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Bibliometric Analysis of Research Publications of BLDEA's V P Dr.P.G.Halakatti College of Engineering and Technology, Vijayapur, Karnataka

M M. Bachalapur
BLDEA's V P Dr.P.G.Halakatti College of Engineering and Technology, Vijayapur, bachalapur@gmail.com

Jayaprakash G. Hugar
Dnyanprassarak Mandal's College and Research Centre, Assagao, Bardez, Mapusa, Goa,,
dmclibrarian@rediffmail.com

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Dr. M. M. Bachalapur[1]
&
Dr. Jayaprakash G Hugar[2]

Abstract:

This paper carried out the bibliometric analysis of research publications published by the BLDEA's V P Dr.P.G.Halakatti College of Engineering and Technology, Vijayapur for the period from 2001 to 2019. In this period, 156 research articles were published and indexed in Scopus bibliographical citation databases. It examines the year wise publications, the annual distribution of publications, author productivity, etc. Analysis found that, the publications raised from 0.64%to 18.59% publications from the year 2001 to 2019 and observed good progress in scholarly publications. Highest citations 324 are received just from 3 publications in the year 2008. More number of scholarly publications are published in the form of article (46.15%). H-index is highest in the Department of Chemistry (21). Since last four years from 2016 to 2019 number of publications are increased very fast from 12 (7.8%) to 29 (18.59%) publications which are the highly productive year by the researchers.

Keywords: Bibliometric, Scholarly Publications, Impact, BLDEA'sCET, Scopus, Citations

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1. Dr. .M.M.Bachalapur, BLDEA's V P Dr.P.G.Halakatti College of Engineering and Technology, Vijayapur-586 103, Karnataka, India
Email: bachalapur@gmail.com, ORCID ID: http://orcid.org/0000-0003-2402-2477

2. Dr.JayaprakashG.Hugar, Dnyanprassarak Mandal's College and Research Centre, Assagao, Bardez, Mapusa, Goa, India
Email: dmclibrarian@rediffmail.com, ORCIDID: http://orcid.org/0000-0001-8307-5582

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Abstract:

This paper carried out the bibliometric analysis of research publicationspublished by the BLDEA's V P Dr.P.G.Halakatti College of Engineering and Technology, Vijayapur for the period from 2001 to 2019. During the period of study 156 research articles were published and indexed in Scopus bibliographical citation databases. It examines the year wise publications, annual distribution of publications, most prolific authors, author productivity, highly cited journals etc. Analysis found that, the publications raised from 0.64%to 18.59% publications from the year 2001 to 2019 and observed good progress in scholarly publications. Highest citations 324 are received just from 3 publications in the year 2008. More number of scholarly publications are published in the form of article (46.15%). H-index is highest in the Department of Chemistry (21) followed by Computer Science and Engineering with h-index of 11. Since last four years from 2016 to 2019 number of publications are increased very fast from 12 (7.8%) to 29 (18.59%) publications which is the high productive year by the researchers.

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Introduction:

The knowledge development in the present century is result of the fabulous growth in the information technology. Strengthening the research and development is most important and essential to any country and it is a continuous process. Science and Technology and Innovation policy 2013 seeks to send a signal to the Indian scientific community, both in the private and public domain, that science, technology and innovation should focus on faster, sustainable and inclusive development of the people. Bibliometric analysis is a technique to measure the scientific productivity in general.It is a quantitative and qualitative study of publication productivity in various types namely, publication pattern, authorship pattern, degree of collaboration, citation analysis, impact factors, h-index, and networks of scholarly communications etc. The rich resources management will boost to inspire the researchers to provide more outputs such new inventions, publications etc. The bibliometric analysis of research publications of BLDEA's CET, Vijayapur for the period between 2001 to 2019 will be useful for researchers to know the impact of their research on the department, institution and on society.

BLDEA's VachanaPitamahaDr.P.G.Halakatti College of Engineering and Technology, Vijayapur:

BijapurLingayatDistrict Educational Association's VachanaPitamaha Dr. P. G.Halakatti College of Engineering & Technology, Vijayapur is a premier technical institute located in Northern part of Karnataka on a scenic stretch of land spread over 14 acres in Vijayapur. BLDE Association started this esteemed Institute in year 1980 as a private Institute. The Institute is the result of BLDE Association's recognition of the need for quality technical education in the country. To achieve this objective, it has striven hard to create an environment and infrastructure that enables it to produce qualified, practical engineers who are ready to face the challenges in

the industries. The Institute is affiliated to Visvesvaraya Technological University (VTU), Belagavi, Karnataka and is recognized by AICTE, New Delhi. Four UG Programs have been accredited by National Board of Accreditation (NBA), New Delhi during the year 2018 for the period of three years and the Institute is accredited by NAAC with B+grade. At present institute is offering 10 UGprogrammesviz., BE in Civil Engineering, Mechanical Engineering, Electrical and Electronics Engineering, Electronics and Communications Engineering, Computer Science and Engineering, Information Science and Engineering, Automobile Engineering, Artificial Intelligence and Machine Learning, Instrumentation Engineering and B.Architectureprograms and 6 PG programs M.Tech in Computer Science and Engineering, Digital Communication & Networking, Micro Electronics & Control Systems, Machine Design, Structural Engineering, Environmental Engineering along with MCA & MBA. Five departments are recognized as Research Centres by VTU, Belagavi to offer Ph.D. and M.Sc. Engg. (by research) programsviz, Computer Science and Engineering, Mechanical Engineering, Civil Engineering, Mathematics and Chemistry.

Literature Study:

In review of literature only a few articles are covered. Various bibliometric studies have been carried out to measure the individual and organizational research publications. But review of literature revealed that, the engineering college performance is not covered in any of the study.

Muneer Ahmad and M Sadik Batcha (2019) made a study on Bharathiar University to find out the impact of research produced and publication trends of the university during 2009 to 2018. The study merely focuses on year-wise research output, citation impact at local and global level, prominent authors and their total output, top journals of publications, collaborating countries, and most contributing departments of Bharathiar University. The 10 years' publication data of the university indicate that a total of 3440 papers have been published from 2009 to 2018 receiving 38104 citations with h-index as 68. Whereas, Renuka S Mulimani and Gururaj S Hadagali (2018)analysed the research output of the Indian Institute of Toxicology Research (IITR) for the period of 25 years (1993 to 2017) and emphasized on the various characteristics of the publications such as highly cited papers, national & international collaboration profile, Degree of Collaboration, most prolific authors, most preferred journals for communication, citation impact of the publications, most frequently used author keywords. The Web of Science, a multidisciplinary bibliographic database was used to retrieve the data for the study. The scientists of IITR preferred to publish in the foreign journals. No journal in which the research works of IITR scientists were published belonged to India. 5.73% of the total publications remained uncited. Only 0.86% of the total publications were contributed by the single authors and rest of the 99% publications were contributed by multi-authors in collaboration. The 13% of the total publications were internationally collaborated and 86% of them were domestically collaborated. The Oxidative Stress, Apoptosis, DNA Damage and Lipid Peroxidation were found to be the most active research areas as per the analysis of keywords of authors. Bibliometric analysis of research publications of Indian Institute of Science Education and Research (IISER), Thiruvananthapuram, for the period 2008-2013 was studied by Hadimani N, Mulla KR, Kumar NS analyzed 157 research publications from the 76 journals. Further, it examines year wise publications, journal wise distributions, document wise distribution of papers, productivity of faculty and researchers, further, findings of the study and conclusion are shown related to data analysis.

Objectives of the study:

The main objectives of the study is

1. To measure the productivity of research publications of BLDEA'sCET, Vijayapur
2. To know the year wise distributions of research papers and citations.
3. To identify most prolific authors and their collaboration with other institutions
4. To explore document wise distribution of research publications
5. To find out most cited journals and Conferences

Methodology:

The bibliometric study covers the research publications of BLDEA's CET. The publications data of the institute has been drawn from Scopus database from 2001 to 2019. It access the institute contributions and impact of research in different field of science and technology. During the study period we found 156 research papers in different disciplines retrieved and matched with BLDEA's CET as author/s affiliation/address. Aspects referring as type of document, subject category, Journal, year etc. were taken into consideration and analyzed in detail**.**

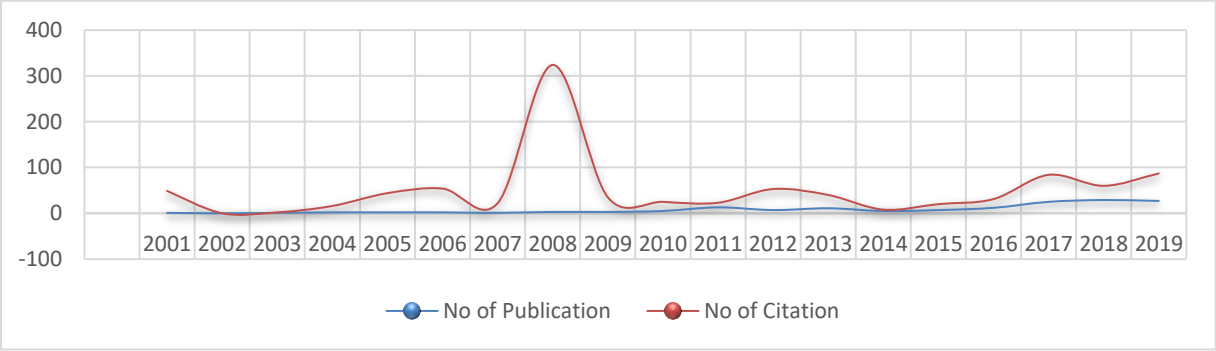
Keeping in mind of the above objectives of the study, data of 156 research articles in different subject from 2001 to 2019 was downloaded from Scopus in May 2020. The data downloaded were enhanced with different parameters like title, authors, years, collaborating countries, and research institutions. Furthermore, the downloaded data were analyzed by using MS-Excel.

Table No.1
Year wise Growth of Publications and Citation

Year	No of Publication	% of Publications	No of Citation	% of Citations	Average Citations Per Year
2001	1	0.64	49	5.01	49
2002	0	0.00	00	0	0
2003	1	0.64	02	0.20	2
2004	2	1.28	16	1.63	8
2005	2	1.28	44	4.50	22
2006	2	1.28	54	5.52	27
2007	1	0.64	22	2.25	22
2008	3	01.92	324	33.16	108
2009	3	01.92	35	3.58	11.66
2010	5	03.21	25	2.55	5
2011	13	08.34	23	2.35	1.76
2012	7	04.49	53	5.42	7.57
2013	11	07.05	40	4.09	3.63
2014	5	03.20	08	0.81	1.6
2015	7	04.49	20	2.04	2.85
2016	12	07.70	31	3.17	2.58
2017	25	16.02	84	8.59	3.36

2018	29	18.59	60	6.14	2.06
2019	27	17.31	87	8.90	3.22

Figure No.1
Growth of Publications and Citations of BLDEACET



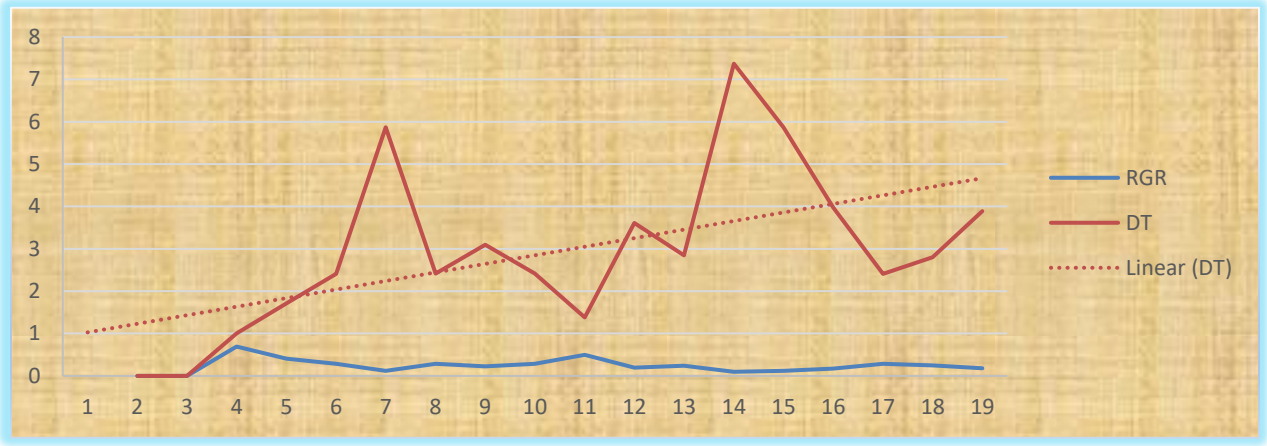
This tableand figure No. 1 depicts that, 156 research publications were published during the study period from 2001 to 2019 by the researchers, faculty members of BLDEA's CET, Vijayapur, as appeared in Scopus citation databases. Further it is noted that, in the year 2018 got highest publications, whereas, citations are highest in the year 2008. The year 2002 is black year for the college, because none of the faculty published articles in this year. On an average 8.21publications are published and average citations received by these publications are 51.42, in other words, 156 publications received 977citations, it shows that, per paper 6.26 citations are received during the study period. From the year 2011 onwards publications are started increasing and in the year 2018 it reached its peak by publishing twenty nine publications. The mandatory publications (API Scores) for the faculty members is visible from the year 2016 when AICTE made all the faculty members to publish their publications in SCOPUS / WoS indexed journals.This data reveals that high productivity is not a necessary indicator of high quality research or excellence in research.

Table No. 2
Relative Growth Rate and Doubling Time

Year	No of Publication	Cumulative Publications	W1	W2	RGR	Mean of RGR	DT	Mean of DT
2001	01	-	-					
2002	00	01	0	0	0		-	
2003	01	02	0	0.693	0		-	
2004	02	04	0.693	1.386	0.693		1	
2005	02	06	1.386	1.791	0.405	0.23	1.711	1.89
2006	02	08	1.791	2.079	0.288		2.406	
2007	01	09	2.079	2.197	0.118		5.872	
2008	03	12	2.197	2.484	0.287		2.414	
2009	03	15	2.484	2.708	0.224		3.093	
2010	05	20	2.708	2.995	0.287		2.414	
2011	13	33	2.995	3.496	0.501	0.22	1.383	3.8

2012	07	40	3.496	3.688	0.192		3.609	
2013	11	51	3.688	3.931	0.243		2.851	
2014	05	56	3.931	4.025	0.094		7.372	
2015	07	63	4.025	4.143	0.118		5.872	
2016	12	75	4.143	4.317	0.174		3.982	
2017	25	100	4.317	4.605	0.288		2.406	
2018	29	129	4.605	4.852	0.247		2.805	
2019	27	156	4.852	5.030	0.178		3.893	

Figure No. 2
Relative Growth Rate and Doubling Time



The relative growth [R(C)] and doubling time [Dt(C)] of publications were determined and provided in the Table and Figure.2.In case of publications it was observed that the relative growth rate of publications was gradually decreased from 0.693 in 2004 to 0.287 in 2010. The mean relative growth [R(C)] of publications during the first ten years (i.e. 2001 to 2010) was higher (0.23) than the last ten years i.e. during 2011 to 2019 (0.22). The corresponding doubling time also indicated an increasing trend of 1in 2004 to 3.893 in 2019. The mean doubling time [Dt(C)] during the first half (i.e. 2001 to 2010) was 1.89 which was increased to 3.8 during the second half. Thus the rate of growth of publications has been gradually reduced and corresponding doubling time has been increased.

Table No 3
Distribution of Document Type

Document Type	No of articles	Percentage
Article	72	46.15
Conference Paper	72	46.15
Book Chapter	7	4.49
Review	4	2.57
Retraced	1	0.64
Total	156	100%

Table 3 illustrates that, out of 156 research publications, 72 (46.15%) publications are published in the form of research articles and another 72 (46.15%) publications are in the conference proceedings, followed by 7 (4.49%) publications are in Book Chapters and only 4 (2.57%) publications are in the form of review, remaining are retraced i.e.: 1 (0.64%). It shows that, researchers are inclined to publish their publications in journal article/Conference proceedings.

Table No 4
Top 15Prolific Authors Citation Score and h-index

Prolific Authors	No of Citation	No of Articles	h-Index	Department
Das, Swastika	509	21	8	Chemistry
Malladi, R S	133	11	8	Chemistry
Teradale, Amit Balasab	33	09	3	Chemistry
Chadchan, K S	14	05	2	Chemistry
Akkasaligar, Prema T.	42	11	4	Computer Science and Engineering
Shirdhonkar, M. S.	24	12	3	Computer Science and Engineering
Patil, Pushpa B.	27	12	2	Computer Science and Engineering
Unki, Prakash H.	19	04	2	Computer Science and Engineering
Dixit, Umesh D	07	05	2	Electronics and Communication Engineering
Hatti, Daneshwari	05	05	2	Electronics and Communication Engineering
Padaganur, S.K	05	08	1	Electronics and Communication Engineering
Biaradr, Sunanda	11	05	2	Information Science and Engineering
Sankad G C	22	08	4	Mathematics
Malaji, P. V.	45	09	4	Mechanical Engineering
Sakri, M I	09	06	2	Mechanical Engineering

Table 4 reveals that, the ranked list of most productive authors during the study. Here we have listed first fifteen prolific authors based on their number of contributions (publications and citations) published in journalsindexed in Scopus database. The most prolific author during the period is Swastika Das with 21publications and received highest 509 citations, followed by R S Malladi published 11 publications and received 133citations and Malaji P.V published 9 articles and received 45 citation, followed AkkasaligarPremareceived 42 citations from 11 publications. Remaining Eleven authors published 73 publications and received 176 citations. First four ranks are received by the department of chemistry in publications, citation and h-index also.

G C Sankadpublished 08 articles and received 22 citations. Remaining twelveauthors from MalajiP.V to Umesh D Dixit published 98 publications and received 228 citations.

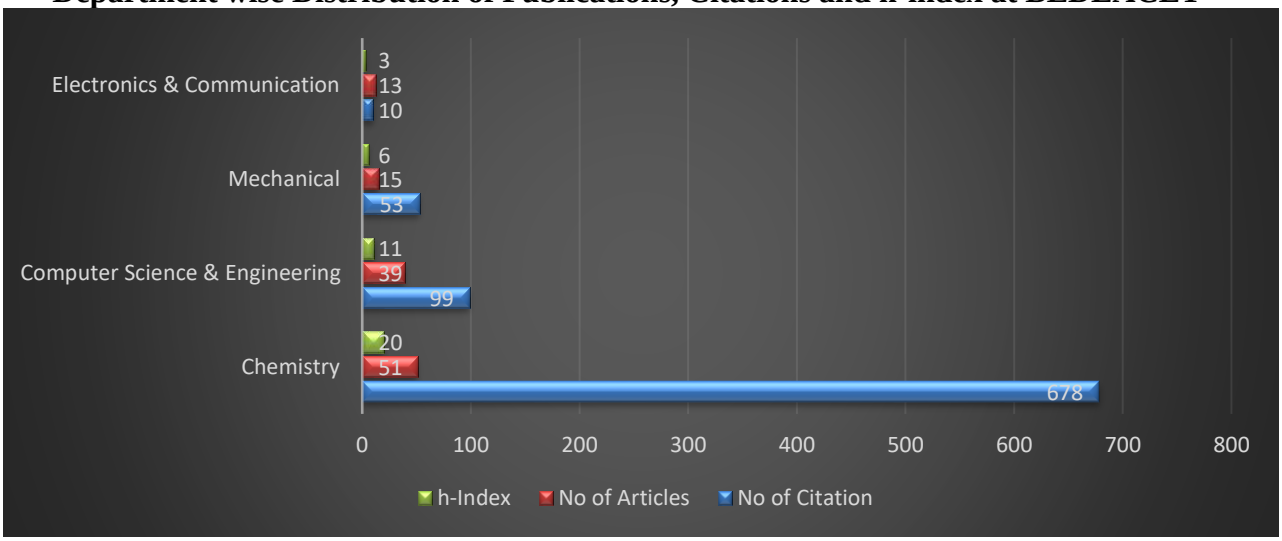
The h-index is an index that triesto calculateboth the research productivity and impact of the published work of a research scholar. The index is based on the distribution of citations received by a given researcher's publications. In this institution, highest h-index from Google Scholar Citations is scored by Swastika Das and Malladi R S their h-index is 8 and positioned number one in the h index list among the faculty members of BLDEA Engineering College, followed by Malaji PV and Prema T. Akkasaligar, Sankad G .C shared 2nd place for having an h-index score of 4. Remaining ten authors scored h-index of 1 to 3.

Table further indicates that, there is a relationship between the number of total publications and the total number of citations. Most efficient authors who are fetching more number of citations with limited publications are Swastika Das, Malladi R S and Malaji P

Table No. 5
Department wise Distribution of Publications, Citations and h-index

Departments	No. of Prolific Authors	No of Citation	No of Articles	h-Index
Chemistry	4	689	48	21
Computer Science and Engineering	4	112	39	11
Mechanical Engineering	2	54	15	6
Mathematics	1	22	08	4
Electronics and Communication Engineering	3	17	18	3
Information Science & Engineering	1	11	05	2

Figure No.3
Department wise Distribution of Publications, Citations and h-index at BLDEACET



Impact of research by each department is observed from the table 5 and figure number 3, Chemistry department is having highest score in all aspects such as publications, citations and h-index among the different departments like Computer Science and Engineering, Mechanical Engineering and Electronics and Communication Engineering. Mathematics and Information Science and Engineering. Chemistry department is having 689 citations from 48 publications and highest h-index of 21and stood 1st rank where other departments easily can't reach to that much of height. Followed by department of Computer Science and Engineering, Mechanical Engineering, Mathematics, Electronics and Communication Engineering and Information Science and Engineering stood 2nd, 3rd, 4th, 5th and 6th rank among the departments in the

college.Basic subject, chemistry is stronger than the other engineering departments. It is once again proved that, the research in chemistry subject is in the forefront compared to other subjects in all over the world.

More number of quality research is taking place in the department of chemistry, followed by Mechanical Engineering, Computer Science and Engineering, Mathematics, Information Science and Engineering and Electronics and Communication Engineering.

Table No. 6
Author Productivity during 2001 to 2019

Year	Total No of Publications	Total no of Authors	Total AAPP	Total PPA
2001	01	03	3.0	0.33
2003	01	02	2.0	0.5
2004	02	05	2.5	0.4
2005	02	04	2.0	0.5
2006	02	10	5.0	0.2
2007	01	05	5.0	0.2
2008	03	09	3.0	0.33
2009	03	07	2.33	0.42
2010	05	17	3.4	0.29
2011	13	34	2.61	0.38
2012	07	22	3.14	0.31
2013	11	27	2.45	0.40
2014	05	10	2.0	0.5
2015	07	17	2.42	0.41
2016	12	33	2.75	0.36
2017	25	50	2.0	0.5
2018	29	56	1.93	0.51
2019	27	79	2.92	0.34
Total	156	387	50.45	6.88

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

The table No.6reveals that the total number of publications are 156, published by 387 authors from the year 2001 to 2019 and total 360 different authors including 100 in-house authors have contributed with an average author per paper 50.45 and Productivity per author is 6.88.

Table No. 7
Top 10 Citations received by BLDEACET Publications

Rank	Title	Author	Source	Citations
1.	Nickel, its adverse health effects & oxidative stress	Das K.K., Das S.N., Dhundasi S.A.	Indian Journal of Medical Research Vol. 128(4), 2008	304

2.	The influence of ascorbic acid on nickel-induced hepatic lipid peroxidation in rats	Das K.K., Das S.N., DasGupta S.	Journal of Basic and Clinical Physiology and Pharmacology Vol.12(3), 2001	49
3.	effect of l-ascorbic acid on nickel-induced alterations in serum lipid profiles and liver histopathology in rats	Das K.K., Gupta A.D., Dhundasi S.A., Patil A.M., Das S.N., Ambekar J.G.	Journal of Basic and Clinical Physiology & Pharmacology Vol.17(1), 2006	33
4.	Electrochemical detection and degradation of textile dye Congo red at graphene oxide modified electrode	Shetti N.P., Malode S.J., Malladi R.S., Nargund S.L., Shukla S.S., Aminabhavi T.M.	Micro chemical Journal Vol. 146, 2019	41
5.	Recognition and classification of food grains, fruits and flowers using machine vision	Savakar D.G., Anami B.S.	International Journal of Food Engineering Vol. 5(4), 2009	25
6.	Performance of glass fiber-reinforced polymer reinforcing bars in tropical environments - Part I: Structural scale tests	Mukherjee A., Arwikar S.J.	ACI Structural Journal Vol.102(5), 2005	24
7.	Protective role of L-ascorbic acid on antioxidant defense system in erythrocytes of albino rats exposed to nickel sulfate	Das K.K., Gupta A.D., Dhundasi S.A., Patil A.M., Das S.N., Ambekar J.G.	BioMetals Vol. 20(2), 2007	22
8.	l-ascorbic acid protects the antioxidant defense system in nickel-exposed albino rat lung tissue	Gupta A.D., Dhundasi A., Das K.K., Patil A.M., Ambekar G., Das S.N.	Journal of Basic and Clinical Physiology and Pharmacology Vol. 17(2), 2006	21
9.	Effect of garlic (Allium sativum) on heavy metal (nickel II and chromium VI) induced alteration of serum lipid profile in male albino rats	Das Gupta A., Das S.N., Dhundasi S.A., Das K.K.	International Journal of Environmental Research and Public Health Vol. 5(3), 2008	20
	Performance of glass fiber-reinforced polymer reinforcing bars in tropical environments - Part II: Microstructural tests	Mukherjee A., Arwikar S.J.	ACI Structural Journal Vol. 102(6), 2005	20
10.	Studies On The Role Of Ascorbic Acid On Nickel Induced Hepatic Nucleic Acid Concentrations In Rats	Das K.K., Das S.N.	Journal of Basic and Clinical Physiology and Pharmacology Vol.15(3 &4), 2004	14

It is well known fact that, impact of research can be found through citations. In this study, the total 156 publications written by 387authors and indexed in SCOPUS citation database. The table 7 shows top 10 papers of BLDEACET scholars.These top 10 papers received 59% (573) citations out of 977citations. On an average 57 citations are received by these top 10 publications that too Das K K written articles received 45% (436) citations from 7 publications. It shows that,

MrsS.N.Das&Mr. Das KK is a renowned researchers in the department of chemistry of this institute. Their only one publication is having more than average citations in this study.

Table No. 8
Subject wise Distribution of Publications

Subject Area	No of Articles	Percentage
Computer Science	78	30.35
Engineering	67	26.05
Mathematics	25	9.72
Biochemistry, Genetics and Molecular Biology	18	7.00
Materials Science	16	6.22
Chemistry	13	5.05
Chemical Engineering	14	5.44
Energy	12	4.66
Medicine	9	3.50
Decision Sciences	5	1.94

The table 8 exposes the subject wise distribution of publications, total 156publications are divided into the 10 main subject headings, out of 156 publications, Computer Science, Engineering and Mathematics subjects published the majority 166 (66%) number of publications during this period of study.

Highest number of publications i.e.: - 30% are published in the Computer Science subject, followed by 26% publications in the Engineering subject and 10% publications are published in the Mathematics subjectduring the study period of 20 years. Remaining subjects published less than 34% publications in the different subjects.

Table No.9
Source wise Distribution of Publications

Name of the Journals	No of Articles
Communications in Computer and Information Science	9
Journal of Basic and Clinical Physiology and Pharmacology	8
Advances in Intelligent Systems and Computing	3
Analytical and Bioanalytical Electrochemistry	3
International Conference on Signal Processing Communication Power and Embedded System Scopes 2016 Proceedings	3
Lecture Notes in Civil Engineering	3
Proceedings of the International Conference on Smart Systems and Inventive Technology Icssit 2018	3
2011 2nd International Conference On Computer And Communication Technology Iccct 2011	2
2016 IEEE International Conference On Computational Intelligence and Computing Research Iccic 2016	2
ACI Structural Journal	2

This table (No.9) analyzed the rank list of 10 highly cited journals/conference proceedings.Communications in Computer and Information Science is ranked number one and highlycited journal which were cited by 9 articles. Second rank got by The Journal of Basic and Clinical Physiology and Pharmacology with 8publications. Whereas, 3rd rank is shared by five journals such as Advances in Intelligent Systems and Computing, Analytical and Bioanalytical Electrochemistry, International Conference on Signal Processing Communication Power and Embedded System Scopes 2016 Proceedings, Lecture Notes in Civil Engineering, Proceedings of the International Conference on Smart Systems and Inventive Technology 2018 with 3 publications each in their journals. Remaining 6 publications are published in 2 different conference proceedings and in one journal.

Table No. 10
Ranking of Collaborative Institutions

Rank	***Affiliation***	***Place of Organizations***	***No of Contributions***
1	V. P. Dr. P. G. Halakatti College of Engineering and Technology	Karnataka	156
2	Basaveshwar Engineering College, Bagalkote	Karnataka	25
3	BijapurLingayats District Education University, B.M. Patil Medical College	Karnataka	15
4	Visvesvaraya Technological University	Karnataka	17
5	Al-Ameen Medical College	Karnataka	11
6	K.L.E. Institute of Technology	Karnataka	9
7	Shri Guru GobindSinghji Institute of Engineering and Technology	Punjab	8
8	K.L.S's V. D. Rural Institute of Technology	Karnataka	6
9	Rani Channamma University	Karnataka	6
10	North-West University, South Africa	South Africa	6

Table 10disclosesthe ranking of collaborative institution's besides BLDEA's CET, 9 other institutions / organizations have also collaborated in publishing of the 156 articles. Of these, authors affiliated to Basaveshwar Engineering College, Bagalakote contributed to 25 (16.02%) articles and thus stood at the 2nd place, followed by BLDE University, BM Patil Medical College, Bijapur (15, 9.61%). VishvesvaryaTechnologicalUniversity of Belagavi, Al-Ameen Medical College, Bijapur, KLE Institute of Technology, Belagavi ranked 3rd, 4th 5th and 6th rank. Shri Guru GobindSinghaji Institute of Engineering and Technology from Punjab and North-West University, South Africa got 7thand 10th rank among the top ten collaborators.

Overall 52 institutions/organization's contributors collaborated in publications along with the BLDEA's CET including the institutions such as Ajou University and Yeungnam University from South Korea, University of Sydney, Swansea University, Wales, UK, Lamar University, Beaumont, Texas, NAL, ISRO, IIT Mumbai and Madras, NIT, JNTU Hyderabad, Kuvempu University, Jadhavapur University, University of Calcutta and many more engineering and technical college researchers in India.

Table No. 11

Authorship Pattern

Year	Single Author	Double Author	Three Authors	Four Authors	Five Authors	More than Five Authors	Total
2001			3				3
2002							0
2003		2					2
2004		2	3				5
2005		4					4
2006						12	12
2007						6	6
2008		2		4			6
2009		4	3				7
2010		2	1	12			15
2011		16	15		5		36
2012		6	6		10		22
2013	2	8	6	4	5	6	31
2014	1	6	3				10
2015		12			5		17
2016		9	15	4	5		33
2017		36	6				42
2018		26	3	12	15		56
2019		22	15		15		52

Figure No.4
Authorship Pattern of BLDEACET

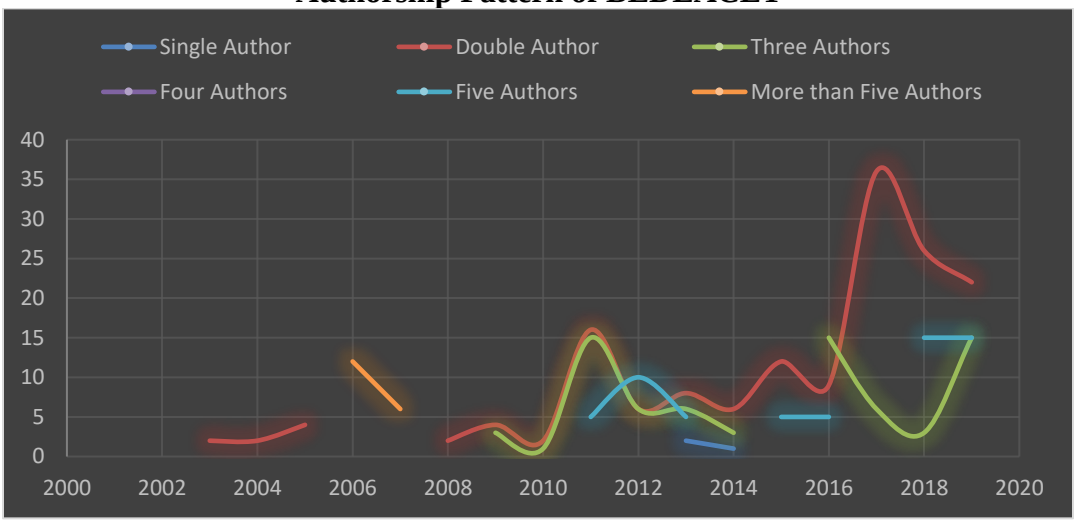


Table 11 and Figure 4presents year-wise publication productivity in relation with authorship pattern (single author and multi-author), collaboration trend among authors of the publications of BLDEA CET.

About 99.14 % of publications were multi-authored and only 0.86 % single authored publications in this study. It is revealed that, the trend is towards multi-authored publications.

The highest number of multi authored publications 56 (16%) was found in the year 2018 followed by 2019 and 2017 with 52 (15%) and 42 (12%) respectively. Lowest collaboration coefficient was found in the year 2013 and 2014, where we have single author publications.

Table No. 12
Access Type of Documents

Access Type	No of Documents
Electronic (Open Access) Journals	19
Printed Journals	137

Articles published in different type of documents are indicated in Table12, 19 documents are published in open access journals and 137 publications are appeared in the form of printed journals, book chapters, conference proceedings etc. The researchers / faculty members are determined to publish their scholarly publications in journals/conferences in the printed form. Very less number of publications are published in the open access publications, here librarian has to make awareness about the benefits of open access journals to the faculty members.

Findings of the study:

The present study has been undertaken to evaluate the research performance of BLDEA's CET research publications

1. It is found from the study that, there are 156 research publications published by the researchers / faculty members affiliated with BLDEA'sCET and Indexed in Scopus from 2001 to 2019.

2. The publications ranges from 01 (0.64%) to 29 (18.59%) from 2001 to 2019 and observed good progress in scholarly publications.

3. Since last four years from 2016 to 2019 number of publications are increased from 12 (7.8%) to 29(18.59%) is the productive contributions by the researchers.

4. Highest citations 324 are received just from 3 high quality publications in the year 2008.

5. More number of scholarly publications are published in the form of article (46.15%). H-index is highest in Department of Chemistry (21) followed by Computer Science and Engineering with h-index of 11.

6. Ms. Swastika Daspublished 21 publications and took509 citationswhereas, 133 citations are received from 11 publications of Mr. Malladi R.S. Both are from the Department of Chemistry and having an h-index of 8 they are the Best Researchersamong the faculty members of the Institute. Ms. Prema T Akkasaligarof Computer Science and Engineering, Mr. Sankad G C of Mathematics and Mr. Malaji P V of Mechanical Engineering is having an h-index of 4.

7. About 99.14 % of publications were multi-authored and only 0.86 % single authored publications in this study.

8. Highest number of publications are published in the subject of Computer Science (30%), followed by Engineering and Mathematics subjects.

9. Communications in Computer and Information Science journal published highest publications, followed by Journal of Basic and Clinical Physiology and Pharmacology.

10. The findings show that researchers are inclined to collaborative with authors of reputed research centers and universities in India and abroad.

11. The total number of publications 156 from 2001 to 2019 and total 387 authors have contributed with an average author per paper 50.45 and Productivity per author 6.88. The Institute h-index is 13 for 156 research publications.

12. It gives more confidence to researchers to show progress in the coming years.Journal articles occupy the prominent place among the research publications. Out of 156 research publications only 19 publicationsare in open access journals, remaining are in the printed journals/ conference proceedings.

Conclusion:

The present bibliometric analysis study reveals that, BLDEA'CET has published 156 scholarly publications in the field of Science and Technology for the period from 2001 to 2019. This study adopted a bibliometric method. Data was collected through the SCOPUS database. Further it examined that 156 scholarly publications found steady growth and author productivity per paper is 50.45 and publication per paper is 6.88 and total citations are 977 and h-Index of the institute is 13. It clearly shows that, scholarly publications are augmenting and author productivity is also increasing and gaining confidence to the contributors for visibility in the academics. Librarian has to take initiative in making awareness and benefits of the open access journals, so more faculty members will publish more and more publications in the open access journals and they will get more citations also. The present study will be very beneficial for the students and researcher to know the productivity of the institutions for the various purposes.

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