

UN Sustainable Development Goals Research: Insights from Bibliometric Analysis of Top NIRF-Ranked Universities

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Abstract: *United Nations Sustainable development goals (SDGs) aim to achieve socially equitable, financially successful and nature friendly world. Being the hub of knowledge creation and dissemination, academic institutes play a crucial role in promoting SDGs through research. Hence the present study analysed the productivity and impact of UN SDG research output of top ten NIRF-ranked universities. Bibliometric data of 51455 SDG publications produced by the top ten NIRF ranked universities for the period 2016-2024 was exported using the pre-defined SDG queries from the Scopus database. The study revealed a steady growth of institutional contribution on SDG research indicating the researchers' meticulous involvement in implementing SDG. Manipal Academy of Higher Education (MAHE) produced highest number of SDG publications (8559) while Banaras Hindu University (BHU) accrued highest citations (200240). The non open access publications (32787) outnumbered their open access (OA) counterparts (18668). On the contrary, citation analysis highlighted that open access SDG publications received higher citations than non-open access publications, emphasizing the role of OA publishing in enhancing research visibility and impact. All the ten universities preferred articles as the major channel for disseminating their scholarly outputs. We recommend that universities should encourage researchers to contribute more SDG publications through open access channels to achieve the goals within the stipulated time.*

Keywords: Sustainable Development Goals, NIRF Universities, Bibliometric Analysis, Research Evaluation, Institutional Productivity

INTRODUCTION

To ensure the sustainable development of the planet United Nations introduced 17 Sustainable Development Goals on 1st of January 2016 which is to be accomplished within (SDGs) the year 2030. Excess utilization of natural resources and unsustainable practices caused serious socio-economic environmental problems around the globe. SDGs addresses the challenges such as “poverty, inequality, climate change, environmental degradation, peace and justice”, to build prosperity and promote socio economic and environmental development of the world. All sectors of the society including higher educational institutions play a major role in achieving these sustainable development goals.

Growth and improvement in United Nations Sustainable development goals needs national and international research initiatives and cooperation (Sweileh, 2020). Research on sustainable development goals are gaining popularity over the years and currently institutions are more focused on SDG research practices. Higher educational institutions especially universities play a key role in transforming the traditional society to a knowledge driven society, so that the institutions all over the world are striving to contribute towards UN sustainable development goals. International ranking system like Times Higher Education and QS ranking provide separate framework to rank institutions that outshine in SDG research.

The National Institutional Ranking Framework (NIRF) is an initiative by Ministry of Education, Government of India to rank higher education institutions in the country. NIRF also prioritized research and publications on UN Sustainable Development Goals by providing a separate score in the ranking (National Institutional Ranking Framework (NIRF), 2024). Present study emphasizes on evaluating the productivity of UN SDG research output of top NIRF universities in terms of publication and citation analysis.

REVIEW OF LITERATURE

Academic research plays a key role in formulating new knowledge (Berggren & Bjørnskov, 2022) and academic excellence of an institution correlates with the scholarly output. Institutional research productivity evaluation has attracted the attention of researchers, particularly engaged in bibliometric studies. Academic Institutions all over the world are actively involved in creating publications addressing the United Nations Sustainable Development Goals (SDG) (Purnell, 2022). International ranking system

like Times higher education provides a separate framework for identifying institutions that excel in SDG (Times Higher Education, 2024). Sustainable development goals developed by United Nations are set of actions to maintain the environmental stability and prosperity of our planet by engaging with issues such as “poverty, inequality, climate change, environmental degradation, peace and justice”(United Nations, 2015). Higher educational institutions being the supreme educational authority of a most contribution in SDG publications (Alfirevic et al., 2023). De La Poza et al. (2021) analysed the institutional sustainable development practices to identify how SDG achievements are integrated with the overall Times Higher Education ranking scores and discovered top ranked universities are more focused on SDG practices.

Leal Filho et al. (2023) conducted a survey-based study to examine the role of SDG in teaching and research and found out a positive attitude of institutions practicing SDG in research and teaching. Institutional research practices can be made more fruitful by connecting them with various sustainable development goals. After conducting a detailed bibliometric analysis of research publications in sustainable development goals, found out the need of adoption of SDG in Universities (Prieto-Jiménez et al., 2021).

Studies analysing the research output of SDGs are limited and even fewer have focused on the role of the institutions developing such research (Bautista-Puig et al., 2021). There exists a research gap for identifying institutional contribution towards SDG research especially in India. Present study is focused to evaluate the scholarly productivity of UN SDG research output of top NIRF universities to identify their institutional contribution towards United Nations Sustainable Development Goals.

METHODOLOGY

Present study analysed the productivity and Impact of UN SDG Research Output of top ten NIRF ranked universities. Data for the present study was collected from Scopus database considering the convenience in data retrieval. Top ten NIRF ranked universities for the year 2024 were listed out with their rank. Pre-defined SDG queries were used to obtain the number of SDG publication produced by each institution (Jayabalasingham et al., 2019). SDG queries were combined and applied in the advanced search option. Dataset comprised of 51455 SDG publications was exported in Comma Separated Values (CSV) file format. The exported dataset was analysed using Microsoft Excel.

OBJECTIVES

1. To explore the institutional contribution on UN Sustainable development goals
2. To assess the publication and citation pattern of SDG publications
3. To Identify the impact of open access publishing in SDG research
4. To identify the different scholarly channels used for disseminating SDG research

RESULTS

Chronological distribution of SDG publications

Table 1 demonstrates the contribution of top ten NIRF universities on SDG research during the period 2016-2024. A total of 51455 publications produced by the top 10

universities gathered 926083 citations. MAHE contributed universities gathered 926083 citations. MAHE contributed highest number publications followed by UoD and VIT. BHU obtained higher concentration of citations (200240) for 6518 publications followed by UoD and MAHE, Substantial number of citations secured by these publications demonstrate the enhanced visibility and acceptance of SDG publications among academic community. Study points out an active engagement of these institutions in SDG research which is a key factor in NIRF ranking. Average number of SDG publication per institution is 5145.5 and average number of citations per institution is 92608.3

Furthermore, Table identifies an enthusiastic approach of Indian universities towards conducting research on SDG starting from the year 2016 itself. A total of 2225 publications were produced in 2016 secured a total citation of 91269 signifies the vigorous attitude of scholarly community towards SDG publications. BHU contains highest number of SDG publications (415) for the year 2016 and attained a significant number of citations (25187). UoD conducted highest number of SDG research for the year 2017, and attained a substantial number of citations (30858). MAHE has been at the forefront of conducting SDG research since 2018, developed highest number of SDG publication till 2024. Highest number of citations received during the years 2018, 2019, 2020 and 2021 highlights the scholarly eagerness of academic community towards SDG research. All the ten universities exhibit a static growth in SDG research over the years. 2225 SDG publications were produced by all universities together in 2016, while 10005 were the total contributions by these universities in 2024. Significant growth in terms of publications and citations in SDG research over the year reveals increased academic recognition towards united nations sustainable development goals.

SDG publications and Access type

Table 2 identifies the preference of top NIRF universities for adopting the different platforms for distributing SDG research publications. Study found out a significant number open access and non-open access publications on SDG research with a remarkable number of citations. All the ten institutes except MAHE produced higher number of non-open access publications highlighting a strong preference of non-open access publishing than open access publishing. 18668 open access publications acquired a total of 530072 citations which is higher than the citations received by non-open access publications emphasizing the role of OA publishing in enhancing research visibility and impact.

MAHE have the highest number of open access publications and is the only university chosen open access publishing over non open access publishing. University of Delhi produced highest number of non-open access articles and received 50567 total citations. Banaras Hindu University received highest number citations for both open access (140019) and non-open access publications (60221). Study highlights preference of top NIRF universities in opting non open access publication platforms mean while greater citations received by the OA SDG publications demonstrate its greater acceptance among scholarly community.

Table 1: Year wise contribution of SDG publications by top NIRF Universities

NIRF Rank	Institution	2016		2017		2018		2019		2020		2021		2022		2023		2024		Total	
		P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C
1	IISc	320	9717	385	11332	415	16185	447	12988	475	11746	604	11511	652	8065	605	4236	654	850	4557	86630
2	JNU	332	11412	308	7882	368	11050	338	10250	492	10627	581	12900	613	6345	592	3355	626	1162	4310	74983
3	JMI	147	5131	158	4611	244	9524	317	10154	412	15791	477	10772	554	9040	626	5311	592	2893	3527	73227
4	MAHE	0	0	11	181	505	6878	769	11683	936	45869	1310	26816	1441	19599	1568	11033	2019	4968	8569	127027
5	BHU	415	25187	383	17448	447	35976	528	24000	704	44228	845	25920	1016	17483	1072	7606	1108	2392	6518	200240
6	UoD	303	25567	486	30858	480	14566	543	13657	700	14001	963	18014	1071	10418	1209	8024	1398	2397	7243	137502
7	AVV	81	888	108	1647	130	2493	130	3072	146	1998	183	1898	316	3162	414	2426	450	565	1958	18149
8	AMU	187	6366	272	9501	328	9831	326	10211	402	11105	582	11514	632	7852	711	4817	649	1235	4089	72432
9	JU	298	6007	314	7302	322	6630	342	6568	457	7762	559	9662	543	5792	564	4365	639	1008	4038	55096
10	VIT	52	994	70	1552	210	4506	399	8469	577	14766	827	16021	1092	18235	1559	12580	1870	3674	6656	80797
Total		2225	91269	2465	92314	3449	117639	4199	111062	5301	177898	6981	145028	7990	105991	8920	63753	10005	21144	51455	926063

IISc- Indian Institute of Science, JNU- Jawaharlal Nehru University, JMI- Jamia Millia Islamia, MAHE-Manipal Academy of Higher Education, Manipal, BHU-Banaras Hindu University, UoD- University of Delhi, AVV-Amrita Vishwa Vidyapeetham, Coimbatore, AMU- Aligarh Muslim University, JU -Jadavpur University, VIT-Vellore Institute of Technology, P=Number of Publications, C=Number of citations

Table 2: SDG publications and Access type

Institute	Open Access		Non-Open Access	
	P	C	P	C
IISc	1981	47768	2576	38862
JNU	1389	36375	2921	38608
JMI	1115	34721	2412	38506
MAHE	4869	99016	3690	28011
BHU	2250	140019	4268	60221
UoD	2339	86935	4904	50567
AVV	532	7472	1426	10677
AMU	1205	28197	2884	44235
JU	796	17031	3242	38065
VIT	2192	32538	4464	48259
Total	18668	530072	32787	396011

P=Number of publications C=Number of citations

Scholarly communication channels for SDG publication

Table 3 demonstrate the different scholarly channels used by top NIRF universities for propagating SDG research ideas. Articles are the most preferred channel followed by reviews and book chapter. 32229 articles accumulated a total citation of 617049 indicate its wider acceptance among scholarly community in disseminating sustainable development goals. Reviews are second most preferred medium acquired 249989 citations followed by book chapters received 24337 citations. University of Delhi produced highest number of articles (4271) and Book chapters (1228) while MAHE topped in Reviews (1505) and Vellore Institute of Technology contributed highest number of conference papers. Other document type includes Data papers, Editorials, Errata, Letter, Notes and Short Surveys, they are fewer in number compared to other types but received a significant number of citations indicate a minimal audience preference towards these channels. This study explored the different channels opted top NIRF universities for conveying SDG research practices based on institutional priorities.

DISCUSSION

The present study investigated UN SDG Research Output of Top NIRF-ranked Universities. The study also aimed to understand publication and citation trends, the impact of open access (OA) publishing, and preferences for various scholarly communication channels for disseminating SDG research output. All the ten universities together contributed 51455 SDG publications indicate the active

participation of Indian universities towards UN sustainable development goals. Manipal Academy of Higher Education (MAHE) produced highest number of SDG publications during the years while Banaras Hindu University (BHU) received higher number of citations. There exists a steady increase in number of SDG publications over the years, reveals the growing interest of top NIRF universities in conducting SDG research over time. Higher concentration of citations (926083) acquired by the total SDG publications demonstrate the enhanced visibility and acceptance of SDG publications among academic community. Greater number SDG publications were published through non-open access mode (32787) while Citation analysis highlighted that SDG publications with higher Open Access (OA) adoption received citations, emphasizing the role of OA publishing in enhancing research visibility and impact. Top NIRF universities adopted different scholarly channels to articulate SDG research ideas. journal articles are the most desired format across all universities. Reviews, Book chapters, and Conference papers are other most favoured medium selected by universities to disseminate SDG research. Study explored the scholarly productivity of Indian universities towards UN sustainable development goals.

Table 3: SDG publications and document type

Institution	Articles		Review		Book		Book chapter		Conference Papers		Others		Total	
	P	C	P	C	P	C	P	C	P	C	P	C	P	C
IISc	3222	64879	389	17197	17	100	266	944	524	2276	134	1138	4552	86534
JNU	2839	47838	506	23036	102	445	651	2307	112	840	98	392	4308	74858
JMI	2139	44990	474	23089	60	169	454	1547	353	2238	45	1156	3525	73189
MAHE	6122	88428	1505	34795	11	79	202	233	316	1102	401	2345	8557	126982
BHU	3953	139555	1006	49761	123	1170	1127	7911	80	441	226	1336	6515	200174
UoD	4271	93420	1150	36451	167	765	1228	4399	253	1526	173	978	7242	137499
AVV	807	9503	190	2530	3	1	132	473	779	5247	43	292	1954	18046
AMU	2420	40648	580	26059	86	364	553	3244	371	1876	75	217	4085	72408
JU	2435	37456	320	12423	49	282	569	1677	615	2952	47	224	4035	55014
VIT	4021	50332	990	24648	32	23	568	1642	920	2960	102	561	6633	80166
Total	32229	617049	7110	249989	650	3398	5790	24337	4323	21458	1344	8639	51406	924870

P = Number of Publication, C=Number of citations, Others= Data papers, Editorials, Errata, Letters, Notes and Short Surveys (Retracted papers are excluded)

CONCLUSION

Research on Sustainable Development Goals is gaining attention over the years. Universities in India are enthusiastically involved in SDG research practices. Institutions which prioritized research and publications on UN Sustainable Development Goals had an advantage in the

institutional ranking framework. Research on SDG will assist academic institutions to attain global recognition, thus research on SDG needs to be explored more to evaluate the individual institutional contribution towards UN's sustainable development goals.

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