Summer 5-21-2021

Authorship Pattern and Growth of Scholar Contributions of the M S University of Baroda: Using Scopus Database

Dr.Ranjita Niladri Dash
The Maharaja Sayajirao University Baroda, Vadodara, ranjitaniladri@gmail.com

Ashok S Chaudhary
Indian Institute of Public Health, Gandhinagar, acashok9@gmail.com

Authorship Pattern and Growth of Scholar Contributions of the M S University of Baroda: Using Scopus Database

Dr. Ranjita Niladri Dash
Assistant Professor, Temp.
Dept. of Library and Information Science
The Maharaja Sayajirao University of Baroda
Email:- ranjita.n.dash-libsc@msubaroda.ac.in
ORCID ID:-0000-0001-6742-1342

Ashok S Chaudhary
Assistant Librarian,
Indian Institute of Public Health, Gandhinagar
Email: - acashok9@gmail.com
ORCID ID: 0000-0001-7188-7065

Abstract

The present paper deals with the analysis of publications of The M S University of Baroda (MSU) that appeared in the SCOPUS database. For authorship pattern and subject-wise distribution study, MSU data has been used from the year 2016 to the end of the year 2020. A total of 1698 data has been downloaded and analyzed according to objectives. The study reveals that the growth of literature follows the exponential growth pattern, journal articles are the most published form of literature (75.15%), AIP Conference Proceedings and Chemistry Select are top journals, The M S University of Baroda and Sardar Patel University are collaborating organizations in India ranked first and the second position. The major areas of research are Physics and Astronomy, Engineering, Material Sciences, Chemistry and Biochemistry, Genetics, and Molecular Biology. In the end, a list of the 10 most cited articles has been highlighted of the authors of, MSU from the sample of 1698.

KEYWORDS: *The M S University of Baroda (MSU), Research Productivity, Bibliometric Study*

Introduction

Bibliometrics is a quantitative study of various aspects of documents used to identify the pattern of publications authorship, citations, and coverage of journals, etc. This consequently leads to better organization of information resources which is essential for effective and efficient use. (Krishna;2005) The bibliometric study involves the process of collection counting, analysis, and interpretation of citations given in documents such as articles, books, book chapters, conference papers, etc. Various methods have been invented and used to evaluate the research productivity where one of the most popular and widely accepted methods is bibliometric analysis. The yearly growth rate of research, Rank List of Core Journals, Co-Authorship Index (CAI), Collaboration index of the authors, Ranking of

Journals Titles, ranking of highly Productive Authors, Geographical distribution of Publication, Institution's wise distribution of papers, Subject wise Distribution and a list of the ten most cited articles in Scopus, from the sample of 1698 have been tabulated and analyzed.

The term bibliometric coined by Pritchard A. He states that "…the use of bibliometrics and scientometrics to evaluate research in any field of knowledge has appeared to a wide range of areas of knowledge" (Pritchard, 1969). It became a dominating tool for measuring the value of research performance by applying the various indicators and metrics, identify the publication pattern, the productivity of the author, the author's affiliation, year-wise growth, citations.

The bibliometric analysis provides the quantitative scenario of research work carried out. Numbers of bibliometric studies performed to quantitative evaluation of research productivity of institutions with the dataset acquired from Scopus. Many researchers (Ram, 2014) (Banshal, Uddin, & Singh, 2015), (González, Hoz, & Beltrán, 2019) (Jelvehgaran, Tavasoli, & Jabbarzadeh, 2019) has applied bibliometric methods in evaluation to measure the productivity and performance in the manner of quantitative examination of research output of discipline's, institution's, journals or individual productivity. The growth of bibliometrics studies is increased due to the existence of large bibliographic databases like Web of Science, Scopus and others specialized in different fields of knowledge that facilitate the collection of data.

Scopus, officially named SciVerse Scopus, is a bibliographic database containing abstracts and citations for academic journal articles. The study is based on publication data, derived from international multidisciplinary Scopus database (Elsevier, 2021) for 6 years from 2009 to 2014. The Scopus is one the world's largest abstract and citation database of peer-reviewed literature. It is owned by Elsevier and is available online by subscription. Searches in Scopus incorporate searches of scientific web pages through Scirus, another Elsevier product, as well as patent databases.

The M S University of Baroda (MSU) is one of the renowned universities in India, established in 1949, offers post graduate, MPhil and doctoral level degree programs in various subjects under different disciplines or streams of study that include science, commerce, arts and social science, computer science, medicine, etc. It comprises 14 Faculties, having 90 Departments, 3 constituent colleges with 1200 well-qualified faculty members and 1500 administrative staff to facilitate the learning of more than 35,000 students having cosmopolitan life on campus and several specialized centres and institutes offering wide spectrum of courses from kindergarten to Ph.D. also with an excellent exposure to the co-curricular and extracurricular experiences (Vyas & Asnani, 2018) The university had more than 1200 research papers to its credit since its establishment. The present study is an attempt to explore and analyses the research output of MSU published during 2016-2020 (msubaroda, 2021)

Objectives of The Study:

The objectives of the present study are as follows:

- Study the publications growth rate of MSU from 2016-2020 covered by Scopus.

- Analysis the collaboration index of the authors, and co-authorship index.
- Most productive author during the period.
- Core list of journals where most of the publications appear.
- Analyze the inter institutional affiliations of authors.
- Type of publications

Scope of The Study:

Present study is covered to the research output of The M S University of Baroda, published in Scopus database. This is using the different set of data has been used for finding the different framed objectives, for year wise analysis data from the year 2016 till the year 2020 has been downloaded for affiliation analysis, authorship pattern.

Methodology:

The study is based on a quantitative analysis of scientific research output published as Articles, book, book chapter, letter, review, conference paper, editorial, erratum, note, retracted and short survey; etc. The data for study has been drawn from SCOPUS an online database, which covers all the subject areas. The research output data of The M S University of Baroda are collected by using different searching facilities provided by SCOPUS database. A total of 1698 research papers have been collected from beginning of the year 2016 to till the end of the year 2020. In the study some advanced indicators are used to assess the research output and author productivity.

Degree of collaboration (DC)

$Dc = Nm / Nm$ plus Ns

Where DC = Degree of Collaboration

Nm = Number of multi-authored publication published during the year

Ns = Number of single – authored publication published during the year

Relative Growth Rate (RGR)

 Relative growth rate is the increase in the number of publications per unit time. The formula for calculating the mean R

$R = W2\text{-}W1 / T2\text{-} T1$

Where, R = means relative growth rate over the specific period of intervals;

W1 = Log W1 (natural log of initial number of publications);

W2 = Log W2 (Natural log of final number of publications);

T2 – T1 = the unit difference between the initial and final time.

Doubling Time (Dt)

Doubling time has been calculated using the following formula: Dt = 0.693 / R

Analysis and Interpretation of Data:

All the analysis and their interpretation findings presented into concise manner into tabular form and in pie chart, bar diagram form also. Analyse of data of this study shows that research work has done on the basis of scientometrics study and output of Scopus databases belong to MSU on the basis of yearly concise output research of growth of data.

1. **Yearly Pattern (Growth Rate):**

This table 1 is indicating the yearly growth of the output on Scopus database clearly showing the calculating by the cumulative index. The growth rate of publication has been calculated on the basic of RGR and Dt modal developed by (Mahapatra, 1994) This table is showing the growth of articles in increasing order. Here highest articles published in 2020, 2019, 2018 these years having 364, 359, and 355 (with RGR 0.27, 0.37, 0.57). While lowest articles were published in 2017, 2016, these two years having the difference of only 10 articles (with RGR 0.97, and 0) has been depicted in Table-1 and figure-1.

Table-1: Yearly Growth Rate of Research

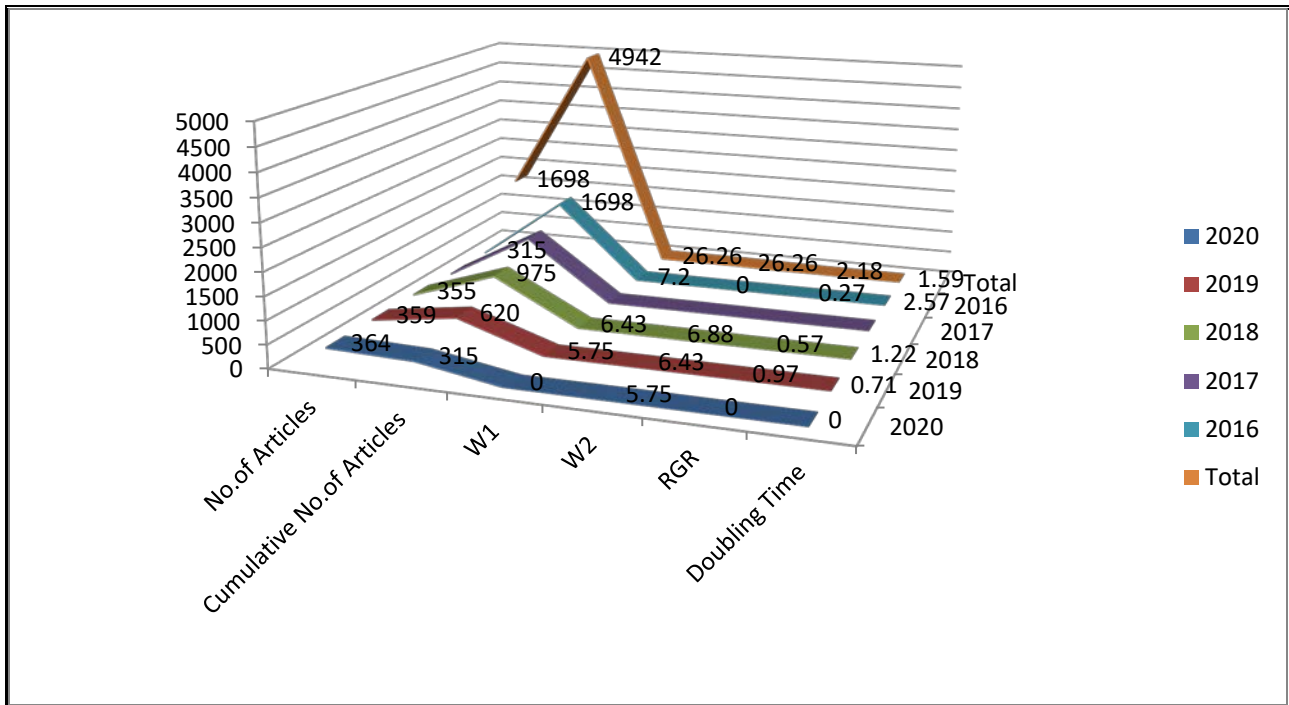| SN	Year	No. of Articles (%)	Cumulative No. of Articles	W1	W2	RGR	Doubling Time
1	2020	364(21.43%)	315	0	5.75	0	0
2	2019	359(21.14%)	620	5.75	6.43	0.97	0.71
3	2018	355(20.90%)	975	6.43	6.88	0.57	1.22
4	2017	305(17.96%)	1334	6.88	7.20	0.37	1.87
5	2016	315(18.55%)	1698	7.20	0.00	0.27	2.57
	TOTAL	**1698 (100%)**	**4942**	**26.26**	**26.26**	**2.18**	**1.59**

Fig-1: Research growth rate

2. Co-Authorship Index (CAI):

In order to understand the pattern of authorship, five-year data from the year 2016 to 2020 has been used and data were analyzed in different types of authorship pattern. The analysis shows that out of 1698 articles by 6362 authors published in five years, only 4.94% (84) papers are written by a single author and 27.85% (473) by two authors, 19.55 % (332) by three authors and 16.31% (277) by four authors. About 95.02% Papers are the result of collaborative research. The table also reveals that there is increasing trend in collaborations from 2016 to 2020 in two, three and four authored papers. The formula of Co-authorship index was used (Subramanyam, 1983)

Table-2: Co-Authorship Index

Number of Authors	Articles 2020	Articles 2019	Articles 2018	Articles 2017	Articles 2016	Total	Total Authors	Articles%
One author (CAI)	13 (72.94)	16 (90.092)	24 (136.66)	17 (112.67)	14 (89.84)	84	84	4.94
Two authors (CAI)	87 (85.8)	108 (108.00)	102 (103.15)	89 (104.75)	87 (99.15)	473	946	27.85
Three authors (CAI)	72 (101.17)	64 (102.29)	71 (103.91)	61 (102.29)	64 (103.91)	332	996	19.55
Four authors (CAI)	73 (122.94)	54 (92.21)	49 (84.61)	44 (88.43)	57 (110.92)	277	1108	16.31

Five authors (CAI)	45 (109.9)	33 (81.72)	39 (97.67)	39 (113.68)	35 (98.78)	191	955	11.24
Six authors (CAI)	26 (106.39)	29 (120.32)	23 (96.5)	19 (92.79)	17 (80.38)	114	684	6.71
Seven authors (CAI)	12 (83.55)	15 (105.89)	19 (135.64)	11 (91.4)	10 (80.45)	67	469	3.94
More author (CAI)	36 (36.96)	40 (118.24)	28 (83.7)	25 (86.97)	31 (104.44)	160	1120	9.42
Total	**364**	**359**	**355**	**305**	**315**	**1698**	**6362**	**95.02**

3. Collaboration index of the authors:

This table 3 reveals the degree of collaboration by calculating the pattern of single and joint authorship of papers. The degree of collaboration is found to be increasing these years, from 104.44 in year 2016 to 36.96 in the year 2020 which means that faculty and scholars are writing in collaboration. This trend may due to the interdisciplinary nature of research carried out these days. The collaboration index counted by the following formula suggested by the (Lawani, 1980)

Table-3: Collaboration Index of the Authors

Year	Single Author	Two Authors	Three Authors	Four Authors	Five Authors	Six Authors	Sevan Authors	More	Total
2016	14	87	64	57	35	17	10	31	315
	89.841	99.15	103.91	110.92	98.78	80.38	80.45	104.44	
2017	17	89	61	44	39	19	11	25	305
	112.67	104.75	102.29	88.43	113.68	92.79	91.4	86.97	
2018	24	102	71	49	39	23	19	28	355
	136.66	103.15	103.91	84.61	97.67	96.5	135.64	83.7	
2019	16	108	64	54	33	29	15	40	359
	90.092	108.00	102.29	92.21	81.72	120.32	105.89	118.24	
2020	13	87	72	73	45	26	12	36	364
	72.194	85.8	101.17	122.94	109.9	106.39	83.55	36.96	
Total	84	473	332	277	191	114	67	160	1698
	100	104.75	100	100	100	100	100	100	

$$CI = \frac{\sum_1^A = 1 jfj}{N}$$

Where

$"J"$ = the number authors in an article i.e. 1, 2, 3.....

Fj= the number of j authored articles

N= the total number of articles published, and

A = the total number of authors per articles'

Hence, table 2 is calculated by the using above formula thus;

$$CI = \frac{\Sigma_1^A = 1jfj}{N}$$

$$CI = \frac{(1 \times 14) + (2 \times 87) + (3 \times 64) + (4 \times 57) + (5 \times 35) + (6 \times 17) + (7 \times 10) + (8 \times 31)}{315}$$

$$= \frac{(14) + (174) + (192) + (228) + (175) + (102) + (70) + (248)}{315}$$

$$= \frac{1203}{315}$$

4. Document Type of Pattern:

Table 4 shows the types of publication used by the authors to publish their research work. Out of 1698 publications, articles 1276 (75.15%)are the most used form for publishing, followed by conference paper i.e.211 (12.43%), and followed by book chapter with 98 (5.77%). This analysis reveals that faculty members and scholars of the M S University of Baroda prefer to publish their work in journal article.

Table-4: Distribution of Document type

SN	Document Type	Articles	Percentage
1	Article	1276	75.15
2	Book	8	0.47
3	Book Chapter	98	5.77
4	Conference Paper	211	12.43
5	Editorial	11	0.65
6	Erratum	3	0.18
7	Letter	6	0.35
8	Note	6	0.35
9	Retracted	1	0.06
10	Review	76	4.48

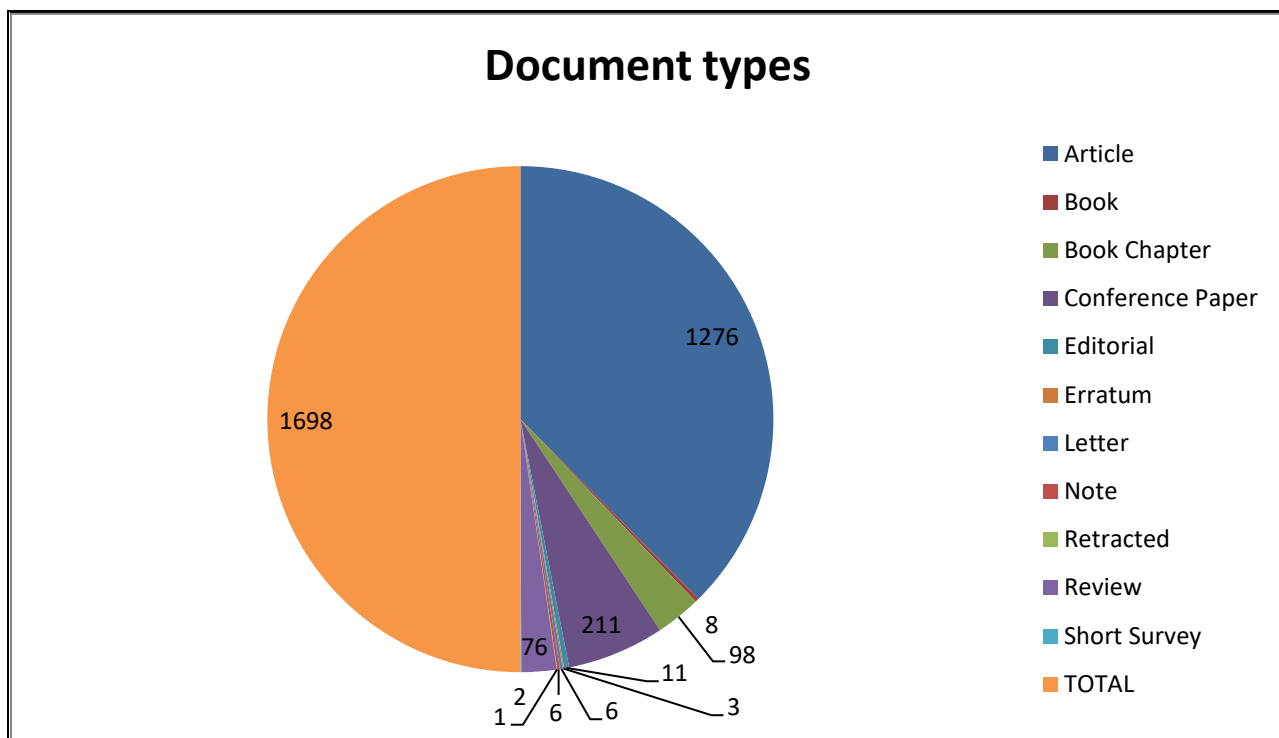| 11	Short Survey	2	0.12
	TOTAL	**1698**	**100.00**

Fig-2: Distribution of Documents type

5. **Ranking of Journals Titles:**

The analysis of Table 4 shows that the majority (75.15%) publication of the M.S University of Baroda has been published in Journals. In order to understand distribution of these articles, a ranked list of journals based on articles publish in them has been prepared in table-5. Here 20 rank titles have been listed here accounting for 298 articles published out of 1276 papers published in journals. There are total 20 journals who have published the total 1276 articles. The AIP conference proceedings 57 (19.13) has got the first rank followed by Chemistry Select 23 (7.71%), 'Physical review C 19 (6.37%) etc.

Table-5: Rank List of Core Journals

SN	Source Title	Articles	Rank	Percentage
1	AIP Conference Proceedings	57	1	19.13
2	Chemistry Select	23	2	7.71
3	Physical review C	19	3	6.37
4	Fathering in India: images and realities	17	4	5.70
5	AAPs pharm SciTech	14	5	4.69
6	International journal of engineering and advanced technology	14	6	4.69
7	International journal of hydrogen energy	14	7	4.69
8	Journal of environmental chemical engineering	13	8	4.36
9	Materials today: proceedings	13	9	4.36
10	RSC advances	13	10	4.36
11	Journal of Molecular liquids	12	11	4.02
12	Advances in intelligent systems and computing	11	12	3.69
13	Scientific Reports	11	13	3.69
14	Journal of Drug delivery science and technology	10	14	3.35
15	New journal of Chemistry	10	15	3.35
16	Polyhedron	10	16	3.35
17	Zootaxa	10	17	3.35
18	Drug development and industrial pharmacy	9	18	3.02
19	International journal of Biological Macromolecules	9	19	3.02
20	Journal of Materials Science: materials in electronics	9	20	3.02
	Total	**298**		**100.00**

6. Highly Productive Authors:

Table 6 shows the list of the most prolific authors who have contributed significantly in association with The M S University of Baroda research output. The ranked list was downloaded from SCOPUS database for all the 1698 papers. There are 15 authors who have published 589 publications during 2016-2020 accounting for 99.95%. The average output per author was 39.26. Table 6 and figure 3 presents in details about most productive authors of The M S University of Baroda during the study period. The most prolific author was Jha, P K who topped in the author list with 147 papers having total citations 915 followed by Patel, A with 45 papers having citations 243 (2nd rank), Begum R with 43 papers having

citations 335 (3rd rank). Three authors ranked at 5th position with 33 papers each but their citations are 222,51 and 227 respectively. Two other authors ranked at 10th position with 26 papers each, where as Gupta S has scored higher citations than Singh N. Prof.Murthy, K V R has least number of publications, which has been cited 80 times.

Table-6: Ranking of highly Productive Authors

| Rank	Author	Total Publication	h_index	g_index	m_index	Total Citations	Percentage of 589
1	Jha P K	147	16	21	2.667	915	24.95
2	Patel A	45	7	12	1.167	243	7.64
3	Begum R	43	11	16	1.833	335	7.30
4	Mukherjee S	36	6	7	1	105	6.11
5	Anand A	33	9	14	1.5	222	5.60
6	Rajput K S	33	4	4	0.667	51	5.60
7	Yadav M R	33	8	14	1.333	227	5.60
8	Misra A	32	11	21	1.833	482	5.43
9	Kanchan D K	30	10	18	1.667	329	5.09
10	Javidi B	29	9	14	1.5	216	4.92
11	Dabhi S D	27	9	14	1.5	226	4.58
12	Gupta S	26	11	20	1.833	414	4.41
13	Singh N L	26	5	7	0.833	84	4.41
14	Jadeja R N	25	7	13	1.167	184	4.24
15	Murthy K V R	24	5	8	0.833	80	4.07
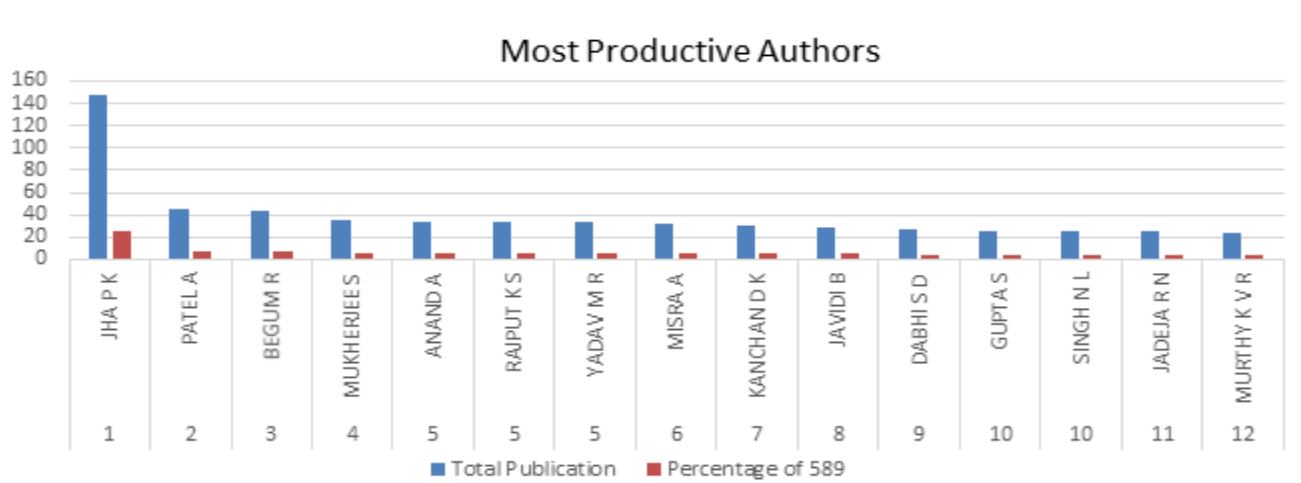
Fig 3: Most Productive Authors

7. Most Cited Countries:

Most Cited Countries of papers shows the authors affiliation from different countries. There were 15 countries' Indian authors who are the part of 1698 papers where The M S University has represented. The India (7391 citation received, ACPP was 5.71) to be found first position among 15 participating countries at international level followed by United States of America (328 citation received, ACPP was 3.92%), Sweden (99 citation received, ACPP1.18%). List of the 15 countries representing more than 18 citation were listed here in the Table: 7 and figure: 4

Tables-7: Most Cited Countries

SN	Country	Total Citation	ACPP: Average Citation per paper
1	India	7391	5.71
2	USA	328	11.71
3	Sweden	99	24.75
4	Oman	76	38.00
5	Canada	70	23.33
6	China	59	14.75
7	Australia	50	16.67
8	Germany	47	15.67
9	Korea	42	8.40
10	Switzerland	39	39.00
11	United Kingdom	39	9.75
12	Iran	38	12.67
13	Spain	38	9.50
14	Singapore	22	11.00
15	France	18	6.00

ACPP: Average Citation per paper

No of citation

18, 0%
32...
7391, 88%

- 1 India
- 2 USA
- 3 Sweden
- 4 Oman
- 5 Canada
- 6 China
- 7 Australia
- 8 Germany
- 9 Korea
- 10 Switzerland
- 11 United Kingdom
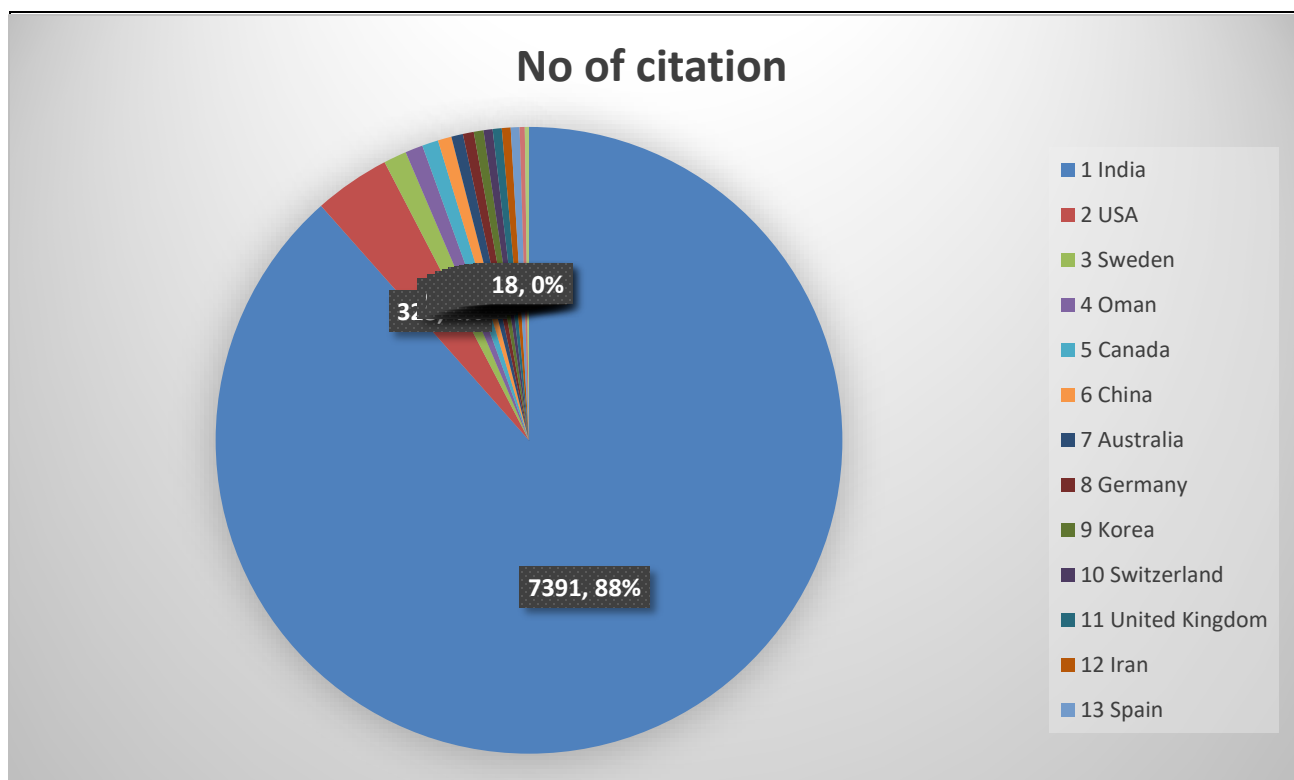- 12 Iran
- 13 Spain

Fig 4: Number of citations received by countries

8. M S University with collaboration Institutions Affiliation

It is evident from table 8 that in The M S University of Baroda published the number of papers (1698, 100%) is published by most of Indian's institute along with collaboration, Sardar Patel University (143, 8.42%) followed by Bhabha Atomic Research Centre stood the same rank i.e. the second position which has been compared with Baylor College of Medicine and University of Connecticut (22, 1.30%). The other institutions have publications.

Table-8: M S University with collaboration Institutional Affiliation

SN	Affiliation	Name of Country	No.of Articles	Percentage of Articles	Rank
1	The Maharaja Sayajirao University of Baroda	India	1698	100	1
2	Sardar Patel University	India	143	8.42	2
3	Bhabha Atomic Research Centre	India	143	8.42	2
4	Nirma University	India	52	3.06	3
5	Saurashtra University	India	39	2.30	4
6	Uka Tarsadia University	India	37	2.18	5
7	Charotar University of Science and Technology	India	35	2.06	6

8	Zydus Research Centre	India	32	1.88	7
9	Pandit Deendayal Petroleum University	India	25	1.47	8
10	Baylor College of Medicine	USA	22	1.30	9
11	University of Connecticut	USA	22	1.30	9
12	Institute of Seismological Research	India	21	1.24	10
13	North Eastern Hill University	India	19	1.12	11
14	Institute for Plasma Research	India	18	1.06	12
15	Anand Pharmacy College	India	17	1.00	13

9. Subject wise Distribution:

Table 9 revels the pattern of distribution of research paper among the broad disciplines. It is further discovered that the two highly productive subjects are physics and Astronomy subjects 398(12.08%), followed by Engineering as a discipline 373 (11.33%), biochemistry including genetics and molecular biology areas 267 (8.11%). Arts and Humanities and Social sciences are least represented, which has been depicted in the figure 5.

Table-9: Subjects Areas

Subject Area	Articles	% of Articles	Rank
Physics and Astronomy	398	12.08	1
Engineering	373	11.33	2
Materials Science	372	11.30	3
Chemistry	354	10.75	4
Biochemistry, Genetics and Molecular Biology	267	8.11	5
Pharmacology, Toxicology and Pharmaceutics	179	5.43	6
Chemical Engineering	157	4.76	7
Environmental Science	156	4.73	8
Agricultural and Biological Sciences	143	4.34	9
Medicine	140	4.25	10
Computer Science	118	3.58	11
Energy	103	3.12	12
Mathematics	98	2.97	13
Social Sciences	94	2.85	14
Earth and Planetary Sciences	83	2.52	15
Immunology and Microbiology	52	1.57	16
Multidisciplinary	40	1.21	17
Business, Management and Accounting	36	1.09	18

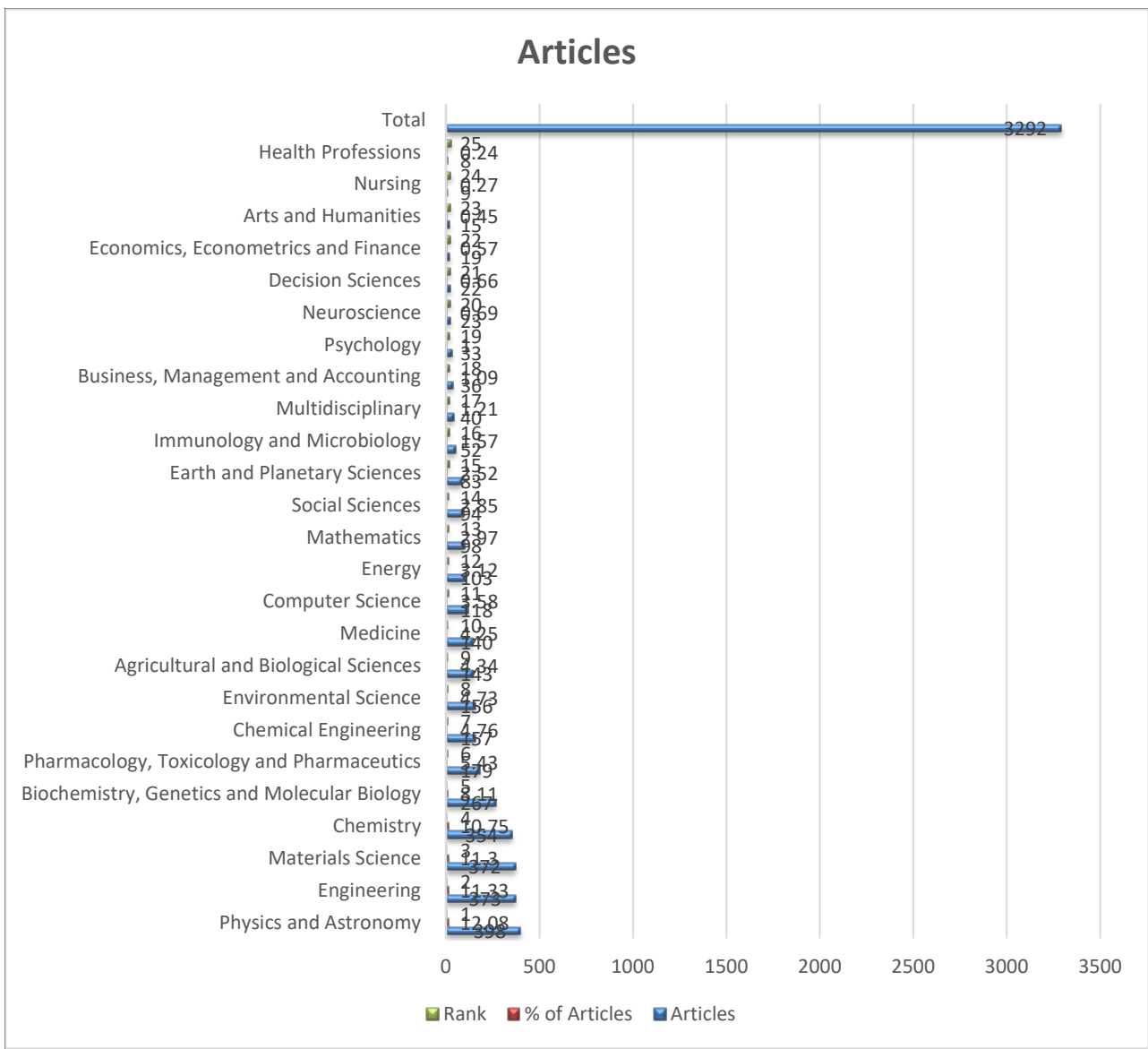|			
Psychology	33	1.00	19
Neuroscience	23	0.69	20
Decision Sciences	22	0.66	21
Economics, Econometrics and Finance	19	0.57	22
Arts and Humanities	15	0.45	23
Nursing	9	0.27	24
Health Professions	8	0.24	25
Total	**3292**		

Fig 5: Contribution of disciplines

10. List of the 10 most cited articles in Scopus, from the sample of 1698:

The top 10 cited publications of articles along with total number of citations received have been displayed in Table 10 and figure 6. The total citations counts were calculated according to Scopus database. One paper titled "Polyethyleneimine: A versatile, multifunctional non-viral vector for nucleic acid delivery" contributed by Pandey, A.P., Sawant, K.K. during the year 2016 received the maximum citations and is placed at the top which has been cited for a record number of 116 times whereas the "Insulin resistance: an additional risk factor in the pathogenesis of cardiovascular disease in type 2 diabetes" by Patel, T.P. *et al.* (2018) has been cited 91 times occupying 2nd position as the data accessed from Scopus appeared on 12th May;2021.

Table-10: Citation of the publications

Rank	Authors	Title	Source	Cited
1	Pandey, A.P., Sawant, K.K. (2016)	Polyethyleneimine: A versatile, multifunctional non-viral vector for nucleic acid delivery	Materials Science and Engineering C	116
2	Patel, T.P., Rawal, K., Bagchi, A.K., (...), Gupta, S., Singal, P.K. (2016)	Insulin resistance: an additional risk factor in the pathogenesis of cardiovascular disease in type 2 diabetes	Heart Failure Reviews	91
3	Gupta, S., Murthy, C.N., Prabha, C.R. (2018)	Recent advances in carbon nanotube based electrochemical biosensors	International Journal of Biological Macromolecules	86
4	Joshi, J.H., Kanchan, D.K., Joshi, .J., Jethva, H.O., Parikh, K.D.(2017)	Dielectric relaxation, complex impedance and modulus spectroscopic studies of mix phase rod like cobalt sulfide nanoparticles	Materials Research Bulletin	77
5	Bhatt, P., Lalani, R., Vohra, I., (...), Misra, A., Mashru, R. (2018)	Liposomes encapsulating native and cyclodextrin enclosed paclitaxel: Enhanced loading efficiency and its pharmacokinetic evaluation	International Journal of Pharmaceutics	73
6	Sharma, R.K., Archana, G. (2016)	Cadmium minimization in food crops by cadmium resistant plant growth promoting rhizobacteria	Applied Soil Ecology	72
7	Butani, D., Yewale, C., Misra, A. (2016)	Topical Amphotericin B solid lipid nanoparticles: Design and development	Colloids and Surfaces B: Bio interfaces	68
8	Jadeja, R.N., Upadhyay, K.K., Devkar, R.V., Khurana, S. (2016)	Naturally occurring Nrf2 activators: Potential in treatment of liver injury	Oxidative Medicine and Cellular Longevity	63
9	Kumar, D., Rajouria, S.K., Kuhar, S.B., Kanchan, D.K. (2017)	Progress and prospects of sodium-sulfur batteries: A review	Solid State Ionics	60

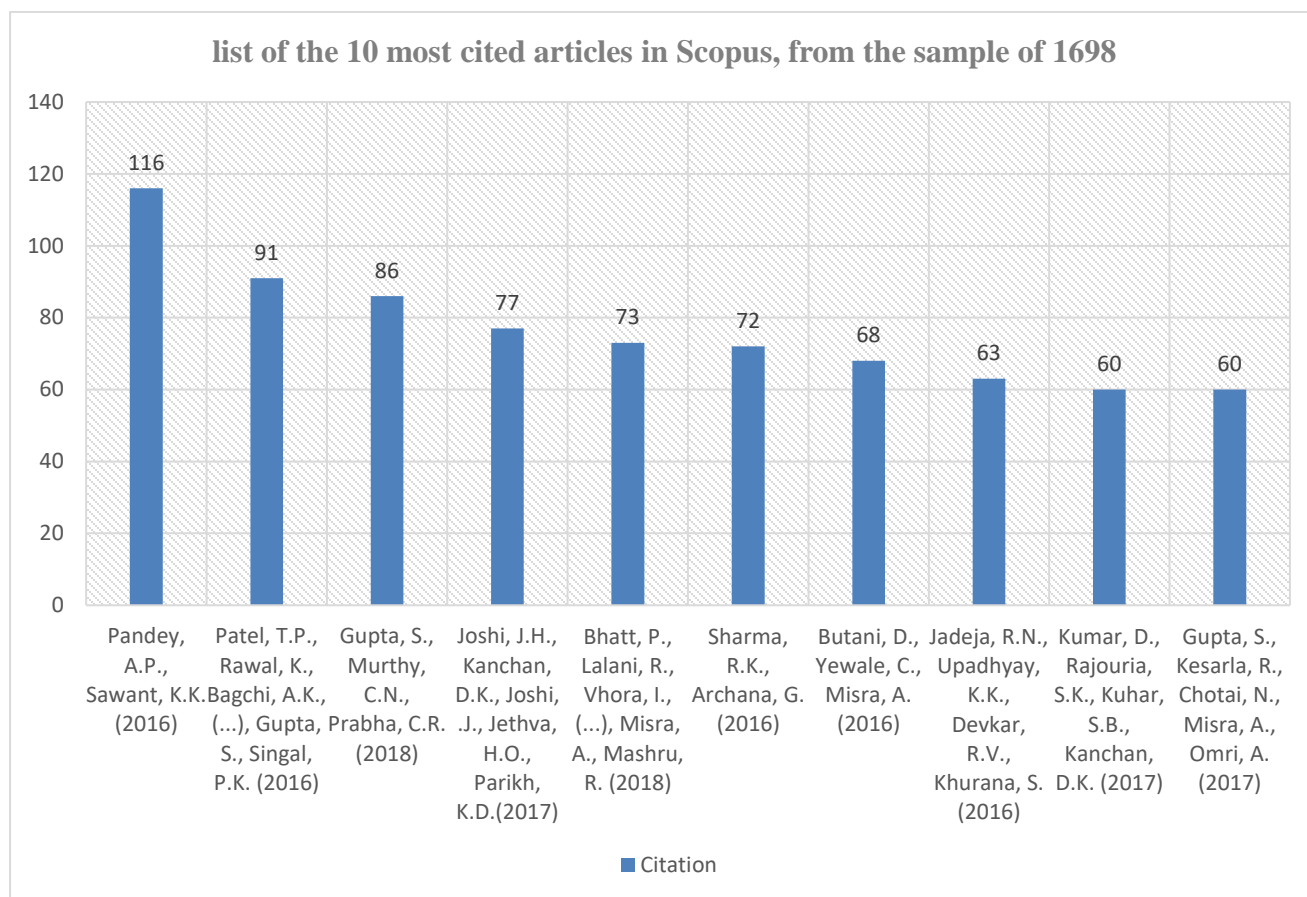| 10	Gupta, S., Kesarla, R., Chotai, N., Misra, A., Omri, A. (2017)	Systematic approach for the formulation and optimization of solid lipid nanoparticles of efavirenz by high pressure homogenization using design of experiments for brain targeting and enhanced bioavailability	BioMed Research International	60

Fig 6: Citation of Articles of the authors

(Source: Research data accessed from Scopus on: -12th May 2021)

Major Findings:

1. The highest number of publications (364, (21.43% of 1698)) were published in the year 2020.
2. Multi-authored contributions are more than 80.45%.
3. P.K Jha is the most productive author with 147 papers.
4. It is further discovered that the two highly productive subjects are physics and Astronomy subjects 398
   (12.08%), followed by engineering as a discipline 373 (11.33%), biochemistry including genetics and molecular biology areas 267 (8.11%). Arts and Humanities and Social sciences are least represented in Database.

5. Faculties and Researchers of The Maharaja Sayajirao University of Baroda prefer to publish their research papers in international journals from foreign countries.

Conclusion

From the above analysis, it has been reached in a conclusion that the M S University of Baroda authorities should explore the reasons, issues, and challenges in improving its research profile. Besides, there should be an Investment done in developing research support facilities for the researchers to promote the publishing efforts of authors with special awards or incentives. Conduct workshops to improve the research and publishing efforts of its researchers. Develop strategies to address the imbalances in research output across various departments.

References

Balutagi, S., Huded, S. M., & Devi, K. N. (2020). Measuring Research Contributions of Prof. Anurag Kumar: A Scientometric Analysis. *Library Philosophy and Practice (e-journal)*, 4626. Retrieved from https://digitalcommons.unl.edu/libphilprac/4626

Banshal, S. K., Uddin, A., & Singh, V. K. (2015). Identifying themes and trends in CS research output from India. . *2015 International Conference on Cognitive Computing and Information Processing(CCIP)*, (pp. 1-6). doi:10.1109/CCIP.2015.7100742

Chaudhari, S. P., Bhatt, A., & Mandalia, S. H. (2020). Trends in Annual Seminar Papers of Ahmedabad Library Network: A Bibliometric Analysis. *Library Philosophy and Practice (e-journal)*. Retrieved from https://digitalcommons.unl.edu/libphilprac/4281/

Chaudhari, S., Chaudhary, A. S., & Vaishnav, N. (2017). Bibliometric Analysis of Book of Papers of Annual Seminars of Ahmedabad Library Network (ADINET). *Re-imaging Today's Librarianship: ADINET 2017 Proceedings of 125th Birthday Celebrations of Dr. S. R. Ranganathan.* Bookwell.

Chaudhary, A., Chaudhary, S., Vaishnav, N., & Dave, S. (2015). Digitization of EDI Repository Resources. *Library as a Learning Space: Role and Relevance of Libraries in the Future.*

Elsevier. (2021, February 9). *Scopus*. Retrieved from Scopus : https://www.scopus.com/

González, J. D., Hoz, J. D., & Beltrán, J. R. (2019). Scientometric Study of Superconductivity Research in South America from 1980 to 2019. *Journal of Physics: Conference Series*, (p. 1391). doi:10.1088/1742-6596/1391/1/012133

Hanumappa, A., Desai, A., & Dora, M. (2015, January 22). A Bibliometrics Profile of Gujarat University, Ahmedabad during 2004-2013. *DESIDOC Journal of Library & Information Technology, 35*(1). doi:10.14429/djlit.35.1.7699

Huded, S. M., & Balutagi, S. (2020). Measuring Global Scientific Research On COVID-19: A Bibliometric Analysis. *Library Philosophy and Practice (e-journal)*, 4208. Retrieved from https://digitalcommons.unl.edu/libphilprac/4208/

Jelvehgaran, E. H., Tavasoli, K., & Jabbarzadeh, A. (2019). Big data and social media: A scientometrics analysis. *International Journal of Data and Network Science, 3*(3), 145-164. doi:10.5267/j.ijdns.2019.2.007

Lawani, S. M. (1980). Quality, collaboration and citations in cancer research: A bibliometric study. *Ph.D Dissertation* . Australia: The Florida State University, 1980.

Mahapatra, G. (1994). Corelation between growth of publications and citations:A stud based on. *Annals of Library Science and Documentation, 41*(1), 8-12.

msubaroda. (2021, April 28). Retrieved from The Maharaja Sayajirao University of Baroda: https://www.msubaroda.ac.in/

Murali, K. K. (2005). Bibliometric Analysis of Doctoral Theses Submitted In Rajasthan Agricultural University Bikaner During 1996 - 2000: A Thesis. *Vikram University,*. MP: Vikram University.

Parmar, S. D., & Mandalia, S. H. (2016, April 19). Webometric Analysis of Universities in Gujarat. *Journal of Advancements in Library Sciences, III*(2), 103-111. Retrieved from http://sciencejournals.stmjournals.in/

Patel, P., & Bhatt, A. (2019). Quantitative Synthesis of Published Research A Study of Gujarat University. *Library Philosophy and Practice*. Retrieved from https://digitalcommons.unl.edu/libphilprac/2514/

Patel, P., & Bhatt, A. (2021). Growth and impact of scholarly contributions for SP University: A Bibliometric Analysis. *Library Philosophy and Practice*. Retrieved from https://digitalcommons.unl.edu/

Pritchard, A. (1969). Statistical bibliography or bibliometrics. *Journal of Documentation, 25(4), 48., 25*(4), 348-349 .

Ram, S. (2014). Research Profile of "Polycystic Ovary Syndrome": A Bibliometric Perspective of Literatures from 1984-2013. *COLLNET Journal of Scientometrics and Information Management, 8*(2), 311-327. doi:10.1080/09737766.2014.954857

Subramanyam, K. (1983, January 1). Bibliometric studies of research collaboration: A review. *Journal of Information Science, VI*(1), 33-38. doi:10.1177/016555158300600105

VOSviewer. (2021). *VOSviewer*. Retrieved April 2021, from https://www.vosviewer.com/

Vyas, P., & Asnani, R. (2018, July). Scholarly publications of the Maharaja Sayajirao University of Baroda, Vadodara: a bibliometrics study:. *Towards Excellence: An Indexed, Refereed & Peer Reviewed Journal of Higher Education, 10*(2), 202-208.