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# Research Publications Trend of St Joseph Engineering College, Mangaluru, Karnataka: A Bibliometric Study

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## *Abstract*

The study examined the bibliometric analysis of the research publication output of the St Joseph Engineering College (SJEC), Mangaluru indexed in Scopus during 2004 to 2019. The parameters such as the growth of publications, authorship pattern, author productivity, degree of collaboration, major areas of contribution, most preferred journals, geographical distribution etc are studied to attain the objectives. The findings revealed that, among the 230 publications published during the period of 16 years, highest numbers of 50 papers were published in the year 2019. The conference proceedings were the most preferred channels of publications followed by journals. There is an increasing trend in the number of publications 195 (84.8%) during the second half period. i.e., from 2012 to 2019. The rate of degree of collaboration is 0.97. The collaborative research by three authors published more articles and 37 publications have collaborated with foreign countries. The “Journal of Molecular Structure” is preferred as the most popular journal by the authors whereas the Journal of “Knowledge-Based System” ranked first having highest impact factor amongst other journals. The study reveals that SJEC has especially contributed to the research in computer science, engineering, physics and astronomy, material science, chemistry, mathematics, medicine, business management and accounting, energy and decision science.

**Keywords:** Bibliometric Analysis, Research Publications, Collaboration, St Joseph Engineering College, Scopus.

## **1. Introduction**

The publications of faculty members are regarded as one of the criteria in order to rank

the University/Institute in 2016. Faculty publications of any institute and appraisal of it have immense value in the inspection of performance of the institute. The quantity in publications alone does not produce more citations (Bhui & Sahu, 2018). Citation analysis has emerged as a more significant and vital means of assessing research excellence through the development and use of various impact indicators e.g. journals, universities, and institutions. Moreover, citation analysis is regarded as one of the major and popular branches of bibliometrics (Astrom & Sandor, 2009). A bibliometric analysis is an efficient way to quantify the quality of published work for organizations, authors, and countries by analyzing the data obtained from several indices and converting it into numerical Figures (Ali et al., 2017). Since the journals have been considered as the popular means of spreading new knowledge and innovative ideas, this study analyses the publications productivity of the faculty members of St Joseph Engineering College, Mangaluru, Karnataka.

St Joseph Engineering College (SJEC) is affiliated to Visvesvaraya Technological University, Belgaum, Karnataka State, and is recognized by the All India Council for Technical Education (AICTE), New Delhi. The St Joseph Engineering College is registered under the trust "Diocese of Mangalore, Social Action Department". Established in 2002, the College offers top-class education in Engineering, Business Administration, and Computer Applications at UG, PG, and Research levels. It has well-qualified staff, state of the art laboratories and all facilities. Presently about 2300 students are studying in the College (SJEC, 2020). The Four UG programs are accredited by the National Board of Accreditation (NBA). SJEC being an active member of VTU Consortium provides access to e-resources on/off-campus through subscription.

## **2. Literature Review**

The study by Banshal et al., (2017) shows that there is a substantial difference in research performance levels of old IITs vis-à-vis the new IITs. The age of an institution alone does not necessarily matter for higher performance. The discipline-wise research performance analysis indicates that the majority of the research output from IITs is in PHY, CHEM, and MAT disciplines and research in engineering disciplines lags substantially.

Singh (2015) analyzed the research performance of the Indian Institute of Technology, Delhi in terms of publications, collaboration and international participation, and major

research areas of study. Physics, Mathematics, and Material Science are the top research areas of IIT, Delhi.

Singh (2015) mapped the research performance of the Indian Institute of Technology Kharagpur from 1990 to 2014, which showed that three-authored papers have been increasing over the years, indicating increasing collaborative research among the scientists of the six Indian Institutes of Technology.

A bibliometric study in Scopus of publication output in Science and Technology conducted by Bala & Gupta (2009) reveals that India produced a total of 48,204 papers related to engineering which was in the fourth position and medicine was in the first ranking where more number of papers published followed by Chemistry, Physics and Astronomy occupied second and third position respectively.

Another study (2016) by the Department of Science and Technology, Government of India, using Scopus database reveals that India's scientific research output increased by 68% from 62,955 in 2009 to 1,06,065 in 2013 and during this period, in the research disciplines ranking Computer Science (16.7%) was in the third position and Engineering (14.5%) was in the sixth position.

A study by Nagaraja et al., (2017) reveals that most of the authors from the Engineering colleges prefer to write/publish their research output in the form of 'articles' followed by 'conference proceedings' as categorized in Web of Science. It is found that all the top 20 productive institutions ranked in Karnataka are belonging to aided and private managements. USA, Malaysia, Germany, South Korea, and Singapore are identified as the top five collaborative countries with VTU affiliated colleges for research activities. Acta Crystallographica Section E Structure Reports Online was identified as one of the top five journals which published the articles produced by the authors affiliated to engineering colleges of Karnataka. The top five research areas in which the contributed papers scattered are Materials Science, Engineering, Chemistry, Physics, and Polymer Science.

Sudhier (2013) analyzed the publications of physicists at the Indian Institute of Science and Kerala University during 2004-2008. He analyzed 352 articles from doctoral theses of Physics of both the institutions and found that multi-authored papers are maximum

from IISc and single-authored papers are maximum from Kerala University and the most familiar publisher is Elsevier.

Sudhier & Priyalakshmi (2012) analyzed the scientist's publication output of Central Tuber Crops Research Institute (CTCRI), Thiruvananthapuram. The study found that such publication is made by three authors and made known in foreign journals.

Tamilselvan (2012) studied the research activity of all NITs in India from Web of Science, Scopus, and EI Compendex database. He concentrated on their searches on science that includes collaboration research, authorship pattern, core journal outputs by Bradford's law, geographical output, etc.

Khalifa (2014) analyzed the Saudi publication productivity in computer science from 1978-2012 as covered by Web of Science. A totality of 998 publications was examined and found productivity increased in the computer science field after 2007 and the computer science research trends focused on engineering, mathematics, and telecommunications.

Moghaddam et al., (2017) examined the faculty publications of Allameh Tabatabai University of Iran as indexed in science citation index and Scopus from 1987 to 2015. Scientometric techniques were used and the co-authorship network was analyzed. Faculty members mostly collaborated with the U.S and Switzerland and jointly authored papers are more predominant.

Bachalapur & Hugar's (2020) study revealed that about 91.14% of publications were multi-authored and only 0.86% single-authored publications. The highest number of publications are published in the subject of Computer Science (30%) followed by Engineering and Mathematics subjects. The researchers are inclined to collaborate with authors of reputed research centers and universities in India and abroad.

Mandhirasalam (2016) study found that journals are the most preferred channels followed by conference proceedings. The relative growth rate ranges from 0.19 to 0.29 from 2006 to 2013 and declined in the years 2008 (-0.11), 2010 (-0.03), and 2013 (-0.14).

Maharana & Das (2013) study found that out of 447 papers only 19 papers have been contributed by singly author which resulted in a high degree of collaboration i.e., 0.95.

Pharmacology, Toxicology, and Pharmaceutics is the most preferred research area followed by Physics and Astronomy, Chemistry, Biochemistry, Genetics, and Molecular Biology; Environmental Science, etc. It also shows the collaboration of University's authors with foreign authors.

### **3. Objectives**

The objectives of the study include:

- i. To know the growth of research publications and citations.
- ii. To identify the most productive authors and authorship pattern
- iii. To identify the research collaboration of SJEC with other institutes and countries.
- iv. To identify the major areas of subject of publications contributed by the faculty.
- v. To identify the most preferred journals for publishing the research papers.
- vi. To find out the top ten papers which have received significant impact by their number of citations.

### **4. Methodology**

To achieve the set objectives, data on publication output on SJEC was extracted from Scopus database listed under the affiliation ID 60114259. The data is collected for 16 years. i.e., 2004 to 2019. The results are refined here shows the source of publication based on the documents from conference proceedings, journals, and book chapters that are covered in the Scopus. During the study period, it is found that SJEC has produced 230 papers in different disciplines. Based on the data retrieved, document type, subject wise, journal, country, etc. taken into consideration, and the data is analyzed accordingly.

### **5. Data Analysis**

#### **5.1 Growth of Research Publications**

It is observed from the Table 1 that, 230 research publications were published during the study period from 2004 to 2019 by the faculty members of SJEC as per Scopus database. The publications started growing from the year 2012 and it reached its peak in 2019 by publishing fifty publications. However, the citations were highest in the year 2016 (15.52%). It is also found that, 230 publications received 1321 citations, i.e., on an average of 14.38 publications are published and average 82.56 citations are received by these publications. It shows that 5.74 citations are received per paper.

**Table - 1 Growth of Research Publications**

<b>Year</b>	<b>No. of Publications</b>	<b>% of Publications</b>	<b>No. of Citations</b>	<b>% of Citations</b>	<b>Average Citations Per Year</b>
2004	2	0.87	84	6.36	42.00
2005	4	1.74	2	0.15	2.00
2006	1	0.43	126	9.54	126.00
2007	2	0.87	10	0.76	5.00
2008	3	1.30	8	0.61	2.67
2009	6	2.61	51	3.86	8.50
2010	8	3.48	31	2.35	3.88
2011	9	3.91	95	7.19	10.56
2012	26	11.30	160	12.11	6.15
2013	24	10.43	129	9.77	5.38
2014	20	8.70	184	13.93	9.20
2015	21	9.13	134	10.14	6.38
2016	19	8.27	205	15.52	10.79
2017	13	5.65	37	2.80	2.85
2018	22	9.57	31	2.35	1.41
2019	50	21.74	34	2.56	0.68
<b>Total</b>	<b>230</b>	<b>100.00</b>	<b>1321</b>	<b>100.00</b>	

## 5.2 Relative Growth Rate [R(a)] and Doubling Time (Dt)

The relative growth rate is the increase in the number of publications per unit of time i.e. one year. The mean relative growth rate R(1-2) over a specified period of interval can be calculated from the following equation suggested by Mahapatra (1985).

$$R(1-2) = \frac{W_2 - W_1}{T_2 - T_1}$$

Where,

R(1-2) = Mean relative growth rate over a specific period of the interval;

$W_1$  = Log W1 (Natural log of the initial number of publications);

$W_2$  = Log W2 (Natural log of the final number of publications);

$T_2 - T_1$  = Unit difference between the initial time and final time.

Therefore,

R(a) = Relative growth rate per unit of publications per unit of time (year).

The relative growth [R(a)] and doubling time [Dt(a)] of publications were determined and provided in Table 2. It was observed that the relative growth rate of publications was gradually decreased from 1.098 in 2005 to 0.295 in 2011. The mean relative growth [R(a)] of publications during the first eight years (i.e. from 2004 to 2011) was higher

(0.36) than the last eight-year i.e., during 2012 to 2019 (0.24).

A direct equivalence exists between the relative growth rate and doubling time. The doubling time for publication can be calculated by the following formula suggested by Mahapatra (1985).

$$\text{Doubling time } (D_t) = \frac{0.693}{R}$$

Therefore,

$$\text{Doubling time for publications } D_t (a) = \frac{0.693}{R(a)}$$

**Table - 2 Relative Growth Rate and Doubling Time**

Year	No. of Publications	Cumulative Publications	$W_1$	$W_2$	R(a) ( $W_2 - W_1$ )	Mean of R(a)	$D_t (a)$ [0.693/R(a)]	Mean of $D_t$
2004	2	2		0.693	-	0.36	-	2.03
2005	4	6	0.693	1.791	1.098		0.631	
2006	1	7	1.791	1.945	0.154		4.500	
2007	2	9	1.945	2.197	0.252		2.75	
2008	3	12	2.197	2.484	0.287		2.414	
2009	6	18	2.484	2.890	0.406		1.707	
2010	8	26	2.890	3.258	0.368		1.883	
2011	9	35	3.258	3.553	0.295		2.349	
2012	26	61	3.553	4.110	0.557	0.24	1.244	3.94
2013	24	85	4.110	4.442	0.332		2.088	
2014	20	105	4.442	4.653	0.211		3.284	
2015	21	126	4.653	4.836	0.183		3.787	
2016	19	145	4.836	4.976	0.140		4.950	
2017	13	158	4.976	5.062	0.086		8.058	
2018	22	180	5.062	5.192	0.130		5.330	
2019	50	230	5.192	5.438	0.246		2.817	
<b>Total</b>	<b>230</b>							

The doubling time indicated an increasing trend of 0.631 in 2005 to 2.817 in 2019. The mean doubling time [ $D_t (a)$ ] during the first half (i.e. 2004 to 2011) was 2.03 which was increased to 3.84 during the second half. Hence the relative growth rate of publications has been reduced and doubling time has been increased.

### 5.3 Type of Publications

Table 3 indicates that, out of 230 publications, 122 (53.04%) publications are published in conference proceedings followed by 102 (44.35%) research articles published in the form of journals. There were 3 (1.3%) articles published in Book Chapters, 2 (0.87%)



Letters to the editors and 1 (0.44%) Book Review. It shows that faculty members prefer conference proceedings and journals to publish their papers.

**Table – 3 Type of Publications**

Publication Type	No of articles	Percentage
Conference Paper	122	53.04
Article	102	44.35
Book Chapter	3	1.30
Letter	2	0.87
Review	1	0.44
<b>Total</b>	<b>230</b>	<b>100.0</b>

## 5.4 Prolific Authors

**Table 4 Prolific Authors**

Sl No	Prolific Authors	No of Publications	Percentage (%)	Department
1	Vincent Crasta	30	13.04	Physics
2	Raju K	29	12.61	Mechanical Engineering
3	Purushothama Chippar	19	8.26	Mechanical Engineering
4	Shreeranga Bhat	18	7.83	Mechanical Engineering
5	Rajesh K	11	4.78	Physics
6	Binu K G	9	3.91	Mechanical Engineering
7	Shreenath, Acharya	9	3.91	Computer Science Engineering
8	Rajesh Kumar P C	9	3.91	Physics
9	Sheryl Colaco G	8	3.48	Electrical & Electronics
10	Subramanya, Krishna B	8	3.48	Electrical & Electronics

It is observed from Table 4 that, Dr Vincent Crasta from Physics having 30 (13.4%) publications is the most prolific author followed by Dr Raju K (12.61%); Dr Purushothama Chippar (8.26%); Dr Shreeranga Bhat (7.83%) and Dr Rajesh K (4.78%) respectively.

## 5.5 Department wise distribution of Publications

It is observed from Table 5 and figure 1 that, Mechanical Engineering department having 1518 citations from 75 publications with h-index 39 ranked 1<sup>st</sup> followed by the Physics department having 780 citations from 50 publications ranked 2<sup>nd</sup> and Electrical & Electronics and Computer Science & Engineering department ranked 3<sup>rd</sup> respectively. Hence it is found that Mechanical Engineering department is the most productive department compared to other departments.

**Table- 5 Department wise distribution of Publications**

SI No	Departments	No of Prolific Authors	No of Citation	No of Articles	h-index
1	Mechanical Engineering	4	1518	75	39
2	Physics	3	780	50	20
3	Electrical & Electronics	2	113	16	8
4	Computer Science Engineering	2	55	25	6
5	Mathematics	1	46	4	4
6	Chemistry	1	38	8	4
7	Electronics & Communication Engineering	1	20	8	3
8	Master of Business Administration	1	12	8	3

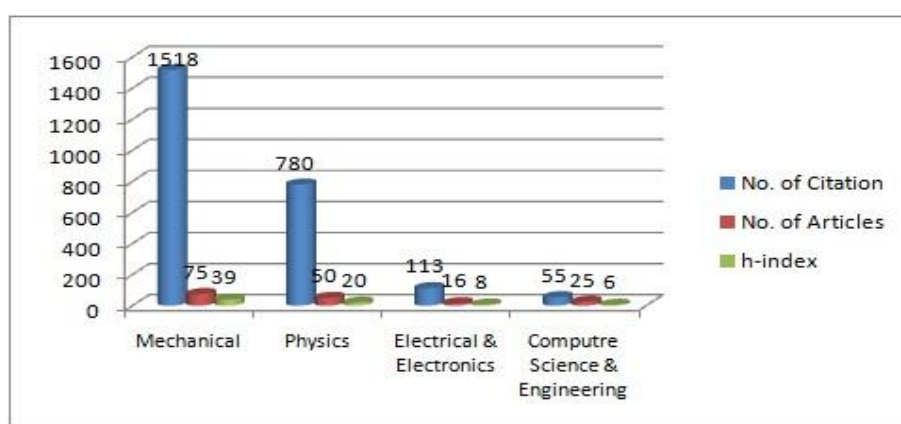


Fig. 1

## 5.6 Author Productivity

Table 6 highlights the productivity of authors, which shows 849 authors produced 230 papers with an average of 3.69 authors per paper and 0.27 papers per author. Further, out of 849 total authors, 436 authors are affiliated to SJEC with an average of 1.90 authors per paper and 0.53 papers per author. It also shows that total AAPP ranges from 2.38 to 5 and in total PPA 0.2 to 0.42.

**Table - 6 Author Productivity**

Year	No of Publications	Total No of Authors	Total AAPP	Total PPA	Authors affiliated to SJEC	AAPP (SJEC)	PPA (SJEC)
2004	2	7	3.5	0.29	2	1.0	1.0
2005	4	12	3.0	0.33	4	1.0	1.0
2006	1	5	5.0	0.2	1	1.0	1.0
2007	2	6	3.0	0.33	2	1.0	1.0
2008	3	10	3.33	0.3	3	1.0	1.0
2009	6	17	2.83	0.35	6	1.0	1.0
2010	8	19	2.38	0.42	8	1.0	1.0
2011	9	33	3.67	0.27	15	1.66	0.6
2012	26	99	3.81	0.26	64	2.46	0.41
2013	24	86	3.58	0.28	43	1.79	0.56
2014	20	62	3.1	0.32	32	1.6	0.63
2015	21	78	3.71	0.27	28	1.33	0.75
2016	19	73	3.84	0.26	29	1.53	0.66
2017	13	42	3.23	0.31	17	1.31	0.76
2018	22	74	3.36	0.30	39	1.77	0.56
2019	50	226	4.52	0.22	143	2.86	0.35
<b>Total</b>	<b>230</b>	<b>849</b>	<b>3.69</b>	<b>0.27</b>	<b>436</b>	<b>1.90</b>	<b>0.53</b>

*Note: Average Author Per Paper (AAPP) = Number of Authors/Number of Papers*

*Productivity Per Author (PPA) = Number of Papers/Number of Authors*

## 5.7 Authorship Pattern

Table 7 reveals that a total of 775 authors have contributed 230 articles and the average number of authors per article observed to be 3.4. Among 230 articles, only 7 articles (3.04%) are written by a single author and 223 (96.96%) articles are written by multiple authors. Two and three author's articles involved the highest percentage of 114 (49.56%) and the rest of the articles are contributed by more than three authors.

**Table - 7 Authorship Pattern**

SI No	No of Authors	No of Publications	%	Authorship Pattern	%
1	Single	7	3.04	7	0.9
2	Two	55	23.91	62	8.0
3	Three	59	25.65	121	15.61
4	Four	46	20.00	167	21.55
5	Five	21	9.13	188	24.26
6	More than Five+	42	18.27	230	29.68
<b>Total</b>		<b>230</b>	<b>100.0</b>	<b>775</b>	<b>100.0</b>

## Degree of Collaboration of Publications

Collaborative co-efficient is used to measure the extent of collaboration. The measure of the degree of collaboration in a discipline lies between 0 and 1 according to the formula of Subramanyam (1983) as below;

$$C = \frac{Nm}{Nm+Ns}$$

Where C = Degree of Collaboration

Nm = Number of multiple authors

Ns = Number of single authors

$$\text{Hence } C = \frac{223}{223+7} = 0.97$$

Hence it was found that the degree of collaboration of publications of SJEC faculty is 0.97

## 5.8 Distribution of Publications by Country Wise

**Table – 8 Distribution of Publications by Country Wise**

Country	No. of Contributors
India	230
Portugal	6
Singapore	6
Malaysia	5
United States	4
Finland	3
United Arab Emirates (UAE)	3
Bahrain	2
Denmark	2
Australia	1
Germany	1
Italy	1
Japan	1
South Korea	1
United Kingdom	1

Table 8 depicts the global distribution of publications, amongst 230 publications of SJEC, 37 publications have collaborated with foreign countries. Out of which 6 articles have collaborated with Portugal and Singapore authors respectively, 5 authors

with Malaysia, 4 with the United States and 3 with Finland and UAE respectively. The authors from Bahrain and Denmark contributed 2 articles respectively. The authors from other countries collaborated on one article respectively.

### 5.9 Ranking of Collaborative Institutions

It is disclosed from the Table 9 that, out of the 230 publications, the National Institute of Technology Karnataka stands second with 36 (15.65%) publications after SJEC. The Mangaluru University with 28 (12.17%) publications ranked third followed by Manipal Academy of Higher Education and Manipal Institute of Technology ranked fourth respectively. The Indian Institute of Technology, Kharagpur is one among the top 10 ranking of collaborative Institutions. The most of the faculty members of SJEC were conducting joint research activities with the institutions located in the state itself. It is also found that the researchers from 120 institutions have collaborated with faculty of St Joseph Engineering College for research and publications.

**Table – 9 Ranking of Collaborative Institutions**

Rank	Institution	No. of Publications	Percentage %
1	St Joseph Engineering College, Mangaluru	230	100
2	National Institute of Technology Karnataka	36	15.65
3	Mangaluru University	28	12.17
4	Manipal Academy of Higher Education	19	8.26
4	Manipal Institute of Technology, Manipal	19	8.26
5	NMAM Institute of Technology	18	7.83
6	Canara Engineering College, Mangaluru	9	3.91
7	Kasturba Medical College, Mangaluru	6	2.61
7	KVG College of Engineering	6	2.61
7	Alva's Institute of Engineering & Technology, Mangaluru	6	2.61
8	Indian Institute of Technology, Kharagpur	5	2.17

### 5.10 Ranking of Subject Wise Distribution

The subject-wise distribution of publications (Table 10) shows that Computer Science is the most preferred subject area among the research scholars of SJEC with 40% responses followed by Engineering 36.52%, Physics & Astronomy 23.48%, and Material Science 22.17%. Further, Chemistry and Mathematics subjects with 10.43% publications ranked 5<sup>th</sup> respectively. The other subjects preferred by faculty members to their publications are Medicine, Business Management and Accounting, Energy and

Decision Science.

**Table – 10 Ranking of Subject wise Distribution**

<b>Rank</b>	<b>Subject</b>	<b>Record</b>	<b>%</b>
1	Computer Science	92	40.00
2	Engineering	84	36.52
3	Physics & Astronomy	54	23.48
4	Material Science	51	22.17
5	Chemistry	24	10.43
5	Mathematics	24	10.43
6	Medicine	15	6.52
7	Business, Management & Accounting	10	4.35
7	Energy	10	4.35
8	Decision Science	9	3.91

### **5.11 Ranking of Journals based on Publications**

The total documents of SJEC were published in 104 journals. The most preferred journals used to communicate research results are depicted in Table 11 which indicates that the 'Journal of Molecular Structure' is the top journal used by the authors/collaborative authors with SJEC to publish their papers. The 'Journal of Crystal Growth'; 'Transactions of the Indian Institute of Metals'; 'Communications in Computer & Information Science' and 'International Journal of Applied Engineering Research' has occupied the second position among the 10 topmost journals. The Acta Crystallographica Section E: Structure Reports Online and Journal of Mechanics in Medicine & Biology occupied the 3<sup>rd</sup> position respectively. The journals of Polymer Engineering & Science, Materials Research Express and Medical Hypotheses occupied 4<sup>th</sup> position respectively.

**Table - 11 Ranking of Journals based on Publications**

<b>Rank</b>	<b>Name of the Journals</b>	<b>No. of Articles</b>
1	Journal of Molecular Structure	6
2	Journal of Crystal Growth	4
2	Transactions of the Indian Institute of Metals	4
2	Communications in Computer & Information Science	4
2	International Journal of Applied Engineering Research	4
3	Acta Crystallographica Section E: Structure Reports Online	3
3	Journal of Mechanics in Medicine & Biology	3
4	Polymer Engineering & Science	2
4	Materials Research Express	2
4	Medical Hypotheses	2

### **5.12 Ranking of Papers based on Citations**

It is clear from the Table 12 that paper titled ‘Microstructural studies on BaCl<sub>2</sub> doped poly(vinyl alcohol)’ published by Bhajantri, R.F. et al. in the journal of Polymer in 2006, is the most cited paper of St Joseph Engineering College and has received 126 citations. Paper titled ‘Automated detection and localization of myocardial infarction using electrocardiogram: A comparative study of different leads’ published by Acharya, U.R. et al. in the journal Knowledge-Based Systems in 2016 comes second with 84 citations.

The impact of the publications is measured in terms of their citations. Table 12 shows the top 10 papers which received the highest citation score based on the Scopus database. These top 10 papers received 42.47% citations out of 1321 citations. On average 56 citations are received by these top 10 publications of which Ravindrachary V publications received 21.95% (290) citations from 4 publications and Vincent Crasta written articles received 19.45% (257) citations from 3 publications. This shows that Ravindrachary V and Vincent Crasta are the renowned authors in the department of Physics of SJEC because their two publications are having more than average citations in this study.

**Table – 12 Ranking of Papers based on Citations**

Rank	Title	Author	Source	Citations
1	Microstructural studies on BaCl <sub>2</sub> doped poly(vinyl alcohol),	Bhajantri R.F., Ravindrachary V., Harisha A., Crasta V., Nayak S.P., Poojary B.,	Polymer, 2006, 47 (10 ), 3591-3598	126
2	Automated detection and localization of myocardial infarction using electrocardiogram: A comparative study of different leads	Acharya U.R., Fujita H., Sudarshan V.K., Oh S.L., Adam M., Koh J.E.W., Tan J.H., Ghista D.N., Martis R.J., Chua C.K., Poo C.K., Tan R.S.,	Knowledge-Based Systems, 2016, 99, 146-156.	84
3	Growth and characterization of an organic NLO crystal: 1-(4-methylphenyl)-3-(4-methoxyphenyl)-2-propen-1-one	Crasta V., Ravindrachary V., Bhajantri R.F., Gonsalves R.	Journal of Crystal Growth, 2004, 267 (1-2), 129-133.	83
4	Application of Lean Six Sigma methodology in the registration process of a hospital,	Bhat S., Gijo E.V., Jnanesh N.A.,	International Journal of Productivity and Performance Management, 2014, 63 (5), 613-643.	56
5	Optical and structural properties of chalcone NLO single crystals,	Rajesh Kumar P.C., Ravindrachary V., Janardhana K., Manjunath H.R., Karegouda P., Crasta V., Sridhar M.A.,	Journal of Molecular Structure, 2011, 1005 (1-3), 1-7.	48
6	Performance and Emission Characteristics of a C.I. Engine Fuelled with Diesel and TiO <sub>2</sub> Nanoparticles as Fuel Additive,.	D'Silva R., Binu K.G., Bhat T.,	Materials Today: Proceedings, 2015, 2 (4-5), 3728-3735	41
7	Structural and optical properties of a new	Rajesh Kumar P.C.,	Journal of Crystal Growth, 2012, 354	33



	chalcone single crystal,	Ravindrachary V., Janardhana K., Poojary B.,	(1), 182- 187.	
8	Effect of filler content on the performance of epoxy/PTW composites, ,	Sudheer M., Prabhu R., Raju K., BhatT.	Advances in Materials Science and Engineering, 2014.	33
9	Application of six sigma methodology in small-scale foundry industry, ,	Gijo E.V., Bhat S., JnaneshN.A.	International Journal of Lean Six Sigma, 2014,5 (2),193-211.	28
10	Diagnosis of multiclass tachycardia beats using recurrence quantification analysis and ensemble classifiers,	Desai U., Martis R.J., Acharya U.R., Nayak C.G., Seshikala G., Shetty K R.,	Journal of Mechanics in Medicine and Biology, 2016, 16 (1).	29

### 5.13 Ranking of Journals based on Highest Impact Factor

It is found that from Table 13 that, the highest impact factor journal in which the SJEC faculty published their research articles is 'Knowledge-Based System' journal ranked first with impact factor 5.101 followed by 'International Journal of Hydrogen Energy' with 4.084 impact factor. The 'Polymer' and 'Optics and Laser Technology' journals ranked in the third and fourth position respectively. The New Journal of Chemistry, Journal of Luminescence, Soft Computing, Nanotechnology Reviews, Optical Materials and Geomechanics and Engineering ranked position according to their next highest impact factor.

**Table 13 Ranking of Journals based on Highest Impact Factor**

Rank	Journal	Impact Factor
1	Knowledge-Based System	5.101
2	International Journal of Hydrogen Energy	4.084
3	Polymer	3.771
4	Optics and Laser Technology	3.319
5	New Journal of Chemistry	3.069
6	Journal of Luminescence	2.961
7	Soft Computing	2.784
8	Nanotechnology Reviews	2.759
9	Optical Materials	2.687
10	Geomechanics and Engineering	2.594

## 6. Summary of Findings

- i. It is found that 230 publications were published by the faculty of SJEC during the period of study of 16 years from 2004 to 2019.
- ii. The relative growth rate publications have been reduced and doubling time has been increased.
- iii. Conference proceedings are the most preferred channels followed by journals.
- iv. Dr Vincent Crasta followed by Dr Raju K and Dr Purushotama Chippar are identified as the top three productive authors of the college under study.
- v. Out of 230 papers, only 7 papers have been contributed by the single author which resulted in a high degree of collaboration i.e., 0.97. The h-index is highest in the department of Mechanical Engineering (39) followed by Physics with an h-index of 20.
- vi. Among the 849 authors contributed a total of 230 papers with 3.69 average authors per paper and 0.27 productivity per author. Out of 849 authors, only 436 authors were affiliated to SJEC with 1.90 average authors per paper and 0.53 productivity per author.
- vii. It is evident that in the country's productivity, the first rank is shared by Portugal and Singapore with six appearances each. The 2<sup>nd</sup> rank is bagged by Malaysia and the 3<sup>rd</sup> rank by the United States. The 4<sup>th</sup> rank is shared by Finland and UAE with three appearances. The 5<sup>th</sup> rank is shared by Bahrain and Denmark with two appearances each. These are identified as the top six countries that collaborated with SJEC for research activities.
- viii. National Institute of Technology Karnataka, Mangaluru University, Manipal Academy of Higher Education, Manipal Institute of Technology and NMAM Institute of Technology are identified as the top five Institutions collaborated with SJEC. It is revealed that all the top 10 productive institutions ranked are belonging to the government and private management.
- ix. The top five research areas in which the contributed papers scattered are Computer Science, Engineering, Physics and Astronomy, Material Science and Chemistry.
- x. It is found that the "European Journal of Molecular Structure" occupies the top position followed by "Journal of Crystal Growth", and "Transactions of the Indian Institute of Metals". The other two leading journals which occupy 4<sup>th</sup> and 5<sup>th</sup> rank respectively were "Communications in Computer & Information Science", and "International Journal of Applied Engineering

Research”.

- xi. One paper has received more than 100 citations and 6 papers have received 31–99 citations as of now.
- xii. The paper entitled Microstructural studies on BaCl<sub>2</sub> doped poly(vinyl alcohol) by Bhajantri et al., in the Journal Polymer, 2016 is the most cited paper of SJEC and has received 126 citations as of now.
- xiii. It found that Knowledge-Based System; International Journal of Hydrogen Energy; The Polymer; Optics and Laser Technology; The New Journal of Chemistry are the five highest impact factor journals in which SJEC faculty have published their research articles among the 10 top highest impact factor journals.
- xiv. ‘H’ Index of SJEC is 20. This means 20 papers have got at least 20 citations each.

## 7. Conclusions

The findings of the study provide a solid platform to the budding researchers of engineering, management, and basic science to promote, support, and sustain future research. Further to enhance research trend in the institute, SJEC has introduced strategies such as incentive policy to encourage the faculty members to publish their research articles in high impact factor journals; compile and publish annually the abstracts of the faculty publications in the form of Compendium of Research Publications; provide financial support to the faculty for registrations and presentation of papers in the national/international conferences; conduct activities on how to write and publish the research article; Access to scholarly e-journals, e-books, Turnitin-Anti Plagiarism Software; Scopus database and grammar writing tool is subscribed through VTU Consortium. The impact of these strategies has enhanced the research output of SJEC in the Scopus database in the recent years. Through collaboration more research articles are expected to be published in future.

## References

1. Bhui, T., & Sahu, N. B. (2018), Publications by Faculty Members of Humanities and Social Science Departments of IIT Kharagpur: A bibliometric study. *DESIDOC Journal of Library & Information Technology*, 38(6), 403-409.
2. Astrom, F., & Sandor, A. (2009). Models of Scholarly Communication and Citation Analysis. In *12<sup>th</sup> International Conference of the International Society for Scientometrics and Informetrics*, Rio de Janeiro: BIREME/PAHO/WHO &

- Federal University of Rio de Janeiro, edited by B. Larsen & J. Leta, 2009, 10-21. Retrieved from <http://portal.research.lu.se/ws/files/3896702/1883080.pdf>.
3. Ali, M. M., Hui-Zhen, Fu & Yuh-Shan, Ho. ( 2017). A Bibliometric Analysis of Linguistics Publications in the Web of Science, *Journal of Scientometrics*, 6 ( 2), 109-118.
  4. SJEC, Retrieved from <https://www.sjec.ac.in/about-sjec.php>
  5. Banshal, S. K., Singh, V.K., Basu, A., & Mahuri, P.K. (2017). Research Performance of the Indian Institutes of Technology (IITs). *Current Science*, 112 (5), 923 – 932.
  6. Singh, V. K. (2015). Mapping the research output of Indian Institute of technology Delhi, *Indian Journal of Scientific Research*, 11(2), 73-76.
  7. Singh, V. K. (2015). Scientometric mapping of research output of Indian Institute of Technology, Kharagpur, *Indian Journal of Scientific Research*, 11(2), 185-188.
  8. Bala, A. & Gupta, B. M. (2009). S & T contribution of Chandigarh during 1998-2007: a case study. *COLLNET Journal of Scientometrics and Information Management*, 3(2), 29-43.
  9. Department of Science and Technology, Govt. of India. (2016), India's Scientific Research Performance: 2009-2013. Retrieved from <http://www.dst.gov.in/sites/default/files/Salient%20Highlights,%20Elsevier,%20>
  10. Nagaraja, A., Gangadhar, K.C., & Kumar, M. V. (2017). Quantitative measuring of research output of Engineering Colleges in Karnataka based on the web of science database, *Journal of Scientometric Research*, 6(1) 36-46.
  11. Sudhier, K.G.P. (2013). Research Publication Trends among Physicists of the Indian Institute of Science and the University of Kerala: A bibliometrics study. *International Journal of Information Dissemination and Technology*. 3(2), 99-106.
  12. Sudhier, K.G.P. & Priyalakshmi, P (2012). Research Publication Trend among the Scientists of Central Tuber Crops Research Institute (CTCRI), Thiruvananthapuram: A Scientometric Study, *Annals of Library and Information Studies*, 60(1),7-14.
  13. Tamilselvan, N. (2012). Evaluation of Research Performance by Faculties in National Institutes of Technology in India: A Scientometric Analysis. Bharathiar University, Madurai, Kamaraj University., 2012. Retrieved from <http://shodhganga.inflibnet.ac.in/bitstream/10603/33858/6/ch6.pdf>.
  14. Al-Khalifa, H. S. (2014). Scientometric assessment of Saudi Publication Productivity in Computer Science in the period of 1978-2012, *International Journal of Web Information Systems*, 10(2), 194-208.

15. Galyani-Moghaddam, Jafari, H. & Sattarzadeh, A. (2017). Publications by faculty members indexed in Science Citation Index and Scopus: an Iranian Case Study. *The Electronic Library*. Retrieved from <https://doi.org/10.1108/EL-04-2016-0102/>
16. Bachalapur, M. M. & Hugar, J G. (2020). Bibliometric Analysis of Research Publications of BLDEA's V P Dr. P.G. Halakatti College of Engineering and Technology, Vijayapur, Karnataka, *Library Philosophy and Practice* (e-journal). Retrieved from <https://digitalcommons.unl.edu/libphilprac/4328>
17. Mandhirasalam, M. (2016), Research Output of PSG College of Technology, Coimbatore: A Scientometric Study, *SRELS Journal of Information Management*, 53 (3), 229-235.
18. Maharana, R. K. & Das, P. (2013), Research Publication Trend of Utkal University's researchers indexed in Scopus during 2008 to 2012: a bibliometric analysis, *Library Philosophy and Practice* (e-journal). Retrieved from <https://digitalcommons.unl.edu/libphilprac/999/>
19. Mahapatra, M. (1985). On the Validity of the Theory of Exponential Growth of Scientific Literature. In *Proceedings of the 15<sup>th</sup> IASLIC Conference*, Bangalore, India. Pp. 61-70.
20. Subramanyam, K. (1983). Bibliometric studies of research collaboration: a review. *Journal of Information Science*, 6 (1), 33-38.