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AN ANALYSIS OF RESEARCH PUBLICATIONS OF KURUKSHETRA UNIVERSITY DURING 2011-2015

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Abstract: In the present study an attempt has been made to assess the research contributions of Kurukshetra University in terms of its Research publication output during 2011-2015 by obtaining data from Scopus database. The study analyse the year-wise distribution of research publications, preferred sources of publications, impact of the university research under different existing subject of the university and indicates its major collaborative countries and institutions. It also highlights citation profile & top cited papers of the university during the period under study. It was found that there is also an increasing trend of collaborative research among Kurukshetra University authors as well as more frequent collaboration with international authors. Physics & Astronomy is one of the most prolific research areas in Kurukshetra University.

Keywords: Kurukshetra University, research productivity, research publications

1.0Introduction

Research in common parlance refers to a search for knowledge. One can also define research as a scientific & systematic search for pertinent information on a specific topic. Slesinger& Stephenson in the Encyclopaedia of Social Sciences define research as the manipulation of things, concepts or symbols for the purpose of generalising to extend, correct or verify knowledge, whether that knowledge aids in construction of theory or in the practice of an art. It is a process of collecting, analysing and interpreting information to answer questions. The growth in information communication technologies (ICTs) in general and electronic information resources in particular, have given impetus to research and related activities throughout the world. Kumbar et al statedresearch productivity in higher education is gaining importance for the past one decade in India. Faculty members of the university in India have 2 functions to perform teaching & research. Teaching is one of the canonically performed functions. However research in university has gained momentum during the past one & half decade mainly due to support received through Ph.D. programme in house projects,& extra mural funding projects from major governmental scientific agencies. The research output of the university scientists in the form of research papers in peer-reviewed scholarly journals is being considered as one of the main criteria for assessing the performance of university scientists and faculty.

1.1 Kurukshetra University, Kurukshetra

Kurukshetra University has been recognised for its excellence, accredited with 'A' Grade by National Assessment and Accreditation Council (NAAC). Located in Kurukshetra, the land of the Bhagwadgita **Kurukshetra University** is a premier institute of higher learning in India. It is spread over 400 acres of land on the south bank of the holy Brahmsarovar. Its foundation stone was laid on 11 January 1957 by Bharatratna Dr.Rajendra Prasad, the first President of the Indian Republic. Since then it has aimed at pursuing excellence in teaching and research in science, technology, humanities, social sciences, performing arts and sports. The University has 445 teaching faculty members. The University also has 457 affiliated colleges and institutes in the Districts of Ambala, Panipat, Kaithal, Yamuna Nagar, Hisar, Fatehabad, Jind, Karnal, Sirsa, Kurukshetra and Panchkula.Its present vice-chancellor is Kailash Chandra Sharma. The present paper analyses the contribution of Kurukshetra University in terms of research publications and citation impact in all fields during 2011 2015..

2.0 Review of Related Studies

Various studies have been conducted in the past analysing the growth, contribution & impact analysing the growth, contribution and impact of individual organisation. Mukherjee studied the publications output of the four most productive Indian academic institutions i.e. universities of Delhi and Uttar Pradesh. The results show that among the four universities, the authors of Delhi University contributed the highest number of articles, followed by Banaras Hindu University. Biochemistry and molecular biology is one of the most prolific

research areas in these four Indian universities. Jeevan& Gupta have analysed thes cientometric profile of research output, its contribution & impact of IIT Kharagpur.Siwach& Kumar studied bibliometric analysis of research publications of Maharshi Dayanand University, Rohtak in the terms of its publication output during 2001-2013 as reflected through Scopus database. The study analyses the year-wise research productivity, its citations impact National & International collaboration & top cited papers of the university. Analyse the Indian research output in computer science during 2004 to 2013 by obtaining data from Scopus database. The study aims to find out the Indian share,the top contributing Indian authors. Pandita examines the comparative study of research output of the university of Kashmir & university of Jammu. Kumbar et al studied growth, contribution& impact of research output carried out by scientists of University of Mysore in science and technology during 1996-2006. Also analyses the international collaborative share of research output at overall level as well as across various subjects. Parmar&Siwach examines the Indian research output in computer science in 2004-2013. This study aims to find out the Indian share, the top contributing Indian institutions, most prolific Indian authors, top countries collaborating with India and top cited papers by Indian authors in computer science research. Baskaran analysed the author productivity, discipline-wise and institution-wise collaboration and ranking of authors in research contribution of Alagappa University during 1999-2011.Kumbar and Gupta stated the research contribution of the Karanatka University in terms of publication output in science and technology, its growth and citation impact during 2001-2010. It also indicates its major collaborating countries and highlights its most cited papers.

3.0 Objectives

The main objectives of the study are:

(a) To study the year-wise distribution of publications of Kurukshetra University.
(b) To find out the major subject categories of publications.
(c) To find out the major document types.
(d) To explore the top sources for publications.
(e) To find out the top institutions collaborating with Kurukshetra University.
(f) To find out the top countries collaborating with Kurukshetra University.
(g) To study the citation profile and top cited papers of Kurukshetra University.

4.0 Methodology

The data for the present study was extracted from Scopus database in April 2018. The affiliation field of the database was searched for AF-ID("Kurukshetra University" 60032618). The results were limited to the time period from 2011 to 2015. The obtained data was entered in MS-Excel spreadsheet and was analysed to obtain relevant results as per the objectives of the study.

5.0 Analysis

5.1 Year-wise Distribution Of Publications

The Kurukshetra University (KUK) has published 1499 papers during 2011-2015. There is decline inthe number of publications as observed from 2013to 2015. In the year 2011 the university published 329 papers but in 2012 number of papers published were 331 highest among all the years from 2011 to 2015 while in 2015 it published 274 papers, In 2012number of publications are highest among all the given years (Table 1). The papers published by the university during 2011-15 received 9512 citationswith an average citations per paper of 6.35. The ACCP was highest (9.07) in 2011.

Table 1:Year-Wise Distribution of Publications in KUK

Year	No. of papers	%age	Total Citations	Avg. Cit.Per Paper
2011	329	21.95	2985	9.07
2012	331	22.08	2221	6.71
2013	300	20.01	2081	6.94
2014	265	17.68	1285	4.85
2015	274	18.28	940	3.43
Total	**1499**	**100.00**	**9512**	**6.35**

5.2 Document Types

It is observed from Scopus database that number of papers which were published in different document types. It indicates from table 2 that out of total number of papers (1499), the highest publications found in Article form (1204) followed by conference paper (181), review (61), book chapter (31), erratum (6), note (5), editorial (4), book (3),letter (2),articles in press and short survey each one shown in table below.

Table 2: Document Types

S. No.	Document Type	No. of papers
1	Article	1204
2	Conference Paper	181
3	Review	61
4	Book Chapter	31
5	Erratum	6
6	Note	5
7	Editorial	4
8	Book	3
9	Letter	2
10	Article in Press	1
11	Short Survey	1
Total		**1499**

5.3 Major Subject Categories

Scopus provides different subject categories to the articles based on its adopted classification method. The papers published by Kurukshetra University(KUK) can be divided into different subject categories as shown in Table 3. The highest publications appear in the subject category Physics and Astronomy (353 papers). This indicates that the authors in Physics and Astronomy are more productive in terms of research publications. The other main subject categories are Engineering (291 papers), Chemistry (290 papers), Materials Science (232 papers), Pharmacology, Toxicology and Pharmaceutics (232papers), Biochemistry, Genetics and Molecular Biology (207 papers), Agricultural and Biological Sciences (176 papers), Medicine (97 papers), Chemical Engineering (93 papers) Environmental Science(91 papers), Earth and Planetary Sciences(74 papers) Immunology &Microbiology(60 papers) and Social Sciences(48 papers).

Table 3:Major Subject Categories

S. No.	Subject Category	No. of papers
1	Physics and Astronomy	353
2	Engineering	291
3	Chemistry	290
4	Materials Science	232
5	Pharmacology, Toxicology and Pharmaceutics	232
6	Biochemistry, Genetics and Molecular Biology	207
7	Agricultural and Biological Sciences	176
8	Computer Science	116
9	Mathematics	103
10	Medicine	97
11	Chemical Engineering	93
12	Environmental Science	91
13	Earth and Planetary Sciences	74
14	Immunology and Microbiology	60
15	Social Sciences	48

5.4Top Sources for Publication

The authors of Kurukshetra University (KUK)have published their research work in 333 different national and international journals. The list of top 20 most preferred journals ofKUK having more than 9 publications is given in Table 4. The most preferred source for publication by KUK authors is Aip Conference Proceedings (58 papers) followed by Medicinal Chemistry Research(33 papers),Annals Of Biology (23 papers),International Journal Of Pharmacy And Pharmaceutical Sciences(21 papers),Materials Physics And Mechanics(20 papers), International Journal Of Applied Engineering Research(18 papers), Journal Of Molecular Liquids (17 papers) and so on according to table given below.

Table 4: Top 20 Most Productive Sources/Journals Of Kuk(2011-2015)

S. No.	Source/ Journal	No. of Papers
1	Aip Conference Proceedings	58
2	Medicinal Chemistry Research	33
3	Annals Of Biology	23
4	International Journal Of Pharmacy And Pharmaceutical Sciences	21
5	Materials Physics And Mechanics	20
6	International Journal Of Applied Engineering Research	18
7	Journal Of Molecular Liquids	17
8	European Journal Of Medicinal Chemistry	15
9	Natural Hazards	13
10	Journal Of Chemical And Engineering Data	12
11	Journal Of Chemical Thermodynamics	12
12	Annals Of Agri Bio Research	11
13	Der PharmaChemica	11
14	Journal Of Computational And Theoretical Nanoscience	11
15	Fluid Phase Equilibria	10
16	Journal Of Heterocyclic Chemistry	10
17	Journal Of Materials Science Materials In Electronics	10
18	Multidiscipline Modeling In Materials And Structures	10
19	Asian Pacific Journal Of Tropical Biomedicine	9
20	Journal Of Alloys And Compounds	9
Total of Top 20		**333**

5.5 Top Collaborating Institutions:

The authors affiliated to Kurukshetra University (KUK) have collaborated with authors of other institutions of India. The list of top institutions collaborating with KUK (having at least 16 collaborating papers) is shown in table5.At the national level KUK has the highest number of collaborative papers with Maharishi Markandeshwar University, Mullana (41 papers) which is followed by Central Electronics Engineering Research Institute India (39 papers). Other major institutions collaborating with KUK includes National Institute of Technology Kurukshetra (37 papers),Maharshi Dayanand University (37 papers),Guru Jambeshwar University of Science and Technology (32 papers), Panjab University (32 papers),Inter University Accelerator Centre India (31 papers) and University of Delhi (29 papers). It was observed that the maximum Indian institutes with which KUK has collaborations are in the same state i.e., Haryana or in neighbouring states and UTs like Delhi, Chandigarh and Punjab.

Table 5: Top Institutions Collaborating With KUK, 2011-2015

S. No.	Institute	No. of Collab. Papers
1	Maharishi Markandeshwar University, Mullana	41
2	Central Electronics Engineering Research Institute India	39
3	National Institute of Technology Kurukshetra	37
4	MaharshiDayanand University	37

5	Guru Jambeshwar University of Science and Technology	32
6	Panjab University	32
7	Inter University Accelerator Centre India	31
8	University of Delhi	29
9	Council of Scientific and Industrial Research India	28
10	Indian Agricultural Research Institute	25
11	National Dairy Research Institute India	20
12	Dr B R Ambedkar National Institute of Technology	18
13	King Abdulaziz University	17
14	Sohag University	16
15	CCS Haryana Agricultural University	16

5.6Top Collaborating Countries

The authors of KUK have collaboration with authors of other countries also. The university has the highest number of collaborative papers with United States (23 papers). Other major international collaborative papers are with Saudi Arabia (18 papers), Malaysia (17 papers), Egypt (16 papers), Denmark (12 papers), Czech Republic and South Korea(10 papers each).

Table 6: Top Collaborating Countries with KUK

S. No.	Country	No. of Collaborative Papers
1	United States	23
2	Saudi Arabia	18
3	Malaysia	17
4	Egypt	16
5	Denmark	12
6	Czech Republic	10
7	South Korea	10
8	Italy	9
9	Turkey	8
10	Greece	7

5.7 Citation Profile: The distribution of citation data of KUK is shown in Table7. It shows that 386 papers did not receive any citation. The remaining papers received at least one or more citations. Out of 1499 papers, only 7 papers received more than 50 citations during the period from 2011-2015.

Table7: Citation profile of papers of KUK (2011-2015)

No. of Citations	Total Papers
Zero	386
1-10	841
11-20	173
21-30	55
31-40	26
41-50	11
51-100	4
>100	3
Total	**1499**

5.8Top Cited Articles: Table 8 gives the list of top 10 highly cited papers receiving 49 or more citations during 2011-2015. These 10 papers have appeared in different journals. Among the productive authors Kumar S.,Narwal S., Kumar V., Prakash O with highest number of citations of the article titled Î±-glucosidase inhibitors from plants: A natural approach to treat diabetes in year 2011 was published in

journalPharmacognosy Reviews received highest citations (167) and some other top listed articles are also given in table 8 below.

Table 8: List of Top Cited Articles

S. No.	Author(s)	Title	Year	Journal	Cit.
1	Kumar S., Narwal S., Kumar V., Prakash O.	Î±-glucosidase inhibitors from plants: A natural approach to treat diabetes	2011	Pharmacognosy Reviews	167
2	Sharma P., Kaur H., Sharma M., Sahore V.	A review on applicability of naturally available adsorbents for the removal of hazardous dyes from aqueous waste	2011	Environmental Monitoring and Assessment	144
3	Kharb R., Sharma P.C., Yar M.S.	Pharmacological significance of triazole scaffold	2011	Journal of Enzyme Inhibition and Medicinal Chemistry	118
4	Singh J., Suhag M., Dhaka A.	Augmented digestion of lignocellulose by steam explosion, acid and alkaline pretreatment methods: A review	2015	Carbohydrate Polymers	100
5	Bonassi S., et al	The HUmanMicroNucleus project on eXfoLiatedbuccal cells (HUMN<inf>XL</inf>): The role of life-style, host factors, occupational exposures, health status, and assay protocol	2011	Mutation Research - Reviews in Mutation Research	98
6	Singh K., Kumar Y., Puri P., Kumar M., Sharma C.	Cobalt, nickel, copper and zinc complexes with 1,3-diphenyl-1H-pyrazole-4- carboxaldehyde Schiff bases: Antimicrobial, spectroscopic, thermal and fluorescence studies	2012	European Journal of Medicinal Chemistry	77
7	Kumar D., Kumar A., Prakash O.	Potential antifertility agents from plants: A comprehensive review	2012	Journal of Ethnopharmacology	60
8	Pal A., Chauhan N.	Volumetric behaviour of amino acids and their group contributions in aqueous lactose solutions at different temperatures	2011	Journal of Chemical Thermodynamics	50
9	Aggarwal R., Kumar S., Kaushik P., Kaushik D., Gupta G.K.	Synthesis and pharmacological evaluation of some novel 2-(5-hydroxy-5- trifluoromethyl-4,5-dihydropyrazol-1-yl)-4-(coumarin-3-yl)thiazoles	2013	European Journal of Medicinal Chemistry	49
10	Aggarwal R., Kumar V., Kumar R., Singh S.P.	Approaches towards the synthesis of 5-aminopyrazoles	2011	Beilstein Journal of Organic Chemistry	49

6.0 Conclusion

The study has explored the publication pattern of scholars of Kurukshetra University. The five year (2011-15) study examined the total numbers of 1499 papers in the formof articles, conference papers and reviews. The study indicates that highest numbers of papers(331) were published in year 2012and lowest (265) in year 2014. The average citations per paper of KUK papers was (6.35) and highest citations (9.07) in year 2011. Maharishi Markandeshwar University, Mullana was major collaborator with 41 papers followed by Central Electronics Engineering Research Institute India (39 papers). Among the international collaborations the university has the highest numbers of collaborative papers with United States (23 papers).Out of 1499 papers only 7 papers

received more than 50 citations. Uniform citation patter was not observed in the results of the study. Among the highly cited papers, the paper byKumar S.,Narwal S., Kumar V., Prakash O published in Pharmacognosy Reviews in the year 2011 received highest citations (167).

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