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# Quantitative Synthesis of Published Research: A Study of Gujarat University

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# Quantitative Synthesis of Published Research: A Study of Gujarat University

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**Abstract:** Research is the one of the most reliable criteria to evaluate the quality of and educational institutes. And the quality can determine by the terms of quantitative evaluation of research publications of institutional scholars with scientometric analysis, this study executed to check the performance, growth and sustainability of scholarly research work carried out at Gujarat University in between year 2008 to 2017. The basic data obtained from the bibliographic database SCOPUS where the total 1248 records searched and analyzed. The result brings up some interesting facts and figures. Study reflects Journals as the most favored publications with 81.97% coverage. Degree of Collaboration (DC) 0.96 indicates that the most research work jointly carried out by Gujarat University scholars. Study shows the tremendous growth of research and research to more than double in decade from 88 publications of 2008 to 189 publications in 2017, publications increase nearby 2.14 times. Citation analysis indicated 77.72% publications cited by single or more times. The researchers point out remarkable growth and upward movement in Gujarat University research. The most work performed in collaborative way however the international collaboration required being increase. The study recognizes some barrier to count the accurate quantitative analysis, like language, regional seminars and conferences publications and un-indexed publications. The possible future study with the Gujarat University faculty publications indexed in other platforms, which should provide the precise analysis of faculty research work of Gujarat University.

**Keyword:** Scientometric, Bibliometric, Gujarat University, Research Productivity

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## Introduction

Research is the most significant character to count the performance of faculty and as well educational institutes by their work of esteem the intellectual of faculty knowledge, it has the educational values, it's more than the profile content and can put emphasis on social development. The research makes firm impact on society and it plays the most important role in built up nation strong. The various government bodies, national committees, private journal's ranking put the heavy weightage on research work for assessment of ranking and gradation process. National Assessment and Accreditation Council (NAAC) and National Institutional Ranking Framework (NIRF) consider the institutional research as the most important segment in the evaluation. NAAC segregates assessment in 7 criteria and where the research innovation and extension allocated the 25% weightage out of the total score of 1000

([www.naac.gov.in](http://www.naac.gov.in)) It is the highest on all the 7 criteria and this highest weightage discriminates the value and need of research in education institute.

### **About Gujarat University**

Gujarat University (<http://www.gujaratuniversity.ac.in>) established in 1949, offers graduate post graduate and doctoral degree program in various faculty of Arts, Commerce, Science, etc. The university highly involved in research in as way of execution on of the mission statement “Promotion of Research, consultancy and extension for the benefit of Society”. Numbers of minor and major research carried out by the university scholars, funded by diversified funding agencies i.e. UGC, CSRI, ISRO, MHRD, GUJCOST etc. The University established an Internal Quality Assurance Cell (IQAC) for quality enhancement in academic and research excellence. One of the largest libraries by means of space and by means of resource, The Gujarat University library established in year 1951 extensively involved performing the information seeking of university scholars. With the vision statement “To support scholarship and research productivity among University Community”, library provides a range of print, non-print, digital resources and more than 10000 electronic databases to their researchers and academic community to boost up the quality of research.

In 2017 Gujarat University acquired the B++ grade with in 2<sup>nd</sup> cycle of NAAC assessment previously Gujarat University scored the B grade in 1<sup>st</sup> Cycle, 2015. One of the reputed private national surveys on the best universities in India, ‘The Week-Hansa Research Study Survey’ executed by *The Week* ranked the Gujarat University on minor downstairs position in last four years. In compare of the year 2015 ranking of 26<sup>th</sup> position Gujarat University moved down on 31<sup>st</sup> rank in year 2016 (Bose, 2016) The same survey for 2018 ranked the university on 32<sup>nd</sup> rank with 367 score, the same ranked grabbed by the university in earlier survey of 2017 (Singh, 2018). Ministry of Human Resource Development, Govt. of India launched the ranking system National Institutional Ranking Framework (NIRF) from 2015 (<https://nirfindia.org>). NIRF also emphasis on the research as the assigned the weightage of 0.30 to research and professional practice, indicates that the research covers up the 1/3<sup>rd</sup> position of total scoring in NIRF ranking. Under the NIRF ranking University ranked on the 73<sup>rd</sup> place in year 2016, where research and professional practice scored 59.60 out of 100 supports the contributed the most in rank of Gujarat University in the ranking status of top 100 universities of India. These high standards of assessments, rankings, and surveys necessitate the university to focus on research and innovation grab the position on top of the list.

Bibliometric and scientometric used as the techniques to evaluate and to examine the research work in quantitative as well qualitative aspect by statistical study of bibliographies. Counting, categorizing and statistical presentation the various parameters of bibliographic records known as bibliometric or scientometric. (Pritchard, 1969) introduced the term ‘Bibliometric’, earlier known as ‘Statistical Bibliography’ introduced by (Hulme, 1923) for evaluation of journal articles and counted the ranking of countries by their productivity. Scientometric developed with the same concept of bibliometric which mainly used for evaluating the research of science and technology. (hood & Wilson, 2001) stated scientometric and bibliometric studies are indistinguishable from each other. Bibliometric used to evaluate and examine characteristics of research work discipline, scholarship, institutional affiliation collaboration,

development of subject area and etc. Various statistical methods used to measure the publication in statistical manner with authorship, citation, publication pattern, relationship and growth of subject domains. Growth of subject, institutional productivity and individual contributions are countable in bibliometric. It's useful to researchers, policy makers, to design to keep track and to develop the new research and policy time by time.

This study is trying to analyze the bibliographic records by using bibliometric and scientometric tools and techniques to present the scenario of research of faculty member of Gujarat University. This attempt carried out to portrait the picture of research work carried out by researches and faculty members of Gujarat University. It should useful to faculty members to set up new trends and to focus on the hidden subject area of research, to management for fulfill the lack of policies, infrastructures and facilities for research and the library for the collection development and user satisfaction.

### **Review of related literature**

Research work of quantitative and qualitative evaluation for research work carried out by any universities or educations institutes has been executed by numbers of researchers. It's founded that the scientometric and bibliometric used as the tools to count the productivity performance by means of qualitative as well the quantitative examination of research publications.

(Maharana & Das, 2013) carried out a study bibliometric analysis of Utkal University research publications published during 2008-2012 based on indexed in Scopus bibliographic database, to find out the annual growth of university publication, author productivity etc. Researched analysed 447 papers and figured out 0.95 Degree of Collbration as out of 447 papers only 19 papers contributred by single author and annual growth rate counted 8.77%. Study calculated 3.8 average authors per paper. (Noruzi & Abdekhoda, 2014) performed a metric based study for quantitative analysis or research publications of Iraqi-Kurdistan universities. Bibliographic database SCOPUS used to gather the data for research and evaluated 459 publications. Analysis striking that the 52% of publications internationally collaborated. The analysis found the steady growth in research and noticed that journal articles cited the most in compare of proceedings. They suggested to developed the effective policies, infrastructures & equipments and provide the funding in relevance of research aspect. (Tripathi & Kumar, 2015) presented the quantitative scenario of faculty research work carried out by the Jawaharlal Nehru University, New Delhi. The study examined 5007 publications of last four decades indexed in Web of Science (Wos). They noted that the worldwide collaborative work increased in last four decades. (Goswami & Hazarika, 2016) evaluated the metric analysis of research productivity for Assam University, they examined 714 publication's bibliographic data extracted from Web of Science published in period of 2000-2015 the paper found the notable progress in research productivity and contributions internationally. The study concluded with remarks the scholarly publications are the best resource to assess the research performance. (Galyani-Moghaddam, Jafari, & Sattarzadeh, 2017) discussed in their research report of scientometric analysis of faculty publication of Allameh Tabataba'i University reported the lower rate of collaborative work with 0.05% indicated the lake of collaboration in research work made by the faculty members of Allameh Tabataba'i University. The based data captured from the two databases, 410 datasets from Science Citation Index (SCI) as well 583 datasets from SCOPUS. Various software and tools applied

to evaluate and interpret the gathered data. The massive gap noted by the study between nation and international publications in research of the university. Majorly international work performed in collaboration with the USA authors. Research concluded language and international relationship as the top barriers for less collaborative work and suggested to structuralize the concrete base to move on toward the higher contribution international research work conducted by the university faculty. The research carried out by (Parabhoi, Sahu, & Kumari, 2017) emphasizes on the research trend of research work performed by the Dr. Yashwant Singh Parmar University of horticulture and forestry, Solan Nauni. Researchers' analyzed 560 bibliographic records from SCOPUS database and evaluation founded journal as the most favored communication tool for research publications. Variance in research work of different departments of university indicates the lack of strong policy to promote the research. The paper concluded with the suggestion of constraint of strong strategy to increase the research to create the compatible research profile among the other Indian universities. (Barik & Jena, 2018) presented as research report for 10 open access journals of Library and Information Science (LIS) index in Scopus database during 2001 to 2015. They evaluated 5208 publications to examine the objective of paper i.e. author productivity, collaborative productivity etc. Researchers analyzed and calculated the data with bibliometric tools and techniques and summarized 0.72 degree of collaboration, 0.29 collaborative co-efficiency and 0.73 collaborative index, which indicates the low rate of collaborative research in LIS open access journals. Study concluded, Researchers of 83 countries published their publications on this platform established the quality impact and acceptance of open access journals in LIS field. (Saini & Verma, 2018) executed the bibliometric analysis of 436 articles from India and Pakistan published in Library Philosophy and Practice during 2008-2017. They analyzed various bibliometric parameters i.e. geographic distribution, authorship pattern length of paper, etc. Out of 436 articles, 346 articles of Indian authors and 86 publications from Pakistani published during the span. The evaluation figured out joint contribution of 21.6 articles per year by both countries, where average of 36 articles contributed by Indian and 9 by Pakistani authors. Average length of publications counted 11-15 pages. Researched concluded that the journal *Library Philosophy and Practice*, recognized as well-known publication and contributions increasing day by day by Indian and Pakistani authors in LPP. Articles received notable citation from other journal publications signified the worldwide acceptance of LPP. Earlier (Kumar, Dora, & Desai, 2015) evaluated the research productivity of Gujarat University for the publication published between Years 2004-2013. They used bibliometric technique to evaluate the 760 publication bibliometric data and founded the Journals as the most used communication tools for research work carried out by university faculty. The research concluded with concern to lower rate of research productivity of Gujarat University in compare of the other universities of the state and mentioned the positive impact of collaborative researches work to develop the positive environment among the faculty.

## **Objective**

The key objective of this research is to present quantitative analysis of research publications of faculty members and research scholar to determine the research productivity of Gujarat University for the period of 2008-2017. Based on the key objective, following sub-objective targeted to assess in the present study.

1. To identify communication form of research publications and publication source
2. To identify the annual growth of research literature
3. To identify the authorship, Co-authorship pattern and the most prolific authors of University
4. To identify collaborative development during decade
5. To identify the most productive subject domain
6. To identify the most cited papers
7. To identify the most preferred publications

### **Scope and Limitation**

The present study is limited to analysis the produced research work carried out by faculty & research scholars of Gujarat University in between 2008 to 2017. Researcher involved 1248 research publications published during 2008-2017 and index in SCOPUS database ([www.Scopus.com](http://www.Scopus.com)) till the December 2018, approach to analysis the research productivity by evaluating various aspects such as research area, citation, subject growth, Collaboration etc. the Study represent picture of only SCOPUS index publications during the span rather than other index databases and publications.

### **Research methodology**

The extensive data search for this research work captured by use of SCOPUS<sup>14</sup>. The key term used to perform search are Gujarat University. While Searching the SCOPUS database with affiliation organization keyword of ‘Gujarat University’ with filter of City ‘Ahmedabad’ and applied “AND NOT” formula i.e. “(AFFILORG( "Gujarat University")AND AFFILCITY (Ahmedabad) AND PUBYEAR>2007 AND PUBYEAR<2018” founded the 1248 Records, and confirm the accurately with the second search string i. e. (AF-ID("Gujarat University" 60024030) AND ( LIMIT-TO ( PUBYEAR,2017) OR LIMIT-TO ( PUBYEAR,2016) OR LIMIT-TO ( PUBYEAR,2015) OR LIMIT-TO ( PUBYEAR,2014) OR LIMIT-TO ( PUBYEAR,2013) OR LIMIT-TO ( PUBYEAR,2012) OR LIMIT-TO ( PUBYEAR,2011) OR LIMIT-TO ( PUBYEAR,2010) OR LIMIT-TO ( PUBYEAR,2009) OR LIMIT-TO ( PUBYEAR,2008) ) ) which produce the same result of 1248 publications records basically affiliated with Gujarat University in between the year of 2008 to year 2017 publisher by 4521 authors by singularly or in collaborative work. All the bibliographic details of searched records exported in MS-Excel program for further analysis, and applied statistical analytic and graphical representative tools within the scope of this evaluation study. Out of 1248 records 149 available in open access platform and rest 1099 publications counted restricted paid or login based access.

### **Treatment of Data**

Researcher has collected data of 1248 publications analyzed to validate the objective or present study. After the interpretations and analysis research finds the following facts and figures for the research productivity of Gujarat University for year 2008- 2017.

### **Objective 1 - To identify communication form of research publications and publication source**

While analyzing 1248 publications, Table I result out the various communication forms of research work such as articles, conference papers, review papers, book chapters, notes, Editorial works, letters and

others. The tabulate representation indicates Article as the most favored form of research work carried out by Gujarat University faculty with 965 publications almost covered 77.32 total productivity followed by huge gap of 62% the Conference Paper with 14.90%. The lowest contribution of Book Chapter counted 2.56% (32) and other form of communications represented only 1.84% contributions with 23 publications.

The publications published in various types of publications i.e. journals, conference proceeding, book series, books trade publications and other. As per the Table II the journals privileged the most with 1023 publications contributed 81.97% of total productivity, and rare other contributed 18.03% with 225 publications by totaling Conference proceeding 132 (10.58%), Books and Book series 84 (6.73%) and trade publications with 9 (0.72%) utilized by the Gujarat University scholars for their research production.

<b>Document Type</b>	<b>No. of Publications</b>	<b>Contribution (%)</b>
Article	965	77.32
Conference Paper	186	14.90
Review	42	3.37
Book Chapter	32	2.56
Others	23	1.84
<b>Total</b>	<b>1248</b>	<b>100.00</b>

<b>Publication Form</b>	<b>No. of Publications</b>	<b>Contribution (%)</b>
Journal	1023	81.97
Conference Proceeding	132	10.58
Book Series	46	3.68
Books	38	3.05
Trade Publications	9	0.72
<b>Total</b>	<b>1248</b>	<b>100.00</b>

## **Objective 2 - To identify the annuals the growth of research literature**

Table III represents the chronological development of research conducted by Gujarat University; show the steady growth in the studied decade. The year 2017 publications have almost reached to double with 189 (15.14%) productivity where in 2008 it was as 88 (7.05%) publications indicated the escalation of research greater than before. However, some downfall noted in the year 2013 (9.94%) and 2015 (10.74%). Research is base of any academic institute and significance of research noted in tabulate description with the average yearly contributions of 124.8 publications.

$$\text{Avg Yearly Contribution: AYC} = \frac{\text{Total Contribution}}{\text{Total Productivity Age}}$$

<b>Year</b>	<b>No. of Publications</b>	<b>Productivity (%)</b>	<b>Cumulative No. of Publications</b>	<b>Cumulative Productivity (%)</b>
2008	88	7.05	88	7.05
2009	101	8.09	189	15.14
2010	75	6.01	264	21.15
2011	90	7.21	354	28.37
2012	130	10.42	484	38.78
2013	124	9.94	608	48.72
2014	145	11.62	753	60.34
2015	134	10.74	887	71.07
2016	172	13.78	1059	84.86
2017	189	15.14	1248	100.00
<b>Total</b>	<b>1248</b>	<b>100</b>	-	-

**Objective 3 - To identify the authorship, Co-authorship pattern and the most prolific authors of University**

### **3.1 Authorship pattern**

<b>Authorship patterns</b>	<b>No. of Publications</b>	<b>Productivity (%)</b>
Single Author	38	3.04
Two Authors	309	24.76
Multi Authors	609	48.80
Mega Authors	292	23.40
<b>Total</b>	<b>1248</b>	<b>100</b>

(Schubert & Braun, 1986) elaborated Co-Authorship Index (CAI), later on (Garg & Padhi, 2001) build up formula for CAI counting. On the based on that the authorship divided in 4 patterns i.e. Single Author, Two Authors, Multi Authors (3 & 4 authors in a paper), and Mega Authors (5 or more authors per paper). Table IV of authorship pattern of GU shows the dominance of multi authors' work with 48.80% contributions with 609 publications followed by the two authors team work with 309 publications contributed 24.76%. The result shows the trend of individual research out of practice in GU; only the 38 publication contributed 3.04% in overall research of studied decade.

### **3.2 Co-authors pattern**

As per the Table V of co-authorship pattern analysis, almost 96% (1210) publications carried out in collaborative way at Gujarat University. Information & Communication Tools plays an important role in collaborative manners and support the most to work, to gather from different location, from different filed,



at different times of authors. The researchers carried the work together for testing the hypothesis and bring up the valuable research jointly. Degree of Collaboration (DC) developed by the (Subramanyam, 1983) measures the ratio of collaborative publications. In present study DC stand on 0.96 indicated the higher ration of collaborative work. Every year of studied period stands on 0.90 DC declare the acceptance of collaborative work at Gujarat University in year 2010 1.00 DC indicates the absence of solo work for said year.

$$DC = Nm / (Nm+Ns)$$

Here Nm referred as No. of Multi Author publications and Ns referred as No. of single Author publications.

Year	Authorship wise publications											Total	DC*
	1	2	3	4	5	6	7	8	9	10	10+		
2008	9	23	21	22	8	2	1	2	-	-	-	<b>88</b>	0.90
2009	4	34	30	15	7	7	2	2	-	-	-	<b>101</b>	0.96
2010	-	22	23	14	6	8	1	1	-	-	-	<b>75</b>	1.00
2011	3	22	19	28	9	6	2	1	-	-		<b>90</b>	0.97
2012	1	26	33	30	22	12	3	1	-	-	2	<b>130</b>	0.98
2013	4	29	25	33	16	9	3	2	1	2	-	<b>124</b>	0.94
2014	5	29	47	26	27	6	1	2	1	-	1	<b>145</b>	0.95
2015	6	25	38	37	17	10	-	-	-	-	1	<b>134</b>	0.95
2016	3	49	48	34	18	12	4	1	2		1	<b>172</b>	0.97
2017	3	50	50	36	21	18	5	3	1	1	1	189	0.97
<b>Total</b>	<b>38</b>	<b>309</b>	<b>334</b>	<b>275</b>	<b>151</b>	<b>90</b>	<b>22</b>	<b>15</b>	<b>5</b>	<b>3</b>	6	1248	0.96
* DC= Degree of Collaboration													

### 3.3 Prolific authors of University

The study shortlisted the top 11 authors in Table VI, counted as the most prolific authors who had more than 40 plus publications. Shrivastav, P.S. secure the top position with 110 publications which were cited 1065 times followed by Menon, S. K., published 76 publications. However, the ACCP score of study period swap both the position where 9.68 ACCP counted for Shrivastav and the highest 12.96 counted for Menon. H-index the author level metric which count the productivity and citation impact of researcher work, suggested by (Hirsch, 2005), H-index determines quality and quantity of publications of scholar. Shrivastav and Menon has the same and highest rate of h-index 18 followed by Shah with 14 score of h-index.

<b>Rank</b>	<b>Author</b>	<b>Number of Papers</b>	<b>Citation</b>	<b>ACCP*</b>	<b>H- Index of Period</b>	<b>Ranks on ACCP</b>
1	Shrivastav, P.S.	110	1065	9.68	18	5
2	Menon, S.K.	76	985	12.96	18	1
3	Shah, N.H.	72	771	10.71	14	4
4	Sanyal, M.	69	523	7.58	13	7
5	Chikhalia, K.H.	68	745	10.96	16	3
6	Gajjar, P.N.	59	159	2.69	7	11
7	Jani, A.R.	53	395	7.45	9	7
8	Verma, R.J.	49	572	11.67	13	2
9	Rana, V.A.	46	303	6.59	10	10
10	Patel, R.B.	45	334	7.42	9	9
11	Shah, N.K.	40	343	8.575	10	6

\* **ACCP - average citation per paper**

#### **Objective 4 – To identify collaborative development during decade**

##### **4.1 Institutional Collaboration**

159 institutes work collaboratively with GU and produce 1035 publications jointly; Table VII describes the institutional collaboration. Analysis brings up in notice, out of total 1248 publications 82.93% carried out in collaborative way. Top 10 institutes contributed nearby 30% of total collaborative research work carried by GU faculty. GU worked collaboratively with almost all the leading educational and research institute of state, where the Sardar Patel University obtained the top position in collaborative research work and contributed 79 (6.33%) publications.

<b>Sr. no.</b>	<b>Affiliation</b>	<b>Nos. Publications</b>	<b>Contribution %</b>	<b>Cumulative %</b>
1	Sardar Patel University	79	6.33	6.33
2	St. Xavier's College Ahmedabad	75	6.01	12.34
3	Veer Narmad South Gujarat University	33	2.64	14.98
4	Sardar Vallabhbai National Institute of Technology Surat	33	2.64	17.63
5	The Maharaja Sayajirao University of Baroda	29	2.32	19.95
6	L.M. College of Pharmacy India	29	2.32	22.28
7	Indian Space Research Organization	28	2.24	24.52
8	Veeda Clinical Research – India	28	2.24	26.76
9	Nirma University of Science and Technology	25	2.00	28.77
10	Ahmedabad University	20	1.60	30.37

## 4.2 Geographical collaboration

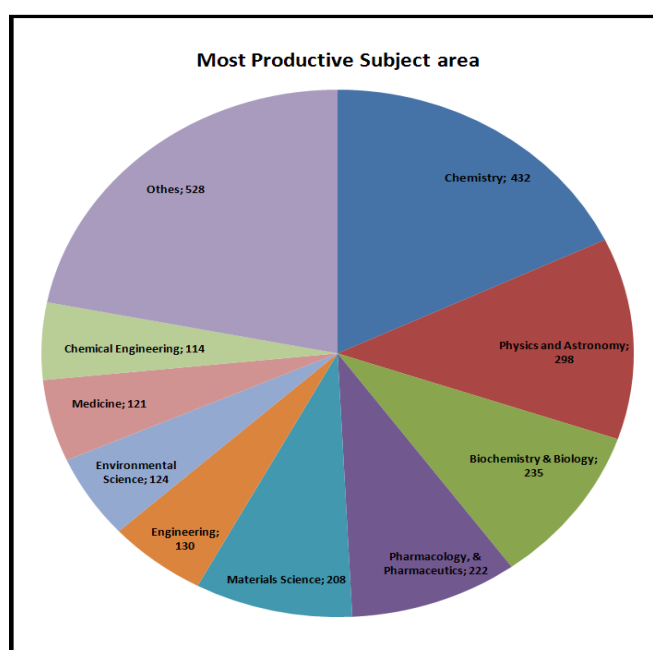
Table VIII describes the geographical distribution of collaborative productivity. During the span out or 1248 publications only 109 (8.73%) publications internationally collaborated with authors from United States, Taiwan, Belgium, Japan China UK Australia and many more countries, which were jointly carried out the research work with Gujarat University. United States contributed the highest 2.80% with 35 publications and the 2nd ranked country Taiwan productivity stand on 0.72% with 9 publications in collaboration with GU, Notable difference between top two collaborative countries is 2.08% is very huge amount. Statistics bring up in notice the very low rate of international collaboration in research at Gujarat University.

Country	Number of publications	International Collaborative (%)	Overall contribution (%)
United States	35	32.11	2.80
Taiwan	9	8.26	0.72
Belgium	7	6.42	0.56
Czech Republic	6	5.50	0.48
Japan	6	5.50	0.48
South Korea	5	4.59	0.40
China	4	3.67	0.32
5 countries with 3 publications each	15	2.75	1.2
6 countries with 2 publications each	12	11.01	0.96
10 countries with 1 publications each	10	9.17	0.80
<b>Total</b>	<b>109</b>	<b>100.00</b>	<b>8.73</b>

### Objective 5 - To identify the most productive subject domain

Research carried out several of subject by Gujarat university scholars, almost all the educational discipline performed in research work. The Figure-I indicates the most productive subject areas of research as university and Chemistry grab the top with highest numbers of publications 432 (18%) followed by the remarkable contribution of Physics and Astronomy with 298 (12%) research publications. It is revealed that Social science has contributed only 39 publications indexed in Scopus for duration of study period.

**Figure 1.** Productivity of Subject Area



## Objective 6 - To identify the Citation impact of Publications

### 6.1 Citation Received pattern

Quantitative analysis of citation expresses the quality of papers. Highly cited papers are important to the reputation of a university (Zhu *et al.*, 2004). Citation analysis is counted as the basic instrument to prove the quality of paper. Table IX represents citation pattern distribution of Gujarat University. Total 9156 citations received by these 1248 publications. Out of total 9156 citations, only 2 publications cited over the 100 times, 548 (43.91%) publications cited in between 2 to 10 times and 160 (12.82%) publications cited single times. However, out of 1248 publications, 278 papers (22.28%) not cited even single time yet.

### 6.2 Highly Cited papers published during 2008-2017

Table X. represents the list of to top 10 cited papers of Gujarat University research scholars. More the 70+ times cited papers included in the list. The list arranged in downward order to numbers of citation received by papers. As earlier discussed only 2 papers received more than 100 plus citation stands on top rank, the first one entitled “Recent advances in the synthesis of quinolines: A review” by Prajapati S.M., Patel K.D., Vekariya R.H., Panchal S.N., Patel H.D. cited over 148 times followed by “Applications of nano-catalyst in new era” by Chaturvedi S., Dave P.N., Shah N.K received 104 citations. Major of the publications stand for Chemical and Chemistry subjects indicated the higher quality based research in the particular subject area.

<b>Table IX. Citation Received pattern</b>			
<b>Citation</b>	<b>Number of papers</b>	<b>Cumulative total</b>	<b>%</b>
Above 100	2	2	0.16
51 to 100	18	20	1.44
21 – 50	76	96	6.09
11- 20	166	262	13.30
2 – 10	548	809	43.91
Single time cited	160	970	12.82
Not cited	278	1248	22.28
<b>Total</b>	<b>1248</b>	<b>-</b>	<b>100.00</b>

**Table X.** Highly Cited papers of GU faculty published during 2008-2017

Sr. No	Title	Authors	Source Title	Year	Citations
1	Recent advances in the synthesis of quinolines: A review	Prajapati S.M., Patel K.D., Vekariya R.H., Panchal S.N., Patel H.D.	RSC Advances	2014	148
2	Applications of nano-catalyst in new era	. Chaturvedi S., Dave P.N., Shah N.K	Journal of Saudi Chemical Society	2012	104
3	Optimal ordering policy for stock-dependent demand under progressive payment scheme	Soni H., Shah N.H.	European Journal of Operational Research	2008	96
4	Synthesis of benzimidazolyl-1,3,4-oxadiazol-2ylthio-N-phenyl (benzothiazolyl) acetamides as antibacterial, antifungal and antituberculosis agents	Patel R.V., Patel P.K., Kumari P., Rajani D.P., Chikhalia K.H.	European Journal of Medicinal Chemistry	2012	90
5	Recognition of lysine, arginine and histidine by novel p-sulfonatocalix[4] arene thiol functionalized gold nanoparticles in aqueous solution	Patel G., Menon S.	Chemical Communications	2009	90
6	Salinity-resistant plant growth promoting rhizobacteria ameliorates sodium chloride stress on tomato plants	Tank N., Saraf M.	Journal of Plant Interactions	2010	88
7	Optimizing inventory and marketing policy for non-instantaneous deteriorating items with generalized type deterioration and holding cost rates	Shah N.H., Soni H.N., Patel K.A.	Omega (United Kingdom)	2013	79
8	Prognostic significance of molecular markers in oral squamous cell carcinoma: A multivariate analysis	Shah N.G., Trivedi T.I., Tankshali R.A., Goswami J.V., Jetly D.H., Shukla S.N., Shah P.M., Verma R.J.	Head and Neck	2009	79

9	Antihyperglycemic, antihyperlipidemic and antioxidant effects of Dihar, a polyherbal ayurvedic formulation in streptozotocin induced diabetic rats	Patel S.S., Shah R.S., Goyal R.K.	Indian Journal of Experimental Biology	2009	75
10	Isolation, characterization and antioxidative effect of phyllanthin against CCl <sub>4</sub> -induced toxicity in HepG2 cell line	Krithika R., Mohankumar R., Verma R.J., Shrivastav P.S., Mohamad I.L., Gunasekaran P., Narasimhan S.	Chemico-Biological Interactions	2009	71

### Objective 7 - To identify the most preferred publications

Table XI ranked the most preferred journals by the researchers in of Gujarat University for their research publications in the period of 2008-2017. In this decade scholarly publications published in 565 journals. The *Aip Conference Proceedings* counted as the most preferred publication with 65 publications contributed 5.21% followed by *Molecular Crystals and Liquid Crystals* with 58 publications contributed 4.65%. However, the 9<sup>th</sup> position publications *Journal of Pharmaceutical Analysis* seize highest cite score of 3.14 means this receives average 3 citations per publications. The top listed journal represents the pure science subject line indicate this as the most interested and the most productive area of Research of Gujarat University researchers.

Journal Title	No. of Publications	% of Publications	Cite Score 2017
Aip Conference Proceedings	65	5.21	0.26
Molecular Crystals And Liquid Crystals	58	4.65	0.59
Solid State Phenomena	28	2.24	0.3
Acta Poloniae Pharmaceutica Drug Research	21	1.68	0.8
RSC Advances	20	1.60	3.01
Indian Journal Of Pure And Applied Physics	18	1.44	0.73
Journal Of Inclusion Phenomena And Macrocyclic Chemistry	17	1.36	1.31
Journal Of Chromatography B Analytical Technologies In The Biomedical And Life Sciences	15	1.20	2.57
Journal Of Pharmaceutical Analysis	14	1.12	<b>3.14</b>
Journal Of Pharmaceutical And Biomedical Analysis	13	1.04	3.05
Biomedical Chromatography	12	0.96	1.65
Medicinal Chemistry Research	12	0.96	1.61
Advanced Materials Research	11	0.88	0.08

Fluoride	11	0.88	1.26
Journal Of Chromatographic Science	11	0.88	1.11
Synthetic Communications	11	0.88	1.15
Bioresource Technology	10	0.80	6.28
Research Journal Of Biotechnology	10	0.80	0.19
9 papers each 3 publications	27	2.16	-
8 papers each 1 publications	8	0.64	-
7 papers each 4 publications	28	2.24	-
6 papers each 9 publications	54	4.33	-
5 papers each 14 publications	70	5.61	-
4 papers each 22 publications	88	7.05	-
3 papers each 33 publications	99	7.93	-
2 papers each 56 publications	112	8.97	-
Single paper publications	405	32.45	-
<b>Total</b>	<b>1248</b>	<b>100.00</b>	-

### Key Findings

- Journal articles counted as the most favored communication form of publications by Gujarat University scholars with 965 articles contribution 77.32% of total publications.
- The analysis pointed out the notable growth for yearly publication indicated upward movement counted almost double from 88 publications in to 189 publications in 2017.
- Authorship pattern evaluation calculated 0.96 DC indicates that most of research work carried out jointly and possible produce the qualitative. Only 3.04% contributed by the single author with 38 publications rest 1210 publication published in collaborative manner.
- The presented picture of quantitative analysis indicated the steady growth in research and collaborative work. 1035 publications published in collaborations with 159 national and international institutes. However, the low rate of international collaboration figured out in analysis, 109 (8.73%) publications contain internationally collaborated.
- Study identified the most productive subject domain, Chemistry;432, Physics;298, Biology;235, Pharmacology;222 and Material Science;208 research publications contributed and grabbed the top spot where the Social science has contributed only 39 research publications and only 3 for Arts and Humanities indexed.
- Citation analysis bring up in notice 20 (1.60%) publication received more than 51+ citation, 160 (12.82) publications received a citation for single time and 278 publications never cited.

### Conclusion

It is revealed in the Analysis, most of research work carried out jointly produces the qualitative work. The presented picture of quantitative analysis indicated the steady growth in research and collaborative work. International collaboration, Inter Disciplinary work, are not in satisfactory figure come into notice while analysis. Management required to design proper research policy to promote the inter-disciplinary research

work, have to marketing and bring up the awareness of library resources as well the funding project grants usage toward scholars. Facilitate faculty with the In-house grants funding for research projects. Pure science and applied science based research work contributed the most and grabbed the top spot where the Social science has contributed less numbers of publications in compare of pure science subjects. Analysis drawn attention of requirement to focused on the more qualitative work to be carried out in less performed subject area. Citation analysis bring up in notice about the quality, where the ration of highly cited paper is very low, and only 1.60% publication received more than 51+ citation, and 278 publications never cited a single time. Scholars should be commit more determination to produce the quality based research work towards enrich the education system and strong contribution for develop the healthy socialism for all human being.

The study recognizes some barrier to count the accurate quantitative analysis, like language, regional seminars and conferences publications and un-indexed journal's publications which should make the well-built structure in current portrait. Language was the barrier as some department performing their research work in regional language which was not included in the SCOPUS database. Regional language research carried out by the Gujarat University faculty not included in the presented papers data Analysis which could make strong impact in terms of quantitative evolution. (Galyani-Moghaddam, Jafari, & Sattarzadeh, 2017) also accepted the importance of language research carried out by faculty members. Many National publications approved by UGC also not indexed in International databases like SCOPUS and WoS. UGC and Gujarat University have to make some strong policy and plan and facilitated the faculty members with funding and infrastructures to publish in indexed journals.

This paper presented the quantitative presentation of publications indexed in SCOPUS only till December 2018 Scopus increasing the numbers of journals in their database and that may be the possibility of vary in data and result later on. The possible future study with the Gujarat University faculty publications indexed in the science Citation index and Indian Citation Index (ICI), which should provide the precise analysis of faculty research work of Gujarat University.

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