Original Article

Indian Journal of Library and Information Science
Volume 18 Number 3, September - December 2024
DOI: http://dx.doi.org/10.21088/ijlis.0973.9548.18224.3

Research Productivity of Jawaharlal Nehru University and Jamia Millia Islamia (2019-2023): A Bibliometric Analysis

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How to cite this article:

Lohrii Kaini Mahemei, Research Productivity of Jawaharlal Nehru University and Jamia Millia Islamia (2019-2023): A Bibliometric Analysis Ind J Lib Inf Sci 2024; 18 (3):208-217.

Abstract

The main purpose of the present study is to make a quantitative analysis and to compare the research publications between two prestigious central universities in India. The data are collected from the Scopus database during the period 2019 to 2023 and mainly focus on the growth of publications, highly cited articles, authorship networks, international collaboration patterns, funding agencies and channels for communicating their research findings. A total of 6990 and 7574 publication records of JNU and JMI respectively were analysed using MS Excel and scientometric techniques. For JNU, 2022 (21.8% publications) is the most productive year, whereas for JMI, the year 2023 with 23.2% publications. The year 2020 received the highest number of citations i.e. 38.1% and 33.3% for both universities. Researchers of JNU and JMI channel their research findings in 1819 and 1806 unique journals in which 66.7% and 64.9% of articles are published respectively. The ACPP for JNU's prolific authors ranges from 6.4 to 18.8 whereas for JMI's most productive authors range from 10 to 51.7. Both JNU and JMI published scientific publications collaborated with 166 and 135 different international countries respectively.

Keywords: Research Productivity, Bibliometric Analysis, Research Performance, Jawaharlal Nehru University (JNU), Jamia Millia Islamia (JMI), Scientometric Study.

INTRODUCTION

Research and scholarly publications play a vital role in producing new ideas and knowledge and also in the growth of discipline, institution, individual, etc. Jawaharlal Nehru University (JNU), New Delhi was established in the year 1966 and formally inaugurated on 14th Nov. 1969 (https://www.jnu.ac.in/). Currently, JNU has a total of 14 Schools and 8 Special Centres. Furthermore, JNU grants recognition/accreditation to prestigious defence institutions, and research and development institutions across the country for the award of specified degrees. Jamia Millia Islamia (JMI) was established in 1920, originally in Aligarh and in 1925 moved to Delhi. JMI became a Central University in 1988 (https://www.jmi.ac.in/. Currently has 11 Faculty of Studies, 7 Schools and 3 Centres of Learning. According to the Times

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Received on: 10.05.2024 **Accepted on:** 13.08.2024

Higher Education World University Rankings 2023, both JNU and JMI were ranked 601-800 and 501-600 respectively. In the QS World University Rankings 2023, JNU ranked 601-610 and JMI ranked at 951-1000 respectively. The National Institute Ranking Framework (NIRF), India Rankings 2023 for universities, JNU and JMI is ranked 2nd and 3rd respectively as shown in *Table 1*.

Table 1: University ranking

	JNU	JMI	JNU	JMI
Year	**NIRF Rankings**		**QS Top Univ. Rankings**	
2019	2	12	N/A	751-800
2020	2	10	1001+	751-800
2021	2	6	N/A	751-800
2022	2	3	561-570	751-800
2023	2	3	601-610	951-1000

REVIEW OF LITERATURE

Several studies and research have been conducted to evaluate the qualitative and quantitative research contributions and performance of universities, institutions and an individual. For the present study, few are reviewed as under.

Gopikuttan & Aswathy (2014) analysed the scholarly literature of Kerala University using the Web of Science to collect data for a study period of 13 years from 2000 to 2012. The authors studied the annual papers distribution, authorship pattern, prolific authors, subject-wise papers, journal articles publications by country, collaborative coefficient, the author preferred journals, and the highest citation counts of articles.

Santhakumar *et al*. (2020) studied the research productivity of Madras University for a period of one decade from 2009 to 2018 indexed in the WoS database. The study identified and analysed the annual publication growth, document types of publications, most prolific authors, international countries for collaborative research activities, preferred journals by the researchers, subject-wise research publications and most cited publications of the university.

Pradhan *et al*. (2020) conducted a scientometric analysis at the National Institute of Technology (NIT), Rourkela. Researchers analysed the research performance of the institution indexed in the Scopus database during the period 2000 to 2009. The authors studied the year-wise research productivity of the institute, authorship pattern and collaboration coefficient, prolific authors, subject-wise publications, AGR, RGR and Doubling Time (Dt), countries and institutions that collaborated with the institute, preferred journals and highly cited publications of the NIT, Rourkela.

Yadav *et al*. (2020) studied "Research Productivity of Mizoram University during 2004-2017: A Scientometric Study Based on Indian Citation Index." The authors analysed a total of 265 data downloaded from the Indian Citation Index during the period from 2004-2017. The study shows that research articles with 230 was the preferred form of communicating research findings by the researchers and the double authorship pattern with 81 articles is the highest among the researchers of Mizoram University.

Chaturbhuj & Motewar (2021) conducted a scientometric analysis of Savitribai Phule Pune University (SPPU) from 2001 to 2019 using the WOS database and retrieved a total of 6449 different document types. Subject and their sub-subjects were analysed using the "Specialisation Index" and the "Research Priority Index" indicators. The authors analysed the annual growth rate of the university, compared the productivity, research priority and subject's specialisation of SPPU with the rest of India and the world, rankings of authors and journals, etc. and observed that the highest number of publications by SPPU is Physics with 2737 papers. The journal "*Current Science*" was the most preferred by researchers with 118 published research papers.

Janen (2022) studied "Research Output of University of Jaffna, Sri Lanka during 2000-2019" indexed in the WOS database. A total of 293 scientific publications were retrieved during the 20 years of the study period. The study analysed the annual growth publications, most prolific authors, authorship pattern, preferred journals and their impact factor, international collaboration and funding agencies of UoJ. The study found that UoJ scholarly publications increased steadily after 2020 and multiple authorship dominates among the UoJ researchers.

The study mainly focuses on the research contributions of two very reputed Indian central universities i.e. Jawaharlal Nehru University (JNU) and Jamia Millia Islamia (JMI).

OBJECTIVES

The present study has been carried out with the objectives as follows:

- Study the year-wise growth publications of JNU and JMI
- Identify the document types for channelling their scholarly research results by JNU and JMI
- Find out the most preferred journals for publications
- Examine the most highly cited articles
- Determine the most collaborative authorship network
- Assess the international collaborative countries and funding agencies supported to both the universities.

METHODOLOGY

The data source for the present study of JNU and JMI research output has been taken from the Scopus database where the scholarly literature is published and indexed. On March 7 2024, a search was conducted in the Scopus database advanced search box using the affiliation IDs "Jawaharlal Nehru University", "Jamia Millia Islamia" and search strings "AF-ID (60030622) and AF-ID (60020458) and PUBYEAR 2019 to 2023". The records were downloaded as a .csv file and the retrieved data was further analysed using MS Excel software as per the objectives of the study. A total of 6990 and 7574 bibliographic records of JNU and JMI research publications were analysed respectively. VOSview visualization tool was used for authorship network analysis.

DATA ANALYSIS & INTERPRETATIONS

Data analysis was carried out on 6990 and 7574 scholarly publications downloaded bibliographic records using various indicators like total no publications (TP), total citations (TC), the core journal for article publications, types of documents for research publishing, authorship network, foreign research collaborations, funding agencies, etc.

Year-Wise Growth Patterns

The JNU and JMI have published 6990 and 7574 scholarly publications respectively during the period of the study from 2019 – 2023. The years 2022 and 2019 were the most productive and the least productive years for JNU, whereas 2023 and 2019 were the most productive and the least productive years for JMI. Further, a total of 66470 and 86093 citation counts were received from JNU and JMI with an average of 9.5 and 11.4 citations per paper (ACPP) for both universities respectively. It is observed from *Table 2* that the year 2020 received the highest number of citations i.e. 38.1% and 33.3% for both universities respectively. *Figure 5.1* revealed a continuous increase in scholarly publications in both the universities and the year-wise publications are growing in a linear pattern.

Table 2: Year-Wise Growth

	JNU					JMI				
Year	**TNP**	**P**	**TNC**	**P**	**ACPP**	**TNP**	**P**	**TNC**	**P**	**ACPP**
2019	1232	17.6	17827	26.8	14.5	1201	15.9	22034	25.6	18.3
2020	1295	18.5	25356	38.1	19.6	1380	18.2	28693	33.3	20.8
2021	1473	21.1	15047	22.6	10.2	1544	20.4	18871	21.9	12.2
2022	1526	21.8	6341	9.5	4.2	1691	22.3	12843	14.9	7.6
2023	1464	20.9	1899	2.9	1.3	1758	23.2	3652	4.2	2.1
Total	6990	100.0	66470	100.0	9.5	7574	100.0	86093	100.0	11.4

"TNP=Total Number of Publications; P= Percentage; TNC=Total Number of Citations; ACPP=Average Citations per Paper"

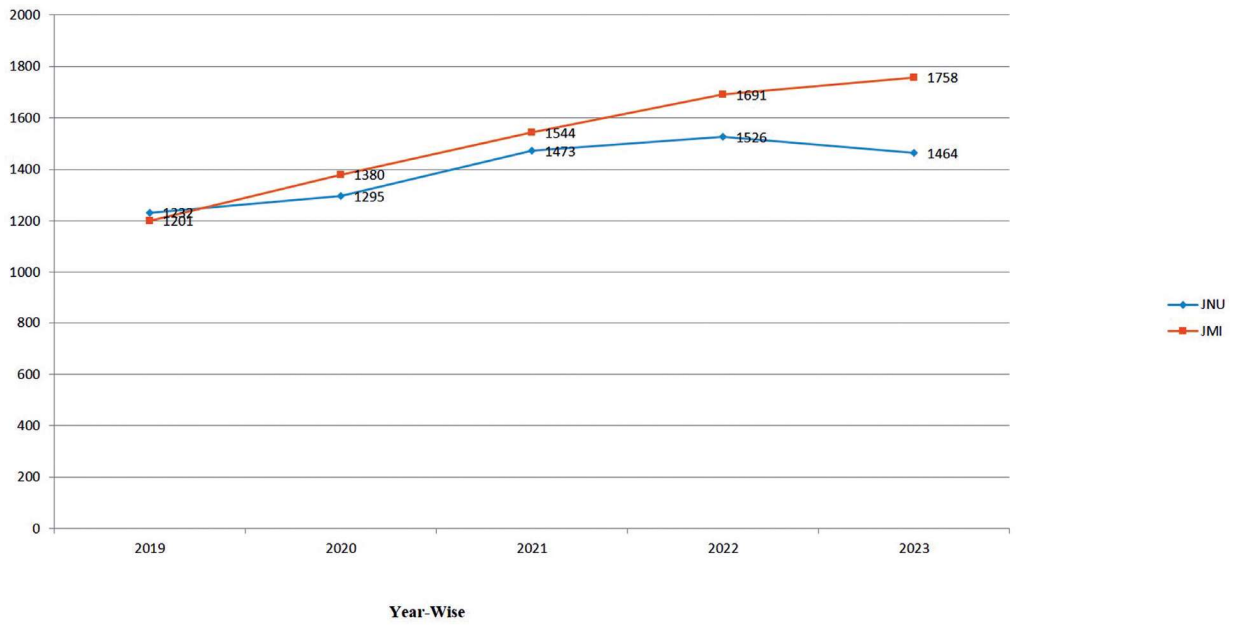

Fig. 1: Year-Wise Growth

Different Types of Documents

Scopus database indexes different types of documents like articles, conference papers, reviews, data papers, short surveys, books, book chapters, editorials, erratum, letters and notes. The present study has taken into consideration only the documents which have received a high and sizable number of citations. There were 1819 and 1806 unique journals in which 4659 (66.7%) and 4915 (64.9%) articles from JNU and JMI were published respectively. The researchers from both universities used the media of journal articles to communicate their research findings to a wider audience and received 73.9% and 72% citations respectively. JNU researchers published a total number of 1153 (16.5%) in book chapters followed by reviews 610 (8.7%) whereas JMI researchers published 1027 (13.6%) in conference papers followed by book chapters with 900 (11.9%). The different types of documents which were published are shown in *Table 3*.

Table 3: Types of Documents Published during 2018-2022

	JNU				JMI			
Document Types	**TNP**	**P**	**TNC**	**P**	**TNP**	**P**	**TNC**	**P**
Article	4659	66.7	49122	73.9	4915	64.9	61979	72.0
Book	122	1.7	222	0.3	86	1.1	82	0.1
Book Chapter	1153	16.5	1994	3.0	900	11.9	1791	2.1
Conference Paper	446	6.4	1128	1.7	1027	13.6	4207	4.9
Review	610	8.7	14004	21.1	646	8.5	18034	20.9
Total	6990	100.0	66470	100.0	7574	100.0	86093	100.0

"TNP=Total Number of Publications; P= Percentage; TNC=Total Number of Citations"

Journals Preferred for Scholarly Publications

During the last five years, the JNU researchers community commonly published in "*Economic and Political Weekly*" with 101 publications followed by "*Journal of Biomolecular Structure and Dynamics*" with 83 publications, whereas the JMI researchers published in "ACS Omega" with 86 articles followed by "*Journal of Biomolecular Structure and Dynamics*" with 74 publications. *Table 4* shows that out of the 21 preferred journals for communicating their research findings, five were common to both the universities namely: "*ACS Omega*", "*Environmental*

Science and Pollution Research", "*International Journal of Biological Macromolecules*", "*Journal of Biomolecular Structure and Dynamics*" and "*Scientific Reports*". Out of these 21 journals, seven are published in the Netherlands, six are published in the USA, four are published in the UK, two in Germany, and one each is published in India and Singapore. The remaining 2331 (50%) and 2659 (54.1%) publications were published in 1319 and 1198 journals for JNU and JMI scholarly publications respectively.

The Journal Impact Factor (JIF 2022) of the top ten journals preferred by JNU vary from 2 to 5.8 whereas for JMI it varies from 2 to 7.8. Furthermore, *Table 5.4* displays that the JIF of one journal each from JNU and JMI was unavailable. The top ten preferred journals by JNU and JMI researchers received a total number of citations of 5.9% and 11.5% respectively.

Table 4: List of Top Ten Journals Preferred by JNU and JMI

Rank	Journal Title Preferred by JNU	Country	TNP	TNC	JIF 2022
1	Economic and Political Weekly	India	101	137	N/A
2	Journal of Biomolecular Structure and Dynamics	UK	83	568	4.4
3	Scientific Reports	UK	82	1360	4.6
4	International Journal of Biological Macromolecules	Netherlands	45	334	2
5	ACS Omega	USA	38	533	4.1
6	Multimedia Tools and Applications	Netherlands	33	213	3.6
7	PLoS ONE	USA	32	220	3.7
8	Environmental Science and Pollution Research	Germany	31	280	5.8
9	Wireless Personal Communications	Netherlands	29	191	2.2
10	Physical Review E	USA	26	79	2.4
Rank	**Journal Title Preferred by JMI**	**Country**	**TNP**	**TNC**	**JIF 2022**
1	ACS Omega	USA	86	1365	4.1
2	Journal of Biomolecular Structure and Dynamics	UK	74	797	4.4
3	International Journal of Biological Macromolecules	Netherlands	71	1054	2
4	Scientific Reports	UK	58	1250	4.6
5	Journal of Molecular Liquids	Netherlands	55	980	6
6	Materials Today: Proceedings	Netherlands	53	487	N/A
7	IEEE Access	USA	51	1185	3.9
8	Environmental Science and Pollution Research	Germany	45	510	5.8
8	Journal of Molecular Structure	Netherlands	45	551	3.8
9	Journal of Industrial Integration and Management	Singapore	37	1103	7.8
10	Physical Review D	USA	33	596	5

"TNP=Total Number of Publications; TNC=Total Number of Citations; JIF=Journal Impact Factor"

Top Ranked Collaborating Authors

The VOSviewer open-source software is used to map the authorship pattern network of the most productive authors. As presented in *Fig. 2* and *Fig. 3* some larger visual images are against prolific authors while others are moderately smaller images, representing their number of scholarly publications. Out of the total 8873 JNU authors, 267 top-ranked authors meet the threshold value set at 15. *Fig. 2* revealed that Kumar S with 304 articles is the most productive author followed by Kumar A with 302 publications.

In the case of JMI, out of the total 8917 authors, 389 prolific writers meet the threshold set at 15. As observed in *Fig. 3*, Hassan M I with 269 publications is the most prolific author followed by Haleem A with 254 research articles. Furthermore, the Average Citations per Paper (ACPP) for JNU's prolific authors ranges from 6.4 to 18.8 whereas for JMI's most productive authors ranges from 10 to 51.7.

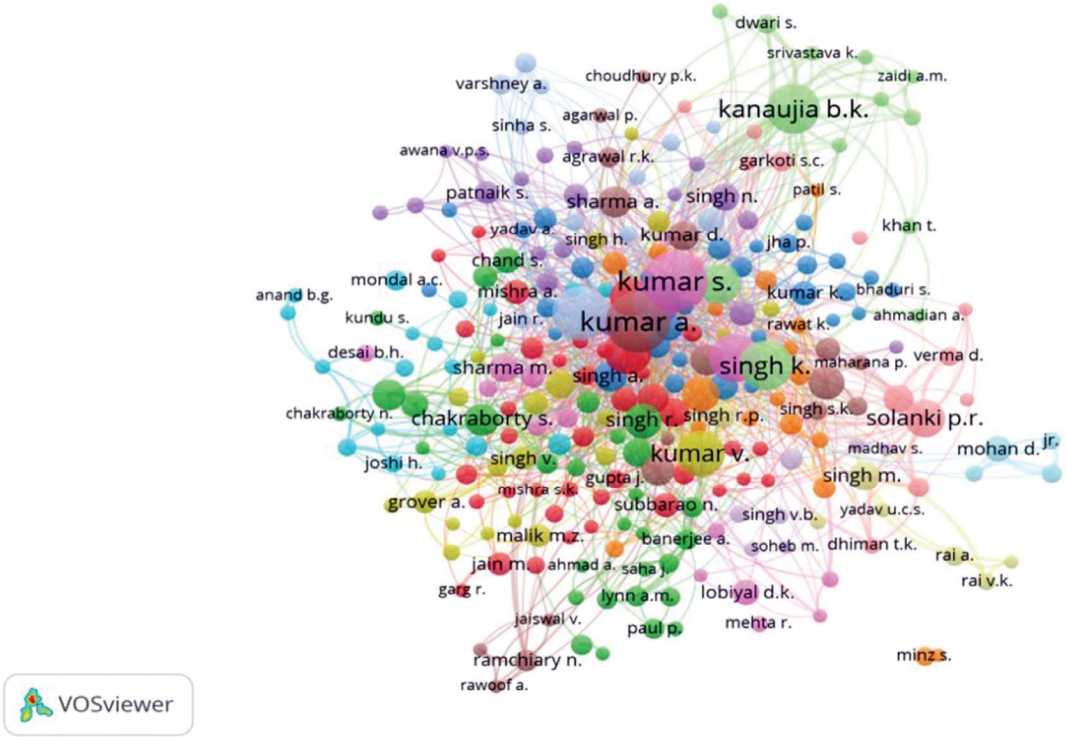

Fig. 2: Authorship Network Map of JNU

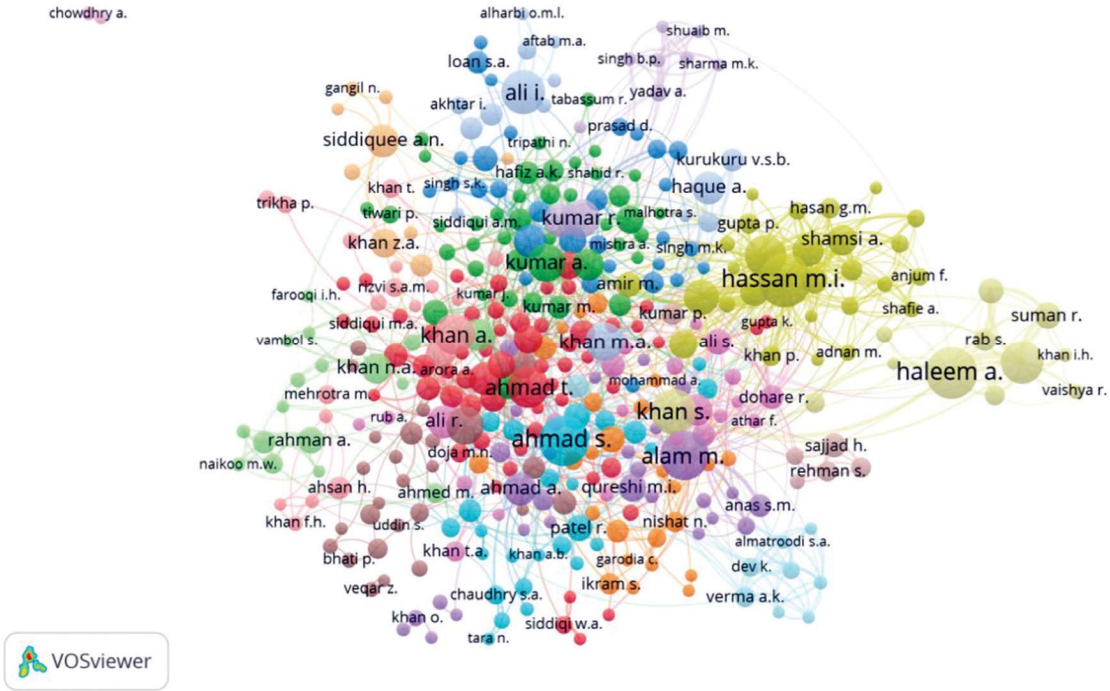

Fig. 3: Authorship Network Map of JMI

Most Citations Received for Articles Published

Table 5.5 presents the top-ten most cited articles of both the universities which received 310 or more citations. Out of the total 6990 documents published by the JNU researchers, a total number of 2180 did not receive any citation; the remaining 4810 publications received 66470 citations. In the case of JMI researchers, out of the total 7574 published publications, a total number of 1964 did not receive any citation; while the remaining 5610 documents received 86093 citations. Out of the ten most cited articles, 6 titles belong to JMI and 4 to JNU and all the papers were multi-authored patterns. Furthermore, *Table 5* shows that the top ten cited articles of JNU and JMI researchers received a total number of citations of 7.7 per cent.

Table 5: List of Top-Ten Cited Articles of JNU and JMI

Author	Title	Journal	DT	Year	TC	Univ.
Abbafati C *et al.*	"Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019"	The Lancet	Article	2020	6824	JNU
Khan A.I *et al.*	"CoroNet: A deep neural network for detection and diagnosis of COVID-19 from chest x-ray images"	Comput. Methods Programs Biomed.	Article	2020	848	JMI
Vaishya R *et al.*	"Artificial Intelligence (AI) applications for COVID-19 pandemic"	Diabetes Metab. Syndr.: Clin. Res. Rev.	Article	2020	844	JMI
Abbafati C *et al.*	"Global age-sex-specific fertility, mortality, healthy life expectancy (HALE), and population estimates in 204 countries and territories, 1950–2019: a comprehensive demographic analysis for the Global Burden of Disease Study 2019"	The Lancet	Article	2020	798	JNU
Singh R.P *et al.*	"Internet of things (IoT) applications to fight against COVID-19 pandemic"	Diabetes Metab. Syndr.: Clin. Res. Rev.	Article	2020	495	JMI
Javaid M *et al.*	"Industry 4.0 technologies and their applications in fighting COVID-19 pandemic"	Diabetes Metab. Syndr.: Clin. Res. Rev.	Article	2020	489	JMI
Kapasia N *et al.*	"Impact of lockdown on learning status of undergraduate and postgraduate students during COVID-19 pandemic in West Bengal, India"	Child. Youth Serv. Rev.	Article	2020	423	JNU
Bilal, Pant M *et al.*	"Differential Evolution: A review of more than two decades of research"	Eng. Appl. Artif. Intell.	Article	2020	391	JMI
Dou J *et al.*	"Assessment of advanced random forest and decision tree algorithms for modeling rainfall-induced landslide susceptibility in the Izu-Oshima Volcanic Island, Japan"	Sci. Total Environ.	Article	2019	367	JMI
Abbafati C *et al.*	"Five insights from the Global Burden of Disease Study 2019"	The Lancet	Article	2020	310	JNU

"DT=Document Types; TC= Total Citation Received"

Top International Research Collaborating Countries

Researchers across the globe are reaching out to peers for access to new sources, sharing and developing new ideas. During the last five years, JNU researchers have collaborated their research with 166 different international countries, whereas JMI authors collaborated with 135 foreign countries for scholarly publications. *Table 6* shows the leading international collaborating countries with JNU and JMI researchers. Moreover, it is observed that five countries were common to both the universities namely – China, Saudi Arabia, South Korea, the UK and the USA. The JNU researchers collaborated with many world-leading research countries and the USA top the list with 546 (31%) total number of publications. JMI authors too collaborated and co-authored scholarly publications with different developed international countries. The top research collaborating country is Saudi Arabia with 47.3% publications and received 6.6% citations.

Table 6: List of Top-Ten Collaborating Foreign Countries with JNU and JMI

Sl. No	JNU collaborating country	TNP	P	TNC	P
1	USA	546	31.0	10385	33.6
2	UK	248	14.1	3853	12.5
3	Germany	159	9.0	1810	5.9
4	China	141	8.0	3577	11.6
5	Australia	139	7.9	2444	7.9
6	Saudi Arabia	103	5.8	1366	4.4
7	South Korea	126	7.2	3036	9.8
8	Canada	79	4.5	1324	4.3
8	Japan	79	4.5	1159	3.8
9	Italy	77	4.4	832	2.7
10	France	64	3.6	1104	3.6
Sl. No	**JMI collaborating country**	**TNP**	**P**	**TNC**	**P**
1	Saudi Arabia	1349	47.3	2015	6.6
2	USA	350	12.3	7156	23.6
3	China	198	6.9	4582	15.1
4	South Korea	171	6.0	3070	10.1
5	UK	158	5.5	2436	8.0
9	South Africa	154	5.4	3519	11.6
6	Egypt	128	4.5	1554	5.1
8	Malaysia	125	4.4	2299	7.6
7	Russia Federation	109	3.8	2610	8.6
10	United Arab Emirates	108	3.8	1136	3.7

"TNP=Total Number of Publications; P= Percentage; TNC=Total Number of Citations"

Main Research Funding Agencies

The researchers of both universities have received funds from India and abroad for carrying out high-quality research and projects. As observed from *Table 7*, governments and research institutes/universities were the main funding agencies for both universities. The "University Grants Commission/Committee" (India) is the main research funding agency for universities with 1038 and 762 documents published, respectively. Moreover, the ACPP for JNU top funding agencies ranges from 4.4 to 29.2 whereas for JMI the top-ten most research funding agencies range from 4.3 to 16.7.

Table 7: List of Top-Ten Funding Agencies of JNU and JMI

Sl. No	JNU research funding agency	CountryC	TNP	TNC	ACPP
1	University Grants Commission, UGC	India	1038	10562	10.2
2	Department of Science and Technology, Ministry of Science and Technology, DST	India	931	9571	10.3
3	Council of Scientific and Industrial Research	India	598	6850	11.5

Sl. No	JNU research funding agency	CountryC	TNP	TNC	ACPP
4	Department of Biotechnology, Ministry of Science and Technology, DBT	India	538	5567	10.3
5	Science and Engineering Research Board, SERB	India	528	5149	9.8
6	Indian Council of Medical Research, ICMR	India	259	2903	11.2
7	Jawaharlal Nehru University, JNU	India	253	1110	4.4
8	Jawaharlal Nehru Technological University Hyderabad, JNTUH	India	138	4033	29.2
9	Department of Science and Technology, Government of Kerala	India	128	2442	19.1
10	Jinan University	China	112	1169	10.4
Sl. No	**JMI research funding agency**	**Country**	**TNP**	**TNC**	**ACPP**
1	University Grants Commission, UGC	India	762	11463	15.0
2	Department of Science and Technology, Ministry of Science and Technology, DST	India	546	7223	13.2
3	Deanship of Scientific Research, King Saud University, KSU	Saudi Arabia	434	6707	15.5
4	Indian Council of Medical Research, ICMR	India	383	6384	16.7
5	Council of Scientific and Industrial Research	India	340	3757	11.1
6	Science and Engineering Research Board, SERB	India	284	4295	15.1
7	Department of Biotechnology, Ministry of Science and Technology, DBT	India	125	1431	11.4
8	Deanship of Scientific Research, King Khalid University, KKU	Saudi Arabia	114	1090	9.6
9	Jamia Millia Islamia, JMI	India	95	411	4.3
10	King Abdulaziz University, KAU	Saudi Arabia	92	1066	11.6

"TNP=Total Number of Publications; TNC=Total Number of Citations; ACPP=Average Citation per Paper"

CONCLUSION

The paper presents a comparative analysis of the research contributions of two very reputed Indian central universities. Based on this study's findings, it is found that the researchers of JNU and JMI published their research findings in various types of sources and a variety of output formats. During the study period (2019-2023), a total of 6990 and 7574 publications were produced, out of which 66.7% and 64.9% are research articles of JNU and JMI respectively. It is observed that the researchers of both universities prefer to publish and communicate their research findings in journals published in developed countries. The study has also shown that "*Economic and Political Weekly*" published in India was very commonly used by the JNU researchers for publishing their research findings, whereas JMI researchers prefer to communicate their research findings in "*ACS Omega*" published in the USA.

Collaboration and cooperation among researchers facilitate and generate new ideas and research findings. During the last five years i.e. 2019-2023, JNU researchers have collaborated with 166 different international countries, whereas JMI authors collaborated with 135 foreign countries for scholarly publications. The USA was the top research collaborator for JNU and JMI Saudi Arabia was the most preferred country for research collaborations. Out of the total 8873 JNU authors, Kumar S (304 publications) is the most productive author, in the case of JMI, out of the total 8917 authors, Hassan M I with 269 publications is the most prolific author.

Out of the ten most cited articles, 6 titles belong to JMI and 4 to JNU and all the papers were multi-authored patterns and have received more than 310 citations and above. Both universities received

funds from India and abroad for carrying out high-quality research. The "University Grants Commission/Committee, India" is the main research funding agency for JNU and JMI with 1038 and 762 documents published, respectively.

All these scientometric/bibliometric studies and analysis results may be of great help to administrators, universities, government institutions and also to the funding agencies for strengthening and promoting the research value of the university and enhancing the overall research learning and development of the university.

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