transactions on Power Systems	10	910	8
48	Applied Mathematics and Computation	32	903	18
49	Journal of Molecular Structure	100	903	16
50	International Journal of Biological Macromolecules	56	885	18

5.9 Bradford Law of Scattering

Table 8 shows the top fifty journals of Jadavpur University and the total citations of journals come out to be 311277.

The number of journals in each Bradford zone can be calculated from the multiplier constant K which is called the Bradford constant using the formulation of Egghe.

Where y is Euler's number having a value of 0.57772

y_m Is the number of citation of rank one journal = 6615

p is Bradford group or number of zones, i.e. p=3

$$k = (2.719^{0.57772} x 6615)^{1/3}$$

$$k = (1.78 x 6615)^{1/3}$$

$$k = 22.75$$

Using k we can calculate different Bradford groups. The nucleus zone r0 can be defined as:

$$r_o = \frac{T(k-1)}{(k^p - 1)}$$

Where, T represents the total number of journals in this study for Jadavpur University i.e. 5981

$$r_o = \frac{5981(22.75 - 1)}{(22.75^3 - 1)}$$

$$r_o = \frac{130086.75}{11773.55}$$

$$r_o = 11.05$$

Different Bradford zone can be obtained using the value of k and $r0$

The k value is found out to be 22.75 and $r0 = 11.05$

Nucleus zone $r0 = r0$ x 1= 11.05

First zone $r1 = r0$ x k = 11.05 x 22.75= 251.39

Second zone $r2 = r0$ x k^2= 11.05 x 22.75^2= 5719.07

It is in the ratio of **11:251:5719**

Table No. 9
Bradsford Law of Scattering of Literature

Zone	1st	2nd	3rd	Total
Citations	41156 (13.22%)	149644 (48.07%)	120477 (38.70%)	311277
Journals	11	251	5719	5981

5.10 Bradford Law of Scattering of Literature

Table 9 reveals that there are eleven journals in the nuclear zone and these are the most productive journal of Jadavpur University articles published in the SCOPUS database sharing 13.22% (41156) of total cited journals. IEEE Transactions on Evolutionary Computation, Polyhedron, Inorganic Chemistry, RSC Advances, International Journal of Advanced Manufacturing Technology, Autophagy, Dalton Transactions, International Journal of Electrical Power and Energy Systems, Journal of Physical Chemistry B, Inorganica Chimica Acta, Sensors and Actuators, B: Chemical these are the journals that belong to the nuclear zone of the Bradford law. The next zone is represented by 251 journals sharing 48.07% (149644) of the total cited journals and the last zone is represented by 5719 journals which share 38.70% (120477) of the total cited journals.

6. Conclusion

The present study analyses the scientific productivity of Jadavpur University for the study period from 2002 to 2021 using the SCOPUS database. The retrieved data have been analyzed on the following parameters; document-wise distribution of the publication, authorship pattern. Collaborative indices, most preferred journals; time series analysis, and Bradford's law test. Journal articles are the most preferred form of publication type of documents of Jadavpur University. The highest growth rate of the Jadavpur University was found at 0.28 with 450 publications during the year 2003. It is observed from the study that the relative growth rate has increased and the doubling time decreased during the study. Time series analysis calculation proved that there is a positive growth in the research output of Jadavpur University publications. The study reveals that there are eleven journals in the nuclear zone and these are the most productive journals of Jadavpur University articles published on the SCOPUS database, sharing 13.22% (41156) of the total cited journals.

References

Deka, P. (2020). A Scientometric Profile of Dibrugarh University, Dibrugarh (Assam) through the Lens of Web of Science, During 1989-2020. *Library Philosophy and Practice*, *2020*(November), 1–9.

Elangovan, N., & Jeyshankar, R. (2018). Research Productivity of All India Institute of Medical Sciences (AIIMS): A Scientometric Analysis. *Library Philosophy & Practice*, *7*(1). https://digitalcommons.unl.edu/libphilprac/1804

Kumar, H. A., Dora, M., & Desai, A. (2015). A Bibliometrics profile of Gujarat University, Ahmedabad during 2004-2013. *DESIDOC Journal of Library and Information Technology*, *35*(1), 9–16. https://doi.org/10.14429/djlit.35.1.7699

Muneem, A., Hallan, D. R., Gee, S., Saineni, S., Asad, U., & Sakya, S. M. (2020). Scientometric Analysis: University Hospital Versus University College of Medicine. *Cureus*, *12*(12), 1–7. https://doi.org/10.7759/cureus.12096

Pattanashetti, D. M., & Harinarayana, N. S. (2017). Assessment of mechanical engineering research output using scientometric indicators: A comparative study of India, Japan, and South Korea. *Journal of Information Science Theory and Practice*, *5*(2), 62–74. https://doi.org/10.1633/JISTaP.2017.5.2.5

Rahaman, J. (2022). A SCIENTOMETRIC ASSESSMENT OF THE RESEARCH PERFORMANCE OF.

Journal of Kavikulguru Kalidas Sanskrit University, Ramtek, *IX*(I, January), 192–205.

Rahaman, J., & Batcha, S. (2022). Scientometric Analysis and Collaboration Trends of Published Literature by State Universities from West Bengal Scientometric Analysis and Collaboration Trends of Published Literature by State Universities from West Bengal. *Journal of Social Sciences and Management*, *March*. https://doi.org/10.5281/zenodo.6372576

Rahaman, J., Hossain, S., & Batcha, M. S. (2020). Scientometric Study of the Research Performance on Oceanography: The World Perspective. *Library Philosophy and Practice*, *2020*(August), 1–14.

Sadik Batcha, M. (2019). Research output analysis of most productive universities of Tamil Nadu, India: A scientometric analysis. *Library Philosophy and Practice*, *2019*.

Sevukan, R., & Sharma, J. (2008). Bibliometric Analysis of Research Output of Biotechnology Faculties in Some Indian Central Universities. *DESIDOC Journal of Library & Information Technology*, *28*(6), 11–20. https://doi.org/10.14429/djlit.28.6.218

Thirumagal, A. (2020). Collaborative Works and Authors Contribution of Madurai Kamararaj University, Tamilnadu, India - a Bibliometric Study. *Library Philosophy and Practice*, *2020*.

Vieira, E. S., & Gomes, J. A. N. F. (2009). A comparison of Scopus and Web of science for a typical university. *Scientometrics*, *81*(2), 587–600. https://doi.org/10.1007/s11192-009-2178-0