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Scientific Publications of Goa University as reflected in Web of Science Database during 2008 – 2017

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Scientific Publications of Goa University as reflected in

Web of Science Database during 2008 – 2017

By:

Dr. Jayaprakash G Hugar

Abstract:

Web of Science is a major citation database which provides access to the world's leading scholarly literature. University of Goa is the only premier higher education institutes which cater the educational needs of the Goa. The present study evaluates the research productivity of University of Goa based on the data collected from Web of Science over a period of ten years from 2008 to 2017. This article studied the publication pattern, trend, collaboration with different organisations, institutions, R&D Centres and different nations. Top funding agencies in Science and Technology field research performance of faculty members of Goa University in last ten years. 1218 articles including 497 international collaborated articles with an increasing growth rate during the study period. Analysis revealed that Current Science journal is the most preferred journal among Goa University faculty members. It has been found that 315 (25.86%) publications belong to Chemistry subject. It is clear that relative growth rate of total research output is decreased gradually. The growth rate is 0.84 in 2009 and which decreased up to 0.15 in the year 2017. It is observed that the SJR and h-Index are the highest for the journal 'Fungal Diversity'. It is suggested to get more international funding by collaborating with more and more authors, universities and R&D centres.

Keywords:

Goa University, Science, Technology, Research Productivity, Web of Science, Impact.

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Introduction

Goa University, established in June 1985 by an Act of Goa Government, is located on a picturesque campus spread over 427.49 acres area of Taleigao Plateau overlooking the Zuari Estuary, within close vicinity of the capital city of Panaji, in North Goa. The University took over the enhanced role of Centre of Post-Graduate Instruction and Research (CPIR) which was set after the annexation of Goa by India in December 1961, by the University of Bombay (now Mumbai), in June 1962. Since 1985 Goa University offers graduate and post-graduate studies and research programmes. It is currently (2014-19) accredited to the National Assessment and Accreditation Council (NAAC) in India with A Grade. The National Institutional Ranking Facility (NIRF) (an organ of Ministry of Human Resources and Development, Govt. of India) in its third cycle of ranking Indian Higher Educational Institutions in the year 2018, ranked Goa University at 68th rank among 3000+ institutions that participated from India. The University also ranked between 201 to 250 in QS World University Rankings for BRICS countries. There are in all about 9000 Universities in BRICS countries. The Goa University was in the top 100 on two scores - staff with PhD and Citations per paper and top 150 for "papers published in Scopus journals".

The University has made a significant impact at the national level in various areas of specialization and draws students in select disciplines from across the country. Goa University has appropriately emerged as an important resource centre for research in the field of flora and fauna endemic to this region, as well as the marine environment. The Ministry of Earth Sciences has recognized Goa University's significant contribution in this domain, as a consequence of which a Centre of Excellence was established in Marine Microbiology.

The University has 26 Departments and 2 Centres offering 33 programmes leading to Masters Degree, 21 programmes leading to M.Phil. Degree and 25 programmes leading to Ph.D. degree in various disciplines. In addition, 9 research institutions in various disciplines situated in the state of Goa are also recognised for research programmes leading to Ph.D. degree by the University. Over 30000 youth from all talukas of Goa are studying in affiliated colleges and over 1900 are enrolled for post-graduate programmes at the University campus. There are about 500 students registered for PhD programmes and doing their research at the University departments, affiliated colleges and recognized institutions. The percentage of women (over 60%) outnumbers men (about 40%). A campus-wide Internet connectivity with strong

bandwidth is available for all 24 hours a day (Goa University, 2015-16). Today Goa University is a university of affiliated colleges, 55 of which are distributed across Goa, 30 in general education, 25 in professional education. The student strength at the affiliated non-professional and professional colleges in 2016-17 was 20714 and 11010 respectively.

The Departments at the University have developed excellent research facilities. Large funding for research is received from Central Government agencies such as University Grants Commission, Department of Science & Technology, Ministry of Earth Sciences, Ministry of Environmental Sciences and Climate Change, Department of Biotechnology, etc. For a relatively small university, Goa University attracts a generous funding of research projects from national funding agencies which reflects upon the high quality of research undertaken at the University.

Publications Repository and H-Index of Goa University

The strength of the Goa University lies in the number of research publications and the H-index. Goa University has so far published over 5000 research publications (including PhD theses) and the full-text of these are available at the unique Publications Repository. There are very few state universities in India who have made such an effort in consolidating the information. There is a multi-fold increase in the visibility of the university with its publications on the repository. Current h-index as per the Web of Knowledge database from just 1246 journal publications out of 5000 is 48. (Data from Web of Knowledge as on 31st May 2018)

1. Review of Literature

Anil Kumar H, Mallikarjun Dora and Asha Desai (2015) analysed the research publications of Gujarat University during the ten-year period between 2004 and 2013. The data for this study was extracted from SCOPUS and included a total of 760 publications that were attributed to authors affiliated to Gujarat University. The publication data was analysed with respect to the type of publications where 83% are journal articles. The paper also analysed the publication trend of Gujarat University and found that from 2008 onwards there was a steady increase in the number of publications. The other aspects that were identified in the paper were the most prolific authors, collaborative authorship patterns and trends, most preferred publications, and

so on. The collaboration was found to be the highest in the year 2012 at 0.70 based on the modified collaboration coefficient. The most preferred journal for publication by Gujarat University faculty was *Acta Poloniae Pharmaceutica-Drug Research* and the most cited author of Gujarat University was P.S. Srivastav, while V.K. Jain had the best average citations per paper. **Anil Kumar Siwach and Satish Kumar (2015)** investigated the research contributions of Maharshi Dayanand University, Rohtak in terms of its publication output during 2000-2013 as reflected through Scopus database. The study analyses the year-wise research productivity, its citations impact, national and international collaborations, top collaborating institutions, subject-wise distribution of papers, journals used for communication, most preferred journals for publication, most prolific authors, number of citations received, and top cited papers of the University during the period under study. Student indicates a steep rise in the research publications of MDU was observed during the last four years. The increasing research productivity of the University can be attributed, to some extent, to the increase in major and minor research projects being undertaken by the faculty members during the last few years. **Baskaran, C (2013)** explored the author productivity, discipline-wise and institution-wise collaboration and ranking of authors in research contribution of Alagappa University during 1999-2011. Relative growth rate (RGR) was found to be fluctuating trend during the study period. The doubling time (DT) was found to be increased and decreased trend in this study. Degree of collaboration and its' mean value is found to be 0.963. The top three institutions with Alagappa University are Central Electro Chemical Research Institute, National Cheng King University, and Anna University. **Gopikuttan and Aswathy S (2014)** analysed the overall performance of the faculty members of Science Departments of University of Kerala in research productivity. The parameters such as form-wise, year-wise, subject-wise classification of published papers, most productive authors and the most preferred journals, etc. are considered for the study. The impact factor and the citation received were also analysed. The study reveals that Chemistry is the subject which produces more number of papers while the multi-authorship also possesses a lead role in this subject. Indian journals are the most preferred journals to publish the articles which are followed by UK. Collaborative Coefficient varies from subject to subject. The result shows that the research productivity of the University of Kerala is much recognised at international level. **Koganuramath, M.M.; Angadi, M. and Kademani, B.S. (2002)** Bibliometric analysis of 663 papers published by the social scientists of Tata Institute of Social Sciences during 1990-2000 in diverse domains in the social sciences were analysed for authorship pattern and collaboration. The results indicate that the collaboration co-efficient of the 613 single-authored papers is 92.46 percent, followed by

6.33 percent (42 papers) two authored papers. Maximum collaboration coefficient (0.13) was found during 1996-1997. The most prolific authors were: Murli Desai, Sarthy Acharya, Lakshmi Lingam, I.U.B. Reddy, Kailash, Shalini Bharat, and Chhaya Datar, publishing between 20-38 papers each. The core journals publishing TISS papers were: Indian Journal of Social Work (98), Economic and Political Weekly (26), Perspective of Social work (7), and All India Institute of Local Self Government (5). **Kumbar, B.D. and Gupta, B.M (2013)** examined the contribution of six Karnataka universities to the mainstream scientific literature during 2007-2011 comprehending inter-related dimensions of quantity (number of papers, number of international collaborative papers) and quality of research output (assessed through the citation received). A number of relative measures are used for inter-field and inter-university comparisons Inter-field comparisons are made at the level of 15 macro subject fields. **Mondal, Dhiman and Raychoudhury, Nitai (2017)**: assessed the performance, trend and citation impact of research publications of faculty members of Jadhavpur University. Identified 6895 articles including 1452 internationally collaborated articles with an increasing growth rate during the study period. The polyhedron journal has been found as the most preferred journal and found that, maximum research articles have been published in Chemistry and allied disciplines. The citation analysis has indicated that the research articles especially with international collaboration have received good citations. The study recommended that the faculty members and researchers should select journals with high impact factor for disseminating research results. The researchers should go for more foreign collaboration for larger readership and international recognition. **Rabindra K. Maharana (2014)** examined the research performance of Sambalpur University's publications that have been indexed in Scopus during 2008 to 2012. The study also identified the annual growth of university publication, authorship pattern, author productivity, degree of collaboration, length of paper published, most prolific contributor, prolific institution/ organization, geographical distribution etc. Lotka's law of scientific productivity was used to determine the author's productivity and Bradford's is law used to determine scattering of literature in the publication pattern of the university during the period under study. The university's publication range ranges from 38 to 83 papers with an annual average growth rate percent of 11.29 papers. Maximum number of three authored (31.23%) papers published which is followed by four authors (22.92%), eight or more than eight authors contributed a total of 17 (5.65%) papers. A total of 1152 authors contributed 301 papers out of which 598 authors were affiliated to Sambalpur University. All the 1152 contributors were scattered among Indian with 11 foreign countries.

Shubhada Nagarkar, Chaitanya Veer and Rajendra Kumbhar (2015) together evaluated the research productivity of life sciences faculty members at the Savitribai Phule Pune University (SPPU), Maharashtra, India. The research is conducted with the intention to know the research productivity over 15 years (1999-2013), the citations received, collaborations, and authorship patterns. Web of Science (WoS) database was used for the bibliographic and citation data. Data were analysed by using bibliometric techniques and software such as HistCite, Intcoll, and Pajek. Results show that the research productivity of faculty members is increasing, their publications are getting good citations and thereby their journals have better Impact Factor. The faculty members have collaborated with prominent international researchers and have extended interdisciplinary research. The paper is based on empirical data exclusively gathered for this research. **Thirumagal, A., (2012)** studied the scientific publications generated by the Manonmaniam Sundaranar University, Tirunelveli, Tamilnadu. The data was collected from the Web of Science. The analysis highlights yearly output of research product. This study focuses on publishing trend, impact factor, authorship pattern, types of articles, institutional collaboration of authors, affiliated institutions of authors, countries of contributing authors and individual author's research productivity and their TLCS (Total Local Citation Score), TGCS (Total Global Citation Score) TLCR (Total Local Citation References) and TLCSb (Total Local Citation Score in the beginning). Only 3.86% of the research done was by single authors. 96.14% of research was done by collaborative authors. In this study, about 93.9% have published journal articles. So journal article are termed as primary vehicles of research communication. The Maximum Citation Score is 61. **Vinod Kumar Gautam and Rajani Mishra (2015)** analysed scholarly research publications of Banaras Hindu University, Varanasi, India. In this regard 1041 articles were collected from ICI for the period of 2004-2013. The study attempts to measure year-wise distribution of publication output, co-authorship index, collaborative co-efficient collaborating universities/institutes/colleges, states and countries. The result indicates that research productivity of Banaras Hindu University is increasing at the average rate of 104.1 publications per years, most of the researches are contributed by joint authors, 404 (39 %) articles published in SCIE indexed journals and 637 (61 %) articles published in non SCIE-indexed journals.

2. Objectives of the Study

- 2.1 To know the publication pattern of Goa University faculty members from 2008 to 2017
- 2.2 To study the impact of research by the faculty members of Goa University.
- 2.3 To explore the top national/international collaboration in Science and Technology field.

3. Methodology and Data Source

The data was collected from Web of Science database in the month of February 2018. The WoS database was searched under the address heading “Goa University”. All the publications published under Goa University in Science and Technology field from last ten year (2008 to 2017) analysed and presented in tabular format. It is included tables like year of publications, prolific authors, and collaboration with different organisations, nations, funding agencies, organisation wise, subject wise and journal wise publications. Identified faculty departments by referring Goa University Annual Report and Google citations. Funding agencies belongingness (of country) is located through Google website.

4. Data Analysis and Discussion

Table No. 1
Year wise Distribution of Publications

Year of Publication	Records	Percentage
2017	112	9.19
2016	111	9.11
2015	106	8.70
2013	89	7.30
2014	89	7.30
2012	70	5.74
2011	68	5.58
2009	60	4.92
2010	50	4.10
2008	46	3.77

Research publications do constitute an important basis in ranking of institutions, apart from infrastructure, faculty, student, and other variables. Most of the institutions in India are now emphasising on research and encouraging researchers to publish more. The table number 1 show that gradual increase in the publication of research articles in Science and Technology field in Goa University from 3.7% to 9.1% from the year 2008 to 2017. Most productive year was 2017 with 112 publications and lowest is the 2008 with just 46. Further it is found that, average eighty articles were published in a year during the last ten years. There is not much difference in number of publication of articles in the year 2013 & 2014 and 2016 & 2017. Overall, 801 publications are coming from 10 years i.e.: 2008 to 2017.

The compound annual growth rate (CAGR) was calculated using the formula given below and is available at www.investopedia.com/calculator/cagr.aspx. CAGR (mean annual growth rate) was found to be 9.31% during the study. (Dwivedi, Garg, & Prasad, 2017)

$$\text{CAGR} = \left(\frac{\text{Ending Value}}{\text{Beginning Value}} \right)^{\frac{1}{n}} - 1 \text{ (Investopedia)}$$

Over the course of ten years periods publications grew from 46 publications to 112, its compound annual growth rate, is 9.31%. CAGR essentially smoothes out the progress of publications over a period of time, providing a clearer picture of annual return. However, although it started at 46 publications and ended with 112, its growth in any one year may have been quite a bit higher or even negative. Consequently, the CAGR figure may give the impression that the publications has produced a stable return throughout its life, even if the publications were extremely fluctuating a great deal from year to year.

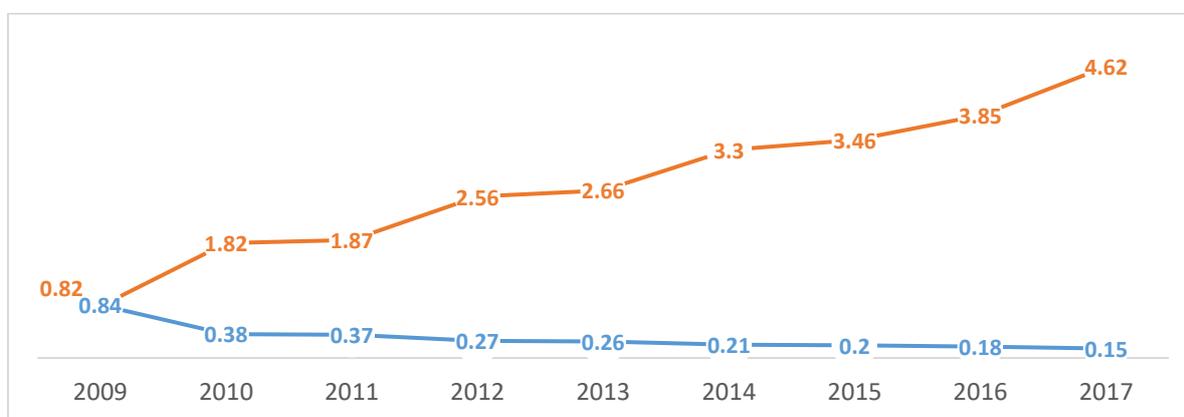
Table No. 2

RGR and Dt for publications of Goa University during 2008 to 2017

Year of Publication	Records	Cumulative Numbers	W1	W2	R(a)	Mean(a) 1-2	Doubling Time	Mean pt (a) 1-2
2008	46	46	-	3.82		0.42	-	1.41
2009	60	106	3.82	4.66	0.84		0.82	

2010	50	156	4.66	5.04	0.38		1.82	
2011	68	224	5.04	5.41	0.37		1.87	
2012	70	294	5.41	5.68	0.27		2.56	
2013	89	383	5.68	5.94	0.26	0.14	2.66	3.57
2014	89	472	5.94	6.15	0.21		3.3	
2015	106	578	6.15	6.35	0.2		3.46	
2016	111	689	6.35	6.53	0.18		3.85	
2017	112	801	6.53	6.68	0.15		4.62	

Figure No. 1



The relative growth rate and doubling time model developed by Mahapatra (1985). The RGR is defined as the increase in number of articles per unit of time. Doubling time (Dt) is directly relative to relative growth rate (RGR) and is defined as the time required for the articles to become double of the existing amount. It is also determined that if the number of article in a subject doubles during a given period then the difference between the logarithms of numbers at the beginning and at the end of this period must be the logarithm of the number 2.

The Relative Growth Rates (RGR) were calculated for publications. The Doubling Time (Dt) against each year of study was also determined. A study of data in table-2 and figure no. 1 indicates that the values of Relative Growth Rate (RGR) and Doubling Time (Dt) for publications of Goa University. It is clear that relative growth rate of total research output is decreased gradually. The growth rate is 0.84 in 2009 and which decreased up to 0.15 in the year 2017. The mean relative growth rate for the first five year (i.e. 2008 to 2012) showed a growth rate of 0.42 whereas, for the last five years (i.e. 2013 to 2017) it was reduced to 0.14.

The overall study period has witnessed a mean relative growth rate is 0.56. The whole study period has witnessed the mean doubling time for article output as 2.49.

Table No. 3
Prolific Faculty Members of Goa University

Name of the Authors	No. of Records	Percentage	Department
Srinivasan B R	118	9.68	Chemistry
Bhat D J	93	7.63	Botany
Hyde K D	89	7.30	Mycology
Priolkar K R	85	6.97	Physics
Tilve S G	68	5.58	Chemistry
Salker A V	55	4.51	Chemistry
Sarode P R	42	3.44	Physics
Nather C	38	3.12	Chemistry
Bensch W	36	2.95	Chemistry
Nayak G N	35	2.87	Marine Science

The academic performance based on the publication output is one of the fundamental parameter to adjudge the performance. Author's academic and research performance has become more crucial in academic and research institutions. The database gives a facility to showcase the publication performance of individual faculty. Publication output has become the key criteria for measuring the quality of university academic program as well as department.^{8&16}

Table No. 3 reveals the prolific faculty members of Goa University during the study period. 1930 authors published 1218 publications during the study period. Highest number of articles are published by Srinivasan B.R of Chemistry department and ranked in first place with 118 publications, followed by Bhat DJ of Botany department and Hyde KD of Mycology department in the second and third rank with 93 and 89 publications respectively. Srinivasan BR, Tilve SG, Salkar AV, Nather C and Bensch W were identified as most prolific authors in chemistry subject. The research activity seems to be highly skewed as the top 10 authors account for more than half (54.10%) of the total publications of Goa University. The average productivity of these top 10 authors is 66 during the last ten years of study period, five author's

i.e: Srinivasan B R, Bhat D J, Hyde K D, Priolkar K R and Tilve S G having publications more than the average of 66 number of publications during the study period.

It is further identified that, Chemistry department of Goa University authors has been the front runner as they (top 10) published highest 315 (25.84%) number of publications during the study period. Out of the 10 most productive authors, 5 authors are from the Chemistry Department. This indicates that the Department of Chemistry has a strong research base.

Table No. 4
International Collaboration with Goa University

Countries	No. of Records	Percentage
Peoples Republic of China	93	7.63
Thailand	88	7.22
Germany	74	6.07
USA	49	4.02
Japan	46	3.77
Italy	42	3.44
Saudi Arabia	41	3.36
France	34	2.79
Canada	30	2.46

Scientific literature is being published in almost all countries of the world. Collaboration among authors plays an important role in research production. In this table number 4, Goa University faculty members collaborated with scientists / authors from China, Thailand and Germany by producing together 93, 88 and 74 publications respectively. Even though, USA leads in research, but collaboration of Goa University authors came down to 4th place in this study period. Average 44 publications are collaborated with USA, Japan, Italy and Saudi Arabia. Very less i.e.:- below 3% of authors collaborated with France and Canada. Top 49 collaborating countries together published 497 publications.

Table No. 5
Types of Documents

Types of Documents	Records	Percentage
Article	1081	88.75

Book Review	47	3.85
Editorial Material	33	2.70
Proceedings Paper	25	2.05
Note	20	1.64
Review	20	1.64
Letter	10	0.82
Meeting Abstract	4	0.32
Biographical Item	2	0.16
News Item	1	0.08

Faculty members of Goa University communicated their papers through variety of communications channels. Table No. 5 provides type of documents, in this study and also it is depicted that, majority 89% of the publications is in the article form followed by book review with 4%. Around 2% of the publications are in the form of Editorial Materials and Conference Proceedings. Publications such as Note and Reviews are appeared 1.6% only. Less than 1% of the publications are in the form of Letter, Meeting Abstract, Biographical items, News items in this study period.

Table No. 6
Top Funding Agencies

Funding Agencies	Nations	Records	Percentage
University Grants Commission, New Delhi	India	67	5.50
Council Of Scientific And Industrial Research, New Delhi	India	55	4.51
Chinese Academy Of Sciences	China	43	3.53
National Natural Science Foundation Of China	China	22	1.80
Department Of Science And Technology, New Delhi	India	20	1.64
Thailand Research Fund	Thailand	19	1.56
Mae Fah Luang University	Thailand	14	1.14

Table No. 6 gives information about top funding agencies. For any research funding is important, without government or private organisations funding research is not at all possible in the field of Science and Technology, as huge money is required for the research. In this study majority 5.5% of the publications received the funding from University Grants Commission of India, New Delhi, and Council of Scientific and Industrial Research, New Delhi is in the second

place with 4.5% funding during this study period while, Chinese Academy of Sciences funded 3.5% publications. Further it is noticed that, more than 10% of the publications are funded by the Indian organisations in this field of study. Overall, 569 funding agencies funded 1218 publications, among these Indian funding agencies funded 11.65%, followed by China and Thailand funding agencies with 3.53% and 2.7% publications during the study period.

Table No. 7
Languages wise Distribution of Publications

Languages	No. of Records	Percentage
English	1216	99.83
German	1	0.08
Spanish	1	0.08

Language plays an important role in any type of communication, in this table no 7 it is once again proved that, English is universal language and 99.8% of the publications are in the English language. Other two languages used for communication is German and Spanish languages and both the languages got each one publications in this period of ten years.

Table No. 8
Top Collaborative Institutions

Name of the Organizations / Institutions	No. of Records	Percentage
Council Of Scientific Industrial Research, (CSIR) India	119	9.77
Mae Fah Luang University	86	7.06
National Institute Of Oceanography, (NIO) India	80	6.56
Chinese Academy Of Sciences	57	4.68
Azad Housing Society	44	3.61
Bhabha Atomic Research Centre (BARC)	42	3.44
Indian Institute Of Science,(IISc) Bangalore	40	3.28
University Of KIEL, Germany	39	3.20
King Saud University	34	2.79

Collaborations in the scientific research are seen essential and useful for universalisation and validation of the research. Faculty members of Goa University have research collaborations with other experts in India and from other countries institutions in the field of Science and Technology. The institutional affiliation of authors was found from their address. Table No. 8 provides top collaborative institutions with Goa University faculty members, with national and international research organisations. Among them 119 (9.7%) authors from CSIR institutions collaborated with Goa University faculty members, followed by Mae Fah Luang University of Thailand and NIO with 7% and 6.5% publications respectively.

National Research Institutions like CSIR, NIO, BARC, and IISc together published about 281 (23%) articles and collaborated with Goa University faculty members in their field of research published as a co-authors. 177 (14.53%) articles are from International research institutions like Mae Fah Luang University, Chinese Academy Of Sciences, University Of KIEL, Germany and King Saud University. Overall, 714 institutions came together and produced 1218 number of publications during the study period.

Table No. 9

Subject wise Distribution of Publications

Subjects	Records	% of 1218
Chemistry	343	28.16
Physics	144	11.82
Mycology	102	8.37
Materials Science	98	8.04
Science Technology Other Topics	67	5.50
Environmental Sciences Ecology	66	5.41
Plant Sciences	64	5.25
Biotechnology Applied Microbiology	60	4.92
Oceanography	56	4.59
Geology	43	3.53

The purpose of analysis of the subject-wise scientific research output is to find out the research trends in terms of research output in specialised disciplines of the subject interest. Table No. 9 reveals the subject wise publications, chemistry publications are 28%, followed by Physics and Mycology subjects with 11% and 8% publications in this study period. Material

Science subject publications are 8%, Science Technology, Environmental Sciences, Ecology, Plant Science, Biotechnology and Applied Microbiology are 5% only, and lowest articles are published in the subject area of Oceanography and Geology with 4.5% and 3.5%. It is observed from the table that, lab oriented practical subjects has more number of publications.

Table No. 10
Top 10 Most Productive Journals of Goa University

Name Of The Journal	No. Of Records	Percentage	Country	SJR	h-index
Fungal Diversity	24	1.97	Hongkong	6.43	71
Journal Of Thermal Analysis and Calorimetry	29	2.38	Netherland	0.59	74
Contributions To Indian Sociology	18	1.47	India	0.37	22
OPTIK	18	1.47	Netherlands	0.34	40
Current Science	45	3.69	India	0.31	98
Indian Journal Of Geo Marine Sciences	17	1.39	India	0.21	28
Indian Journal Of Chemistry Section A (Inorganic Bio Inorganic Physical Theoretical Analytical Chemistry)	30	2.46	India	0.2	35
Mycotaxon	22	1.80	United States	0.60	37
Phytotaxa	30	2.46	New Zealand	0.60	24
Mycosphere	23	1.88	China	0.71	8

To publish research articles, journals are important and one has to know its scope, impact factor, whether indexing in major databases like WoS and Scopus etc. Table No. 10 includes the list of the top 10 prolific journals that have published most of the articles contributed by the authors from Goa University in the field of Science and Technology, the leading journals preferred by the faculty members of Goa University is Current Science Journal and published with 3.7% publications, 2.46% articles are published in Indian journal of Chemistry Section A and Phytotaxa Journal and shared second rank, and third rank goes to journal of Thermal Analysis and Calorimetry with 2.38% publications.

Around 10% of the publications are divided into 6 journals i.e.:- Fungal Diversity, Mycosphere, Mycotaxon, contributions to Indian Sociology, PTIK, Indian Journal of Geo Marine Sciences by publishing 1.6% publications.

The distribution of papers were spread over 449 journals. The leading journals preferred by the scientists/authors for their publications were Current Science and Indian Journal of Chemistry Section It is interesting to note that, four Indian journals made an entry into this top 10 most productive journals, and published around 9% publications in these journals.

Table No. 10 also shows the SJR and h-index of the top 10 journals for the year 2017. The impact factor of a journal is calculated by dividing the number of current year citations to the source items published in that journal during the previous two years²⁰. SCImago journal rank (SJR) is a prestige metric based on the idea that 'all citations are not created equal'. with SJR, the subject field, quality and reputation of the journal have a direct effect on the value of a citations based on the total number of citations in a subject field (Sources, 2018).

It shows that, journal having highest SCImago Journal Ranking is Fungal Diversity, remaining are having less than 1. The top 3 journals according to SJR are Fungal Diversity, Journal of Thermal Analysis and Calorimetry and Contributions to Indian Sociology. Further it says that, highest h-index journal is Current Science from India with 98 h-index, 2nd rank goes to Journal of Thermal Analysis of Netherland with 74 and 3rd rank got by Fungal Diversity from Hongkong with 71 as its h-index. Thus, it is observed that the SJR and h-Index are the highest for the journal 'Fungal Diversity'.

5. Findings

5.1 Majority of the articles are published in the year 2016 and 2017 in this ten year study period.

5.2 Srinivasan B.R of Chemistry department published highest number of publications among the Goa University faculty members in Science and Technology field.

5.3 Highest collaboration of Goa University faculty members is with China authors.

5.4 Study reveals 89% of the publications are in the form of articles.

5.5 It is found that UGC funded majority of the articles at national level, and at international level Chinese Academy of Sciences funded more articles/research on Science and Technology field.

5.6 English is the major language of communication in Science and Technology publications. As this study identified that, almost cent percent publications are belonged to English language.

5.7 Highest 10% of the faculty members are collaborated their research with Centre for Scientific and Industrial Research (CSIR) Scientists.

5.8 Majority 26% of the publications are related to Chemistry subject area compared to other subject publications.

5.9 Current Science journal is the major source of publications among the faculty members in the field of Science and Technology during the study period.

5.10 The overall study period has witnessed a mean relative growth rate is 0.56. The whole study period has witnessed the mean doubling time for article output as 2.49.

6. Suggestions

6.1 All the departments should publish more and more articles in reputed journals which are indexed in WOS and Scopus databases.

6.2 Mathematics, Medicine, Applied Science and other department publications are very less compared to Physics and Chemistry publications. University authorities have to encourage other science faculty members to publish more articles.

6.3 Faculty members of Goa University have to collaborate more with all the nations which are pioneer in their field of Science and Technology research.

6.4 Majority of the funding is from UGC, faculty members has to diversify their funding agencies from all over the world.

7. Conclusion

Goa University is one of the internationally renowned universities in India. The prime objective of the study was to give an over-view of productivity of Goa University faculty members and focused mainly on their areas of specialization in Science and Technology field. Study found that few departments are conducting high quality research and produces many publications along with their day to day classes and academic instructional programmes.

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