Research Article

[i]Scientometrics Study of Research productivity of Delhi University (DU), Jamia Millia Islamia (JMI) and Jawaharlal Nehru University (JNU)[1],[2]

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ABSTRACT

Scientometrics studies have now a days become popular to evaluate and rank research productivity of authors, institutions and universities globally. Number of such studies has been published in various journals, conference proceedings, review papers, book chapters, and research reports. The study was taken to analysis research productivity of University of Delhi, Jamia Millia Islamia and Jawaharlal Nehru University during the last 30 years.

Keywords: Scientometrics, Research productivity, Research papers, University of Delhi, Jamia Millia Islamia, Jawaharlal Nehru University

1. OBJECTIVES

The main aim of the study is to present a comparative assessment of the status of research productivity of University of Delhi, Jamia Millia Islamia and Jawaharlal Nehru University using different scientometrics parameters. The objectives are given below:

1. [3]To study the growth of literature in these universities.
2. To find the future trend of publications in these three universities. (**Hypothesis 1: The growth rate of literature in these universities is steady since 1989**)
3. To study the research publication pattern of University of Delhi, Jamia Millia Islamia and Jawaharlal Nehru University.
4. To analyze the international collaboration of these three universities.
5. To find the preferred document types used by the faculty in the said universities. (**Hypothesis 2: The journal article as source of publication occupies the top rank**)
6. To know the preferred language of the document in which the research output is published. (**Hypothesis 3: English is highly preferred language used by the faculty to disseminate their research output**)

2. INTRODUCTION

The researcher found it challenging to identify the top most journals published in one's subject field, highly prolific contributors, top contributing institutions, and the upcoming areas of interest. This task becomes more difficult with the origin of open access journals. It is tedious job to locate high impact journals for publishing research output. The problem arises in identifying high-impact journals for publishing the articles. The problem also comes in selecting the authors for further collaborative research in any filed and to identify the national and international institutions which could have collaborations in near future.

An outcome of research activity by the faculty members of an institution is its status nationally and globally. In present times Government as a whole and universities in particular are devoting highly in research activities in main areas along with their traditional duties of imparting knowledge through, teaching and learning.

The research productivity can be defined as a process in which new knowledge is created inputting human resources, materials along with the existing knowledge. The output of the process is getting patents, standards, publication of articles, articles in conference proceedings, research reports, etc.

Performance in any organization can be seen by analyzing the productivity of it's individual or research group. The publications covered in Web of sciences, Scopus etc. which are internationally known indexing databases and writing research output in peer reviewed journals are considered some of the standards forms.

Quantitative analysis is one of the tool which uses counting, comparing, measuring and analyzing the data. The publication productivity is very useful in present times for taking policy decisions. In all most all countries now a days, the universities and other research organisations evaluate their performance on the basis of their productivity output. Therefore it now required that every university must have a clear understanding of it's performance through ongoing evaluation of its research productivity. Every university must evaluate its performance by it's research output.

Research is now most important activity. Data on research output helps administrators to take important decisions about the fields where research is to be supported. It also helps the university authorities to understand their position at global and domestic level of research productivity.

Following questions like, How much research is conducted? What is the impact of the ongoing research? How many articles were produced in peer reviewed journals by the faculty members? Whether the number of publications is increasing or decreasing are answered by quantitative analysis for making policies, deciding goals, charting the programs, funds allocations and collaboration with outside organizations, etc.

Scientometrics is used to track the scientific developments. It uses the mathematical and statistical method to study the growth of the research output in any field.

Scientometrics studies have now a days become popular to evaluate and rank research productivity of authors, institutions and universities globally. Number of such studies has been published in various journals, conference proceedings, review papers, book chapters, and research reports.

However from literature review it was found that no comprehensive comparative study has been done on research productivity of theses universities. Therefore it was decided to undertake analysis of research productivity of University of Delhi, Jamia Millia Islamia and Jawaharlal Nehru University during the last 30 years.

3. LITERATURE REVIEW

Various studies have been done in the past to highlight the research productivity of different countries, institutions, and individuals. They have been conducted to study development in a particular subject area also.

A study was carried out by Kim in 2001 in which he studied the research productivity on Physics by Korean researchers during 1994-1998. The data was collected from SCI CD-ROM database. They studied the growth rate of physics literature, the citation impact of the Korean publications, their international collaborations, investment by Korean government on R&D activities, average citations per paper, highly productive institutions, etc.

A study was carried out on collaboration of Indian research activities with other South Asian countries during 1992-1999. The data from SCI was collected. It shows different areas in science and technology in which collaboration took place

between Indian and other South Asian countries. The collaboration between institutions, authors etc was also studied. (Gupta, Munshi, and Mishra 2002)

Pandita, et al. conducted an analysis on research output of four reputed medical research institutions of the country for 2007-2011. The data was collected from Web of Science. In this analysis authors find the trends in research from these institutions, different areas of medical science, highly prolific authors from the said institutions, frequency distribution of their publications.

Another study was carried on the topic "quantity and quality of stem cell research in Iran during the period 1996-2012". The data from Web of Science was used in the study. The study analyzed number of articles published by the authors from Iran, their citation frequency, collaboration pattern of scientists involved in stem cell research. (Habibi, et el. 2014)

In one of such study authors tracked the nanosafety research around the word. They analyzed the research trend on nanosafety, the country-wise distribution of its publications, authorship trend, and highly preferred periodicals in the field. In the study authors found that during 2003-2013 the growth of literature was linear. The highly productive countries in the field were China, Germany, UK and USA. The two highly productive journals in the field were found to be Yakugaku Zasshi-Journal of the Pharmaceutical Society of Japan and Risk Analysis. The two high productive institutions were Chinese Academic Science and Osaka University. (Li, Guo, and Jovanovic 2014)

Data from Web of Science and Scopus was used to analyzed research productivity of Slovenia for the period 1996-2011. The authors considered publications trends in different fields such as applied sciences, agriculture, engineering and technology, medical sciences, and natural sciences, and social sciences, etc their study. (Bartol, et al 2014)

The productivity pattern of The Russian Academy of Sciences and the Higher Education for the period 2007-2011 was carried in 2014. The data was taken from Web of Science and Journal Citation Report (JCR). The paper covers the productivity pattern of different Russian universities taking into consideration different subject areas. The number of authors, their preferred document type, preferred journals, and highly cited articles from these Russian universities, the national and international collaboration from theses Russian universities was studied by the authors. (Markusova, et el. 2014)

The performance of medical science research in University College of Medical Science (University of Delhi) for the period 1975- 2013 was undertaken from data of Scopus. The institute's research performance was studied by analysis: author productivity and its trend, ranking of authors, the degree of collaboration, etc was found by the authors. (Meera, and Sahu 2014)

An analysis of research productivity of Gujarat University for the period 2004-2013 was taken by Kumar, et al. in 2015. The data for the study was retrieved from Scopus. Total 760 research publications published by Gujarat University faculties during the period was taken into consideration. The authors studied the different document types; author collaboration pattern, most contributing faculties from Gujarat University, well known journals used by the faculties to publish their research results. (Kumar, Dora, and Desai 2015)

A study was carried out to study the research productivity of Maharshi Dayanand University (MDU) for 2000-2013. The data was downloaded from Scopus. It was done to find out the Year-wise growth of publications from MDU, to know international and national collaborators; to study the research output in various subject areas, to get the most preferred journals of MDU faculties, and the citation analysis of their papers. The study found the steep rise in the publication output of research activities during the last four year of the study. The MDU output shows 5.58 average citations per paper. (Siwach and Kumar 2015)

In a study the growth rate of modern science literature was analyzed. The study reported triple growth rate in last phase of the study period as compared to previous two phases. The growth rate was found to be less than 1% up to the mid 18th century, then it was between 2–3% between the two world wars, and finally it became 8–9% till 2010. (Bornmann and Mutz 2015)

A study on growth pattern of computer science research in India for the period 1989-2013 was conducted. It presented the twenty-five year research. The data was taken from Scopus. In the study the total research output in computer science in India, most contributing authors and institutions, collaboration pattern of institutions, most preferred periodicals in computer science field in India. (Singhal, K. et al. 2015)

A study found the impact of research funding on research productivity of the following countries-Denmark, Belgium, Switzerland, Netherlands, Norway and Sweden. The study also investigated highly cited papers from these countries, total citations, etc. (Gok, Rigby, and Shapira, 2016)

4. RESEARCH METHODOLOGY

The data for the analysis was downloaded from SCI by searching the institutions under: University of Delhi, Jamia Millia Islamia and Jawaharlal Nehru University. The data in the form of publications from these universities for the last 30 years was collected and analysed by using MS-Excel. In the paper we have used abbreviated form of the names of University of Delhi, Jamia Millia Islamia and Jawaharlal Nehru University as DU, JMI & JNU respectively.

5. DATA ANALYSIS

GROWTH OF LITERATURE

It can be seen from Table1 that literature has not grown steady in all three universities. However the growth in terms of number of publications is more evident in case of DU, followed by JNU and JMI. DU has produced total 18959 publications; JNU has 7354 publications followed by JMI with 4343 publications from 1989 to 2018. The Relative Growth rate was also calculated for the three universities. The DU reported mean RGR of 6.34 during 1989-1998, which decreased to 0.90 during 1999-2008 but increased to 1.54 during 2009-2018. However JMI and JNU shows decreasing RGR from 1989-2018. The decrease in growth rate means the logistic growth curve is more appropriate in our study. The analysis shows that **Hypothesis 1: The growth rate of literature in these universities is steady since 1989 is neither approved nor disapproved.** The growth of literature is also shown in the Figure 1 through Line graph.

DU						
S. No.	Year	Pub (Y)	Log1P	Log2P	RGR	Mean
1	1989	302	0	5.710427	5.710427	
2	1990	273	5.710427	5.6094718	0.100955	
3	1991	320	5.609472	5.768321	0.158849	
4	1992	314	5.768321	5.749393	0.018928	
5	1993	314	5.749393	5.749393	0	
6	1994	274	5.749393	5.6131281	0.136265	
7	1995	291	5.613128	5.6733233	0.060195	
8	1996	301	5.673323	5.7071103	0.033787	
9	1997	308	5.70711	5.7300998	0.02299	
10	1998	340	5.7301	5.8289456	0.098846	6.341242
11	1999	340	5.828946	5.8289456	0	
12	2000	335	5.828946	5.8141305	0.014815	

S. No.	Year	Pub	Log1P	Log2P	RGR	Mean
13	2001	415	5.814131	6.0282785	0.214148	
14	2002	395	6.028279	5.9788858	0.049393	
15	2003	490	5.978886	6.1944054	0.21552	
16	2004	492	6.194405	6.1984787	0.004073	
17	2005	572	6.198479	6.349139	0.15066	
18	2006	583	6.349139	6.3681872	0.019048	
19	2007	712	6.368187	6.5680779	0.199891	
20	2008	740	6.568078	6.6066502	0.038572	0.90612
21	2009	803	6.60665	6.6883547	0.081705	
22	2010	896	6.688355	6.7979404	0.109586	
23	2011	986	6.79794	6.8936564	0.095716	
24	2012	1017	6.893656	6.9246124	0.030956	
25	2013	1110	6.924612	7.0121153	0.087503	
26	2014	1160	7.012115	7.0561753	0.04406	
27	2015	1336	7.056175	7.1974354	0.14126	
28	2016	1429	7.197435	7.2647302	0.067295	
29	2017	1479	7.26473	7.2991215	0.034391	
30	2018	632	7.299121	6.4488894	0.850232	1.542703
		18959				
JMI						
S. No.	**Year**	**Pub**	**Log1P**	**Log2P**	**RGR**	**Mean**
1	1989	13	0	2.564949	2.564949	
2	1990	9	2.564949	2.197225	0.36772	
3	1991	18	2.197225	2.890372	0.693147	
4	1992	26	2.890372	3.258097	0.367725	
5	1993	19	3.258097	2.944439	0.31366	
6	1994	22	2.944439	3.091042	0.146603	
7	1995	25	3.091042	3.218876	0.127833	
8	1996	35	3.218876	3.555348	0.336472	
9	1997	53	3.555348	3.970292	0.414944	
10	1998	43	3.970292	3.7612	0.20909	5.542144
11	1999	36	3.7612	3.583519	0.17789	
12	2000	47	3.583519	3.850148	0.266629	
13	2001	47	3.850148	3.850148	0	
14	2002	50	3.850148	3.912023	0.061875	
15	2003	59	3.912023	4.077537	0.165514	
16	2004	92	4.077537	4.521789	0.444251	
17	2005	122	4.521789	4.804021	0.282232	
18	2006	149	4.804021	5.003946	0.199925	
19	2007	156	5.003946	5.049856	0.04591	
20	2008	177	5.049856	5.17615	0.126294	1.770521

21	2009	189	5.17615	5.241747	0.065597	
22	2010	248	5.241747	5.513429	0.271682	
23	2011	230	5.513429	5.438079	0.07535	
24	2012	286	5.438079	5.655992	0.217913	
25	2013	287	5.655992	5.659482	0.00349	
26	2014	263	5.659482	5.572154	0.08733	
27	2015	328	5.572154	5.793014	0.22086	
28	2016	358	5.793014	5.880533	0.087519	
29	2017	430	5.880533	6.063785	0.183252	
30	2018	526	6.063785	6.265301	0.201516	1.414509
		4343				
JNU						
S. No.	Year	Pub	Log1P	Log2P	RGR	Mean
1	1989	129	0	4.859812	4.859812	
2	1990	135	4.859812	4.905275	0.045462	
3	1991	138	4.905275	4.927254	0.021979	
4	1992	137	4.927254	4.919981	0.00727	
5	1993	157	4.919981	5.056246	0.136265	
6	1994	147	5.056246	4.990433	0.06581	
7	1995	121	4.990433	4.795791	0.19464	
8	1996	149	4.795791	5.003946	0.20816	
9	1997	144	5.003946	4.969813	0.03413	
10	1998	170	4.969813	5.135798	0.16599	5.070789
11	1999	141	5.135798	4.94876	0.18704	
12	2000	149	4.94876	5.003946	0.05519	
13	2001	177	5.003946	5.17615	0.17220	
14	2002	166	5.17615	5.111988	0.06416	
15	2003	165	5.111988	5.105945	0.00604	
16	2004	189	5.105945	5.241747	0.13580	
17	2005	211	5.241747	5.351858	0.11011	
18	2006	194	5.351858	5.267858	0.08400	
19	2007	204	5.267858	5.31812	0.05026	
20	2008	268	5.31812	5.590987	0.27287	0.45519
21	2009	273	5.590987	5.609472	0.01848	
22	2010	271	5.609472	5.602119	0.00735	
23	2011	333	5.602119	5.808142	0.20602	
24	2012	151	5.808142	5.01728	0.79086	
25	2013	79	5.01728	4.369448	0.64783	
26	2014	420	4.369448	6.040255	1.67081	
27	2015	135	6.040255	4.905275	1.13498	
28	2016	713	4.905275	6.569481	1.66421	

29	2017	768	6.569481	6.64379	0.07431	
30	2018	920	6.64379	6.824374	0.72490	0.32791
		7354				

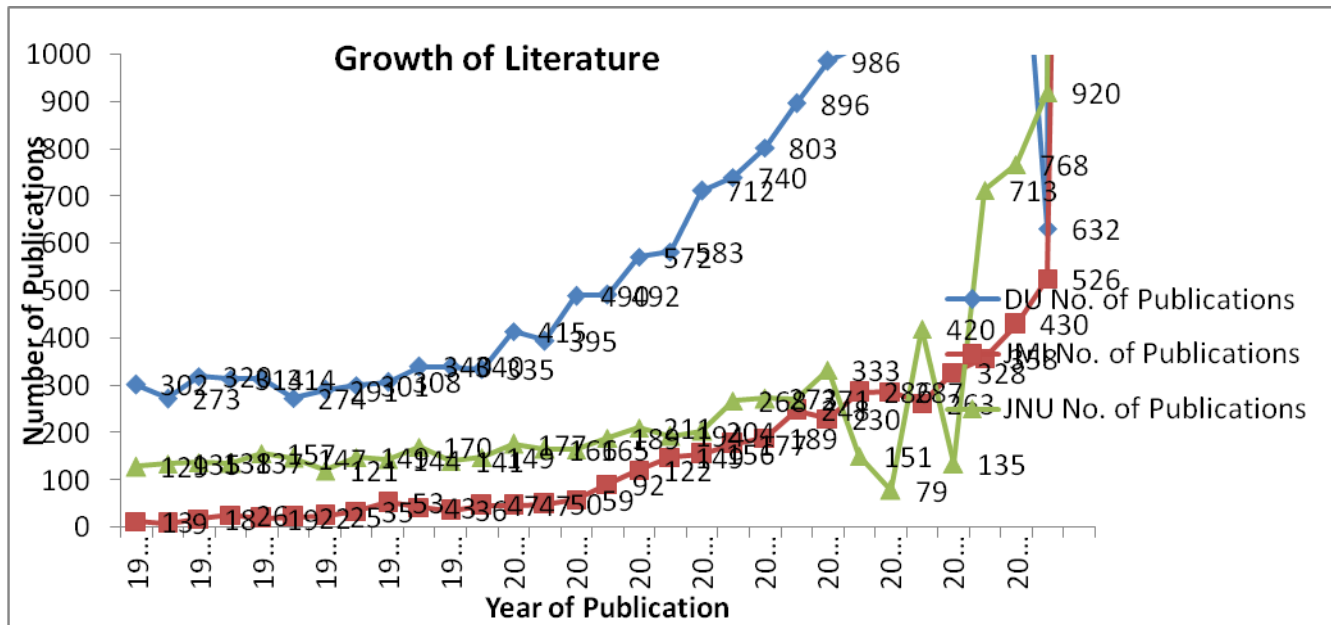Table 1: Growth of Literature

Figure 1: Growth of Literature

2. COLLABORATIVE PATTERN OF PUBLICATIONS

From the data it was revealed that faculties of these universities are publishing their work in collaboration with authors from other universities/organizations to great extent. About 37% authors from DU have papers with international collaboration, followed by 35% authors from JMI who have international collaboration, and 30% authors from JNU publishes with international collaboration. In DU & JNU, USA has a highest collaborative paper. JMI has highest collaborative papers from Saudi Arabia. The list of top 16 countries have collaboration with three universities is given in Table 2. It can be justified with the fact that now a days research is not an individual's effort, it is now team work spread all along the globe. With the use of ICT one can have collaboration in research also with person working in another corner of the globe. The collaboration helps in getting high quality result as more peoples are involved and they share their experiences, etc.

	DU		JMI		JNU	
S. No.	Country	No. of Publications	Country	No. of Publications	Country	No. of Publications
1.	USA	1347	Saudi Arabia	440	USA	529
2.	UK	484	USA	154	Germany	168
3.	Germany	395	South Africa	80	UK	150
4.	Japan	307	Egypt	74	Japan	88
5.	Canada	219	South Korea	72	France	86
6.	Australia	215	Japan	61	Canada	65

7.	France	192	Iran	51	Australia	59
8.	South Korea	191	Malaysia	44	South Korea	52
9.	Italy	189	Spain	38	Switzerland	46
10.	Denmark	187	Peoples R China	36	Peoples R China	45
11.	Peoples R China	181	Germany	34	Netherlands	43
12.	Netherlands	177	UK	33	Spain	40
13.	Belgium	115	Australia	29	Italy	35
14.	South Africa	115	Taiwan	29	Sweden	34
15.	Spain	109	Russia	25	Saudi Arabia	30
16.	Saudi Arabia	102	Canada	23	Malaysia	29

Table 2: Collaborative Countries

3. CITATION ANALYSIS

The citation analysis of the papers from these universities is shown in Table 3. The total number of citations received by DU is 195724, JMI are 63905, and JNU are 151765. The average citation per year calculated for these universities were found to be 6524.133, 2130.167, and 5058.833 for DU, JMI and JNU respectively. The average citations per paper are 10 in DU, 14 in JMI and 20 in JNU.

Year	DU			JMI			JNU		
	Total Citations	No. of Publications	Citation per Paper	Total Citations	No. of Publications	Citation per Paper	Total Citations	No. of Publications	Citation per Paper
1989	13	302	0.043046	0	13	0	5	129	0.03876
1990	125	273	0.457875	2	9	0.222222	73	135	0.540741
1991	261	320	0.815625	14	18	0.777778	161	138	1.166667
1992	454	314	1.44586	24	26	0.923077	294	137	2.145985
1993	576	314	1.834395	29	19	1.526316	470	157	2.993631
1994	764	274	2.788321	26	22	1.181818	582	147	3.959184
1995	1010	291	3.47079	58	25	2.32	635	121	5.247934
1996	1435	301	4.767442	65	35	1.857143	810	149	5.436242
1997	1536	308	4.987013	80	53	1.509434	779	144	5.409722
1998	1826	340	5.370588	133	43	3.093023	1027	170	6.041176
1999	2038	340	5.994118	152	36	4.222222	1253	141	8.886525
2000	2065	335	6.164179	147	47	3.12766	1404	149	9.422819
2001	2528	415	6.091566	202	47	4.297872	1583	177	8.943503
2002	2496	395	6.318987	310	50	6.2	1793	166	10.8012
2003	3308	490	6.75102	352	59	5.966102	2046	165	12.4
2004	3758	492	7.638211	483	92	5.25	2328	189	12.31746
2005	4943	572	8.641608	635	122	5.204918	2817	211	13.35071
2006	5964	583	10.22985	844	149	5.66443	3257	194	16.78866

2007	7702	712	10.81742	1280	156	8.205128	3815	204	18.70098
2008	9449	740	12.76892	1736	177	9.80791	4740	268	17.68657
2009	11230	803	13.98506	2227	189	11.78307	5493	273	20.12088
2010	14213	896	15.86272	2562	248	10.33065	6433	271	23.73801
2011	16894	986	17.13387	3365	230	14.63043	7566	333	22.72072
2012	16896	1017	16.61357	3968	286	13.87413	8875	151	58.77483
2013	16037	1110	14.44775	4826	287	16.81533	10692	79	135.3418
2014	15225	1160	13.125	5444	263	20.69962	12451	420	29.64524
2015	14242	1336	10.66018	6481	328	19.75915	14286	135	105.8222
2016	13762	1429	9.630511	7885	358	22.02514	16659	713	23.36466
2017	13015	1479	8.799865	9169	430	21.32326	18356	768	23.90104
2018	11959	632	18.92247	11406	526	21.68441	21082	920	22.91522
Total	**195724**	**18959**	**10.32354**	**63905**	**4343**	**14.71448**	**151765**	**7354**	**20.63707**
C/Y	**6524.133**			**2130.167**			**5058.833**		

Table 3: Citation analysis of papers from DU, JMI and JNU

4. HIGHLY PRODUCTIVE JOURNALS

The Table 4 depicts top 5 journals in which faculties of these universities has published their research output. It can be seen from the Table that all these universities are publishing their output in high impact journals in their field. Almost all journals are published in foreign countries and have high reputation in their field. Only one journal Current Science is published from India and DU & JNU have 304 and 206 papers in it. JMI does not have it in top 5 journals. It has 22 papers in Current Science and is at rank 15 in JMI's list.

	DU			
S. NO.	**Journals**	**No. of Publications**	**Country**	**IF(2018)**
1.	PHYSICAL REVIEW D	385	USA	4.368
2.	PHYSICAL REVIEW LETTERS	346	USA	9.227
3.	PHYSICS LETTERS B	343	NETHERLANDS	4.162
4.	JOURNAL OF HIGH ENERGY PHYSICS	310	USA	5.833
5.	CURRENT SCIENCE	304	INDIA	0.756
	JMI			
S. NO.	**Journals**	**No. of Publications**	**Country**	**IF (2018)**
1	PHYSICAL REVIEW D	94	USA	4.368
2	INTERNATIONAL JOURNAL OF BIOLOGICAL MACROMOLECULES	66	NETHERLANDS	4.784
3	EUROPEAN JOURNAL OF MEDICINAL CHEMISTRY	62	FRANCE	4.833
4	JOURNAL OF MOLECULAR LIQUIDS	53	NETHERLANDS	4.561
5	RSC ADVANCES	49	UK	3.049
	JNU			
S. No.	**Journals**	**No. of Publications**	**Country**	**IF (2018)**

1	CURRENT SCIENCE	206	INDIA	0.756
2	PHYSICAL REVIEW E	199	USA	2.353
3	PHYSICAL REVIEW B	162	USA	3.736
4	PLOS ONE	142	USA	2.776
5	SCIENTIFIC REPORTS	113	UK	4.011

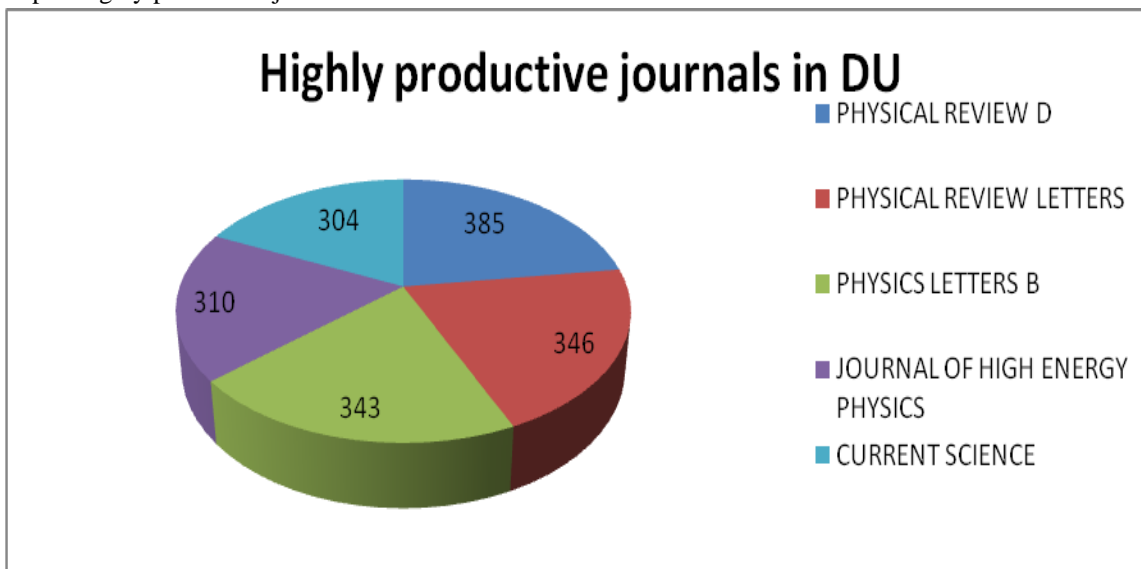Table 4: Top 5 Highly productive journals
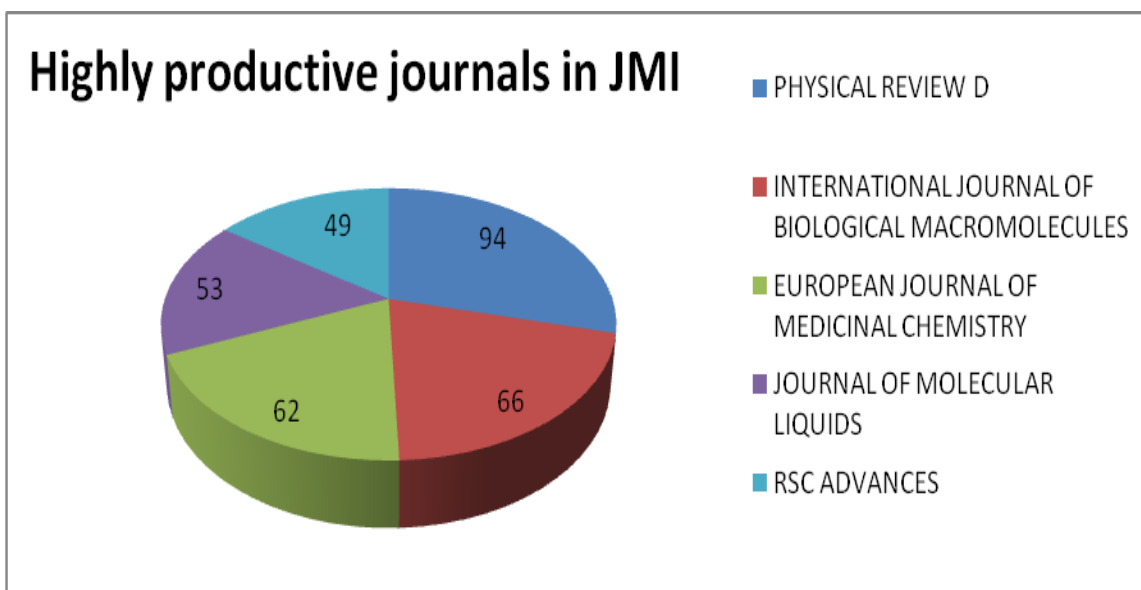

Figure 3A: Highly productive journals in DU

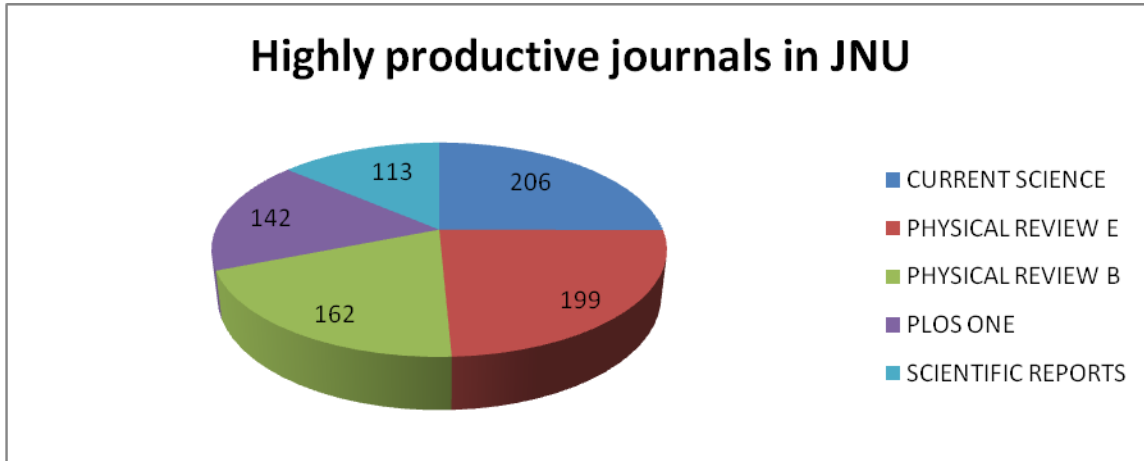Figure 3B: Highly productive journals in JMI

Figure 3C: Highly productive journals in JNU

5. TYPES OF DOCUMENTS

In the Table 5 types of documents in which the publication from the universities had appeared is listed. As expected, Journal Articles occupy the first rank with regard to type of document preferred by the faculties of the universities to publish their output. The researchers always consider journals as principal source of communication to disseminate their research output. Therefore we may say that **Hypothesis 2: The journal article as source of publication occupies the top rank is approved**. These are considered in academic community reliable and authentic source of research information. The second rank for type of document is of Article Reviews in DU, JNU and JMI.

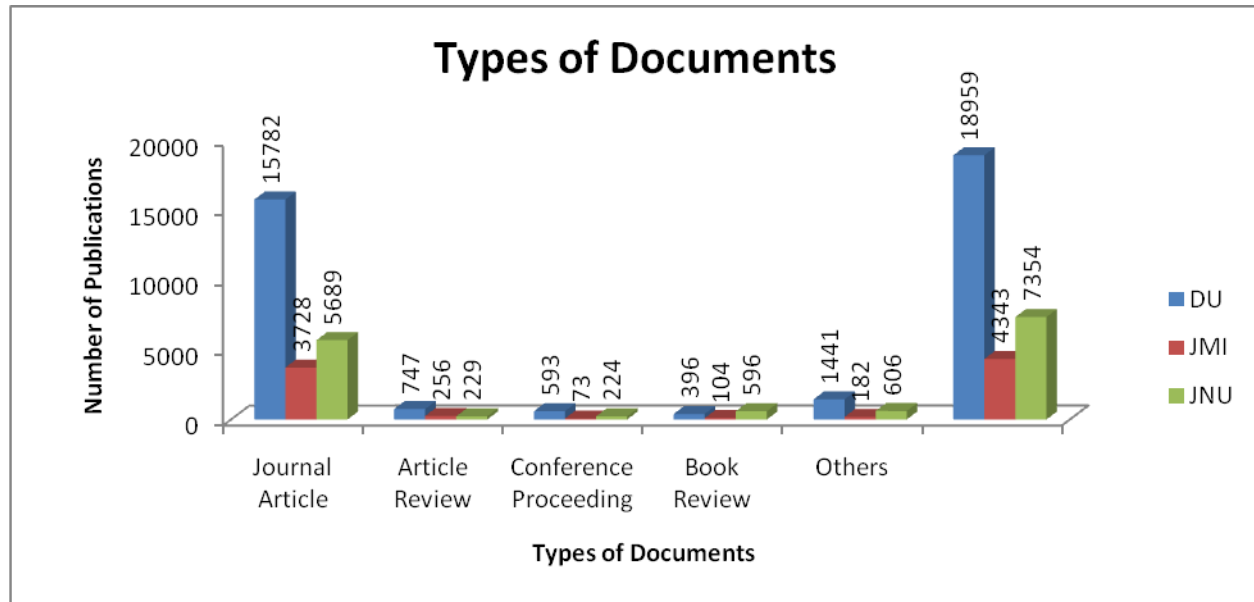|	DU	JMI	JNU
Document Types	**No. of Publications**	**No. of Publications**	**No. of Publications**
Journal Article	15782	3728	5689
Article Review	747	256	229
Conference Proceeding	593	73	224
Book Review	396	104	596
Others	1441	182	606
	18959	**4343**	**7354**

Table 5: Types of documents

Figure 4: Types of documents

6. LANGUAGE OF PUBLICATIONS

Table 6 shows language of the documents retrieved from these universities. English is most common source of medium of publishing the research outputs. DU has published 09 documents in languages other than the English; JMI has only one publication in Spanish; however JNU has all 6806 publications in English language. Since English is international language, most of the researchers published their research in English language sources to get international audience. Thus the **Hypothesis 3: English is highly preferred language used by the faculty to disseminate their research output is approved**.

	DU	JMI	JNU
Language	**No. of Publications**	**No. of Publications**	**No. of Publications**
English	18950	4342	7354
Spanish	3	1	0
Others (German, French, Polish, Portuguese, Russian)	6	0	0
TOTAL	**18959**	**4343**	**7354**

Table 6: Language of publications

6. RESULT

The result of analysis from these three universities, i.e. University of Delhi, Jamia Millia Islamia and Jawaharlal Nehru University is already given in above paragraphs and is now summed up here. The Growth of literature shows their increase is not steady in all the three universities from 1989 to 2018. DU has produced total 18959 publications; JNU has 7354 publications followed by JMI with 4343 publications from 1989 to 2018. Therefore we can say **Hypothesis 1: The growth rate of literature in these universities is steady since 1989 is neither approved nor disapproved.**

The international collaboration followed in these universities is around 35%-37%. The USA is the country which has maximum collaborative papers in DU and JNU, Saudi Arabia is highest collaborative country in JMI. The universities are publishing their outputs in international journals which are published from advanced countries like USA, UK, Netherlands, etc. Current Science is the only top 5 journals that is published from India. DU & JNU has 304 and 206 papers in Current

Science. JMI has 22 papers in it and is at 15 rank in it's list. The top most type of document in which faculties of these universities have published their results is Journal Articles. It is as expected since Journals are considered as most important source of communication by researchers. Therefore we may say that **Hypothesis 2: The journal article as source of publication occupies the top rank is approved**.

The data about the language of publication source was also analyzed. It shows English as most preferred language. It was expected because English is an international language and every researcher wants to have worldwide view of his output. In the analysis, **Hypothesis 3: English is highly preferred language used by the faculty to disseminate their research output is approved**.

The overall result from these universities is not very encouraging. A lot of efforts are needed by the individual university to improve their performance in terms of their research productivity. The concerned authorities in order to improve the performance of these universities, has to allocate more funds for upgrading the infrastructure such as advanced laboratory, latest equipments in it, high speed internet connectivity, updated syllabi and increasing the quality of teaching and research practices in their universities. There is need to have manpower to carry out the research activities at high end and providing opportunities to its faculties for the international collaboration in their fields. In the present times it is essential for a university to be visible globally by producing high research productivity.

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i