

# Social Media Coverage of Research Output from 100 Most Productive Institutions in India

Tanu Solanki<sup>1</sup>, Mousumi Karmakar<sup>2</sup>, Sumit Kumar Banshal<sup>3</sup> and Vivek Kumar Singh<sup>2\*</sup>

<sup>1</sup>Department of Computer Science and Engineering, G.C.E.T., Greater Noida, Uttar Pradesh, INDIA.

<sup>2</sup>Department of Computer Science, Banaras Hindu University, Varanasi, Uttar Pradesh, INDIA.

<sup>3</sup>Department of Computer Science, South Asian University, New Delhi, INDIA.

## ABSTRACT

In the modern age of connected world and social media, research outcomes that are of direct interest & relevance to society are increasingly being shared and disseminated in news sources and social media platforms. Some studies have found that social media mentions of research papers can be an early indicator of their impact. India, which is now among the top 10 knowledge producers in the world, has more than 900 Universities that contribute to its research output. This paper tries to analyze as to what proportion of research output from the 100 most productive Indian institutions gets social media coverage. It is found that, while average social media coverage for India is around 28.5%, the coverage varies between 5% to 60% for different institutions. It is also observed that research output from institutions in some specific disciplines (such as Medical Science and Biological Science) attract more social media coverage as compared to others. The possible impact of geographical location (in a metro city) of an institution on social media coverage of its research output is analyzed as well. The findings present useful insight about social media coverage of research output of Indian institutions, which may be a proxy for societal relevance of the research work, and also indicate that suitable mechanisms need to be designed to promote dissemination of research results from Indian institutions in popular social media platforms.

**Keywords:** Altmetrics, Research Performance, Scientometrics, Social Media. Scholarly Publishing, Science and Society

## Correspondence

**Vivek Kumar Singh**

Department of Computer Science,  
Banaras Hindu University,  
Varanasi-221005, Uttar Pradesh, INDIA.  
Email: vivek@bhu.ac.in

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## INTRODUCTION

In the modern era of knowledge economy, scientific research and technological developments are considered as the key factors in development of a country. India, which is now poised to become the fifth largest economy of the world<sup>1</sup>, is striving hard to promote high end research in its institutions. Institutions are not only funded to carry out research on internationally recognized problems but are also encouraged to do research in areas of national priority. Several programs have been created to fund research that has direct relevance to society and can play an important role in national development and improvement in quality of life of its citizens.

There are now various kinds of institutions in India that are engaged in research activities of different kinds. This includes research laboratories created by the government, universities

(both public and private), scientific and technological education and research institutions (such as IITs, IISERs, NITs etc). Many of these institutions now figure in top institutions lists prepared by various International agencies. Given the large amount of public fund that goes in research activities carried out in these institutions, it is expected that they take up research and technological development in areas of direct relevance to Indian national development, that may have the potential to improve quality of life of Indian citizens. It is in this context that this paper tries to look at research output from 100 most productive Indian institutions, mainly to measure and analyze how much of the research from these institutions gets news and social media coverage. The underlying assumption (though a simplistic one) is that research results that are directly relevant to society and help in national development attracts higher attention in news and social media.

The data obtained from Web of Science shows that the 100 most productive institutions, taken together, produced 62,688 research papers during 2016, which constitutes about 82% of the total 76,709 research papers produced from India during the same period. Analysis of these 100 most productive institutions is thus a good representation of whole research output of India. The paper mainly aims to answer following research questions in its analysis:

1. <https://www.worldbank.org/en/country/india>

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**RQ1:** How much research output from 100 most productive Indian institutions is covered in social media platforms?

**RQ2:** Whether the coverage levels are similar in all institutions or institutions in some specific disciplines get higher social media coverage of their research output?

**RQ3:** Whether institution located in big metropolitan cities attract more social media coverage of their research output?

### Related Work

Social media coverage of research output is now being analyzed from various viewpoints and has emerged as an important research area, called Altmetrics. There are several kinds of studies performed during last five years, ranging from correlations between social media attention and citations<sup>[1-3]</sup> and predicting citations from social media coverage<sup>[4-7]</sup> to even proposing altmetric as a complementary measure of research performance of institutions.<sup>[8,9]</sup>

Some of the studies have tried to analyze altmetric phenomena for specific geographies, such as for Taiwan,<sup>[10]</sup> for South Korea,<sup>[11,12]</sup> for South Africa<sup>[13]</sup> and for China.<sup>[14-16]</sup> Lepori *et al.*<sup>[17]</sup> in a recent work compared altmetric phenomena in institutions from US and Europe. There are, however, very few studies about altmetric phenomena in India. To the best of our knowledge, the only previous works on altmetric analysis for India.<sup>[18-20]</sup> These studies, however, only looked at overall data from India and analyzed the social media coverage levels and patterns in research output from India as a whole. There are no existing studies that analyze social media coverage of research outputs at institution-level. This paper aims to bridge this gap and to explore on factors of discipline and geographical location for higher social media coverage of research output from a particular institution and present implications of the findings.

### Data and Methodology

The data for analysis is obtained from two sources: Web of Science (WoS) and altmetric.com. *First*, the research output data is obtained from WoS for the 100 most productive institutions, during the year 2016. A total of 62,688 publication records are found, which constitutes about 82% of the total research output from India during this period. The data was downloaded during 8<sup>th</sup>-10<sup>th</sup>, July 2019, with all the 69 standard metadata fields.

*Secondly*, for each record obtained from WoS, a lookup was done in altmetric.com for obtaining social media data around the research articles. The altmetric.com is a major social media aggregator that gathers and provides 18 types of online mentions from different social media platforms like Twitter, Facebook, Google Plus, LinkedIn, Weibo; blog-sites; online

news sites; aggregators like Pinterest, Reddit; academic networks like F100 and Mendeley; and online encyclopaedia like Wikipedia. The altmetric data downloaded was updated till 12<sup>th</sup> July 2019. Out of 62,688 records found in Web of Science, only 20,106 records (approx. 32.1%) were found indexed in altmetric.com. Mentions and reads in different social platforms are obtained for each article.

To analyse the data, computer programs were written in R. The data for each institution was processed and analysed by these programs. Since disciplinary association with social media coverage was one main point of analysis, each record was tagged into one of the 14 broad disciplinary areas, as originally proposed in.<sup>[21]</sup> The geographical location of all the institutions was also recorded through a manual process. Further, institutions were also identified with the major discipline of their research. The results are presented in various tables and figures.

### RESULTS

It has been shown in a previous study<sup>[20]</sup> that on an average only 28.5% of research output from India gets social media coverage as compared to world average of about 47%. However, the coverage levels are not uniform across all the institutions. The social media coverage levels of the research output from the 100 most productive Indian institutions are computed. Table 1 shows the detailed data for all the 100 institutions with location of the institution, its total research output, research output that is covered in social media platforms and coverage percentage. It can be seen that in terms of absolute number of papers getting social media coverage, CSIR is at the top followed by DST. These are also the 1<sup>st</sup> and 3<sup>rd</sup> largest producers of research papers, respectively. In terms of coverage percentage, institutions like DBT and TIFR perform better, with more than 60% of their articles getting social media attention. Among large producers, DST and IISc Bangalore have more than 40% of their articles getting social media coverage. Other institutions which have higher coverage percentage include NIMHANS, JNCASR, IISER Kolkata, PHFI, ICMR and PRL. The institutions with lower social media coverage of their output are IIT Roorkee, Anna University, ISM Dhanbad, IICT Hyderabad, Thapar University, NIT Tiruchirappalli and VNIT. In general, higher social media coverage is seen in institutions producing research in Medical Science or Multidisciplinary areas and institutions with more technology centric research focus have lower social media coverage of their research. This may be perhaps due to the reason that research in technology is often more complex for a general person to understand.

To have a clearer picture of the productivity and social media attention of the articles, Figure 1 shows a plot of institutions on total papers *vs* social media attention. It is observed that

**Table 1: Social Media Coverage Levels of Research Output from 100 most Productive Institutions in India.**

Institution	Abbr.	State	Total Papers (WoS)	Papers covered in altmetrics	Coverage %
Council of Scientific and Industrial Research	CSIR	Delhi	4999	1699	33.99
Indian Council of Agricultural Research	ICAR	Delhi	2729	708	25.94
Department of Science Technology India	DST	Delhi	2146	1032	48.09
Indian Institute of Science IISc Bangalore	IISc Bangalore	Karnataka	1861	746	40.09
Indian Institute of Technology IIT Kharagpur	IIT Kharagpur	West Bengal	1666	422	25.33
All India Institute of Medical Sciences	AIIMS	Delhi	1621	621	38.31
Bhabha Atomic Research Center	BARC	Maharashtra	1491	385	25.82
Indian Institute of Technology Delhi	IIT Delhi	Delhi	1479	354	23.94
Indian Institute of Technology Bombay	IIT Bombay	Maharashtra	1412	489	34.63
Indian Institute of Technology Madras	IIT Madras	Tamil Nadu	1393	370	26.56
University of Delhi	DU	Delhi	1226	461	37.60
Banaras Hindu University	BHU	Uttar Pradesh	1210	377	31.16
PGIMER Chandigarh	PGIMER	Chandigarh	1197	467	39.01
Indian Institute of Technology Roorkee	IIT Roorkee	Uttarakhand	1190	225	18.91
Indian Institute of Technology Kanpur	IIT Kanpur	Uttar Pradesh	1088	388	35.66
Anna University, Chennai	Anna University	Tamil Nadu	1023	154	15.05
Jadavpur University, Kolkata	JU	West Bengal	972	203	20.89
Tata Institute of Fundamental Research	TIFR	Maharashtra	955	577	60.42
Vellore Institute of Technology	VIT	Tamil Nadu	922	197	21.37
Department of Biotechnology India	DBT	Delhi	890	550	61.80
Indian Institute of Technology Guwahati	IIT Guwahati	Assam	888	263	29.62
Defence Research Development Organization DRDO	DRDO	Delhi	856	202	23.60
Academy of Scientific and Innovative Research	ACSIR	Delhi	811	321	39.58
University of Calcutta	CU	West Bengal	790	283	35.82
Manipal University, Manipal	MU	Karnataka	786	302	38.42
Indian Institute of Technology Indian School of Mines Dhanbad	IIT(ISM) Dhanbad	Jharkhand	746	97	13.00
Indian Institute of Chemical Technology, Hyderabad	IICT	Telangana	695	36	5.18
Panjab University	PU	Punjab	682	121	17.74
Aligarh Muslim University	AMU	Uttar Pradesh	625	188	30.08
University of Hyderabad	UOH	Telangana	613	264	43.07
Savitribai Phule Pune University	SPPU	Maharashtra	600	242	40.33
Jawaharlal Nehru University	JNU	Delhi	596	253	42.45
CSIR National Chemical Laboratory	CSIR-NCL	Maharashtra	584	219	37.5
National Institute of Technology Rourkela	NIT Rourkela	Odisha	550	108	19.64
ICAR Indian Agricultural Research Institute	ICAR-IARI	Delhi	547	140	25.59
Birla Institute of Technology and Science Pilani	BITS Pilani	Rajasthan	497	160	32.19
Indian Institute of Technology BHU Varanasi	IIT BHU	Uttar Pradesh	491	103	20.98
Tata Memorial Hospital	TMH	Maharashtra	483	161	33.33
Saha Institute of Nuclear Physics, Kolkata	SINP	West Bengal	468	218	46.58
Christian Medical College Hospital Vellore	CMCH	Tamil Nadu	465	193	41.50
Thapar University, Punjab	TU	Punjab	465	66	14.19
Bharathiar University, Coimbatore	BU	Tamil Nadu	462	115	24.89
Annamalai University	Annamalai University	Tamil Nadu	444	104	23.42
Indian Association for The Cultivation of Science Jadavpur	IACS	West Bengal	430	190	44.19
Ministry of Earth Sciences, India	MOES	Delhi	414	151	36.47

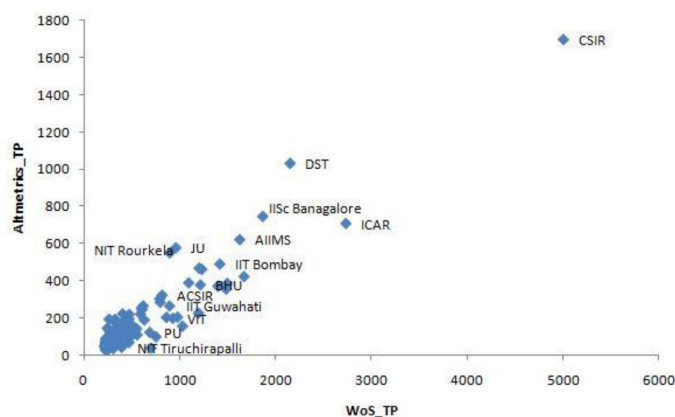
Table 1: Cont'd.

Institution	Abbr.	State	Total Papers (WoS)	Papers covered in altmetrics	Coverage %
Institute of Chemical Technology, Mumbai	ICT Mumbai	Maharashtra	403	83	20.60
Amity University, Noida	Amity	Uttar Pradesh	399	124	31.08
National Institute of Mental Health and Neurosciences, Bengaluru	NIMHANS	Karnataka	399	221	55.39
Indian Institute of Science Education Research, Pune	IISER Pune	Maharashtra	396	175	44.19
Indian Statistical Institute, Kolkata	ISI	West Bengal	395	133	33.67
Sanjay Gandhi Postgraduate Institute of Medical Sciences	SGPGI	Uttar Pradesh	394	127	32.23
Indira Gandhi Centre for Atomic Research	IGCAR	Tamil Nadu	391	43	10.99
CSIR Central Drug Research Institute, Lucknow	CSIR-CDRI	Uttar Pradesh	389	173	44.47
Guru Nanak Dev University, Amritsar	GNDU	Punjab	387	90	23.26
National Institute Technology Tiruchirappalli	NIT Tiruchirappalli	Tamil Nadu	387	41	10.59
Jamia Millia Islamia	JMI	Delhi	382	133	34.82
National Institute of Pharmaceutical Education Research, Mohali	NIPER	Punjab	372	149	40.05
Visva Bharati University	VB	West Bengal	355	71	20
Indian Institute of Engineering Science Technology, Shibpur	IEST Shibpur	West Bengal	341	55	16.13
Shanmugha Arts Science Technology Research Academy	SASTRA	Tamil Nadu	332	111	33.43
Indian Institute of Technology, Indore	IIT Indore	Madhya Pradesh	331	146	44.11
Jawaharlal Nehru Center for Advanced Scientific Research	JNCASR	Tamil Nadu	326	173	53.07
Indian Institute of Science Education Research, Kolkata	IISER Kolkata	West Bengal	320	191	59.69
Bharathidasan University, Tiruchirappalli	BDU	Tamil Nadu	317	115	36.28
University of Madras	UNoM	Tamil Nadu	317	88	27.76
Osmania University, Hyderabad	OU	Telangana	313	62	19.81
Indian Space Research Organization, Bengaluru	ISRO	Karnataka	310	82	26.45
National Institute of Science Education Research, Bhubaneswar	NISER	Odisha	307	130	42.35
National Physical Laboratory India	NPL	Delhi	301	82	27.24
Sri Venkateswara University, Tirupati	VU	Andhra Pradesh	300	33	11
Jamia Hamdard University	JHU	Delhi	294	108	36.74
Tezpur University	TzU	Assam	293	72	24.57
Pondicherry University	PDU	Tamil Nadu	292	83	28.43
Indian Institute of Technology, Hyderabad	IIT Hyderabad	Telangana	286	93	32.52
Shivaji University, Kolhapur	Unishivaji	Maharashtra	285	52	18.25
Amrita Vishwa Vidyapeetham University, Coimbatore	AMRITA	Tamil Nadu	284	95	33.45
King Georges Medical University, Lucknow	KG MU	Uttar Pradesh	272	115	42.28
Indian Institute of Chemical Biology, Kolkata	IICB	West Bengal	262	128	48.86
Indian Institute of Science Education Research, Bhopal	IISER Bhopal	Madhya Pradesh	261	102	39.08
Indian Council of Medical Research	ICMR	Delhi	257	135	52.53
Public Health Foundation of India	PHFI	Delhi	257	192	74.71
ICAR National Dairy Research Institute	ICAR-NDRI	Haryana	251	49	19.52
ICAR Indian Veterinary Research Institute	ICAR-IVRI	Uttar Pradesh	247	85	34.41
Visvesvaraya National Institute of Technology Nagpur	VNIT	Maharashtra	247	28	11.34
Birla Institute of Technology Mesra	BIT Mesra	Jharkhand	240	47	19.58
Physical Research Laboratory, India	PRL	Gujrat	239	143	59.83
University of Allahabad	UOA	Uttar Pradesh	232	65	28.01
Homi Bhabha National Institute	HBNI	Maharashtra	228	91	39.91
Madurai Kamaraj University	MKU	Tamil Nadu	228	69	30.26
Jawaharlal Institute of Postgraduate Medical Education Research	JIPMER	Tamil Nadu	225	84	37.33

Continued...

Table 1: Cont'd.

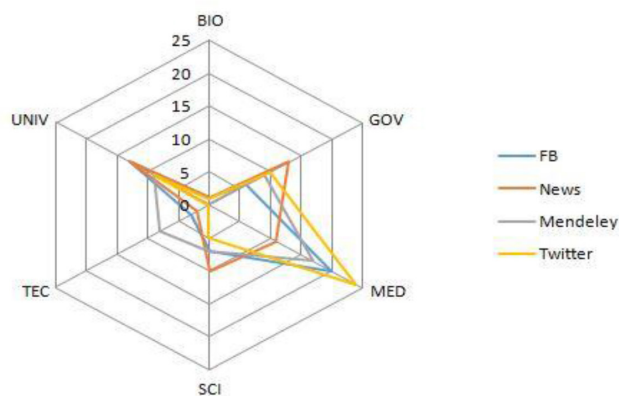
Institution	Abbr.	State	Total Papers (WoS)	Papers covered in altmetrics	Coverage %
University of Mysore	UOM	Karnataka	225	63	28
University of Kashmir	UOK	Jammu and Kashmir	224	78	34.82
Andhra University	AU	Andhra Pradesh	222	51	22.97
National Institute of Technology, Durgapur	NIT Durgapur	West Bengal	220	37	16.82
Alagappa University, Karaikkudi	Alagappa University	Tamil Nadu	218	69	31.65
Cochin University Science Technology	CUST	Kerala	217	41	18.89
Maharaja Sayajirao University, Baroda	MSUB	Gujrat	217	56	25.81
Sardar Vallabhbhai National Institute of Technology	SVNIT	Gujrat	217	27	12.44
Kalyani University	KU	West Bengal	213	46	21.59
National Institute of Technology Karnataka	NITK	Karnataka	213	46	21.59



**Figure 1:** Plot of Different Institutions on Total Papers vs Total Altmetric Mentions.

among large producers, CSIR stands tall with a good number of its papers getting mentioned in social media platforms. ICAR stands next to DST in social media coverage despite having higher output than DST. Among smaller institutions, NIT Rourkela, Jadavpur University get better social media coverage than other institutions. Among moderate sized institutions, IISc Bangalore, AIIMS New Delhi, IIT Bombay, BHU have reasonable social media coverage of their articles.

Since significant variations in social media attention of articles from institutions are seen, we tried to find out if institutions located in big metropolitan cities are able to get more social media attention of their research as compared to other institutions. First of all, all institutions in a particular state were clubbed together to find out which state has higher social media attention. It was observed that Delhi contributes 31.59% of total records in the data. In terms of social media attention, Delhi has highest share of 35.2% papers getting social media attention. States of Tamil Nadu, Maharashtra and West Bengal each account for 12.8%, 11.30% and 10.34% papers, respectively in the data. In terms of social media coverage, Maharashtra and Delhi performs better. Analyzing the data



**Figure 2:** Institution type distribution of 50 top referred papers in altmetric.com

further, it can be seen that there is no definite pattern indicating that institutions in big metropolitan cities get higher social media attention of their research, as seen in institutions located in cities like Mumbai, Hyderabad, Chandigarh that do not get any location advantage in terms of social media attention. However, there appears to be a little bit higher coverage for some institutions located in metropolitan cities, particularly in Delhi. On the other hand, the disciplinary variation looks like a more important factor in social media attention level. It is observed that research output in some disciplines get higher social coverage.

The institutions that are part of the analysis are categorized further into different types based on their overall nature and role. We use category of UNIV for multidisciplinary University, MED for a Medical College, GOV- for a government department or organization, BIO- for a biological sciences research institute, TEC- for a technological institution, and SCI- for a general-purpose scientific research institution. Figure 2 shows a radar chart for top 50 papers as per their social media attention counts into institution categories, as proposed above. It is observed that the top papers in social media atten-



The results obtained may have important inferences and implications for scholarly research output of Indian institutions. *First*, Indian institutions, in general, do not have an institutional or a formal mechanism to promote dissemination of research articles in social media platforms. Though some of the institutions are now formally registering their presence on social media platforms but these largely remain as individual examples. On the contrary, majority of the institutions in developed countries are now actively using social media platforms for different purposes. An institutional mechanism put in place in our institutions can significantly help in wider dissemination of research outputs of our institutions. *Secondly*, researchers in Indian institutions are not actively submitting pre- or post-print versions of their research papers in institutional or disciplinary repositories, which help in removing the access barriers to research. It is well-established that research articles that are open access get much higher impact- both citation and altmetric. Therefore, an incentive mechanism may be created to promote researchers to submit their papers in institutional and/ or disciplinary repositories. *Thirdly*, lower social media visibility of research output of Indian institutions may also be an indicator that Indian institutions are perhaps either not engaging in research work on frontier problems or problems that are directly related to society. This is particularly because of the fact that previous studies have established that research results that are either directly related to society or those representing a breakthrough in the area, get much higher social media attention. Therefore, our science policy has to be more prescriptive in specifying national priorities and research challenges directly related to society. It could be concluded from this study that much more needs to be done for higher social media attention of research output of Indian institutions.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## REFERENCES

- Peters I, Kraker P, Lex E, Gumpenberger C, Gorraiz J. Research data explored: an extended analysis of citations. *Scientometrics*. 2016;107(2):723-44.
- Shema H, Bar-Ilan J, Thelwall M. Do blog citations correlate with a higher number of future citations? Research blogs as a potential source for alternative metrics. *Journal of the Association for Information Science and Technology*. 2014;65(5):1018-27.
- Thelwall M. Interpreting correlations between citation counts and other indicators. *Scientometrics*. 2016;108(1):337-47.
- Sotudeh H, Mazarei Z, Mirzabeigi M. CiteULike bookmarks are correlated to citations at journal and author levels in library and information science. *Scientometrics*. 2015;105(3):2237-48.
- Thelwall M. Early Mendeley readers correlate with later citation counts. *Scientometrics*. 2018;115(3):1231-40.
- Thelwall M, Kousha K. ResearchGate versus Google Scholar: Which finds more early citations?. *Scientometrics*. 2017;112(2):1125-31.
- Thelwall M, Nevill T. Could scientists use Altmetric.com scores to predict longer term citation counts?. *Journal of Informetrics*. 2018;12(1):237-48.
- Costas R, Zahedi Z, Wouters P. Do "altmetrics" correlate with citations? Extensive comparison of altmetric indicators with citations from a multidisciplinary perspective. *Journal of the Association for Information Science and Technology*. 2015;66(10):2003-19.
- Das AK, Mishra S. Genesis of Altmetrics or Article-level Metrics for Measuring Efficacy of Scholarly Communications: Current Perspectives. *Journal of Scientometric Research*. 2014;3(2):82-92.
- Chen K, Tang M, Wang C, Hsiang J. Exploring alternative metrics of scholarly performance in the social sciences and humanities in Taiwan. *Scientometrics*. 2015;102(1):97-112.
- Cho J. A comparative study of the impact of Korean research articles in four academic fields using altmetrics. *Performance Measurement and Metrics*. 2017;18(1):38-51.
- Holmberg K, Woo H. An altmetric investigation of the online visibility of South Korea-based scientific journals. *Scientometrics*. 2018;117(1):603-13.
- Bangani S. The impact of electronic theses and dissertations: a study of the institutional repository of a university in South Africa. *Scientometrics*. 2018;115(1):131-51.
- Liu Y, Lin D, Xu X, Shan S, Sheng QZ. Multi-views on Nature Index of Chinese academic institutions. *Scientometrics*. 2018;114(3):823-37.
- Shu F, Lou W, Haustein S. Can Twitter increase the visibility of Chinese Publications?. *Scientometrics*. 2018;116(1):505-19.
- Teixeira da Silva JA. Does China need to rethink its metrics- and citation- based research rewards policies?. *Scientometrics*. 2017;112(3):1853-7.
- Lepori B, Thelwall M, Hafeez B. Which US and European Higher Education Institutions are visible in ResearchGate and what affects their RG score?. *Journal of Informetrics*. 2018;12(3):806-18.
- Banshal SK, Singh VK, Kaderye G, Muhuri PK, Sánchez BP. An altmetric analysis of scholarly articles from India. *Journal of Intelligent and Fuzzy Systems*. 2018a;34(5):3111-8.
- Banshal SK, Basu A, Singh VK, Muhuri PK. Scientific vs. Public Attention: A Comparison of Top Cited Papers in WoS and Top Papers by Altmetric Score. *Proceedings of AROSIM 2018-Communications in Computer and Information Science Springer*. 2018b;856:81-95.
- Banshal SK, Singh VK, Muhuri PK, Mayr P. How much Research Output from India gets Social Media Attention?. *Current Science*. 2019;117(5):753-60.
- Rupika, Uddin A, Singh VK. Measuring the university-industry-government collaboration in Indian Research Output. *Current Science*. 2016;110(10):1904.