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Scientometric analysis of global publication output on “Ladakh” in Web of Science (1989-2018)

Abstract: The present study is aimed to explore the research trend on Ladakh for the past 30 years using the popular Indexing database “Web of Science”. A total of 561 research publications were found indexed by the Web of Science contributed by as many as 1106 authors, 462 institutions/organizations, 30 nations which appear in 261 journals in three languages and in 15 different document types. This research paper analyses the research productivity chronologically, nation wise, author wise, language wise, preferred journals and organization/institution wise for the period of 30 year (1989-2018).

Keywords: Ladakh; Kargil; Drass; web of science

Introduction: Ladakh is a cold Himalayan desert which is spread from Zojila pass and Drass region to Nobra Valley, Galwan Valley-Changthang and Zaskar. Ladakh is spread over two districts; Leh and Kargil. Ladakh shares its geographical boundary with Kashmir, Jammu, Himachal Pradesh and China. Ladakh most popularly known as the “Moon Land” is habitat for its rich wildlife, medicinal plants and geological features.

Review of related literature:

¹**Bhattacharya, S., & Shilpa, S. (2011)** in an analysis of Nanotechnology literature of the nation found that most of the publications appeared in Journal of Nanoscience and Nanotechnology followed by Journal of Applied physics and Applied Physics Letters for the study period of 200-2009. IISC Bangalore, IIT Kharakpur and National Chemical Laboratory are the three top institutions contributing 1004, 830 and 734 publications on nanotechnology respectively. Iran ranks 1st in the list of most contributing asian nation followed by Singapore and Thailand during the study period. ²**Dutt & Nikam, (2015)** studied collaboration pattern in solar cell research and revealed that 80% of the total publications were from a single country while as 16% publications were collaborated bilaterally followed by 3% multi collaborations. The study suggests that 12 countries produced as much as 75% of the total publications. ³**Gautam & Mishra, (2015)** studied the authorship pattern of Banaras Hindu University and found that for the study period most of the publications are authored by 3-4 authors followed by 2 author publications. The authors also studied the collaboration with institution of other states of India and found that the highest number of collaborations are with the institutions of Delhi (5.3%) followed by Maharashtra (3.1%) and Andhra Pradesh (2.9%). Study of Institution specific collaboration revealed that Indian Agricultural Research Institute (IARI) ranked 1st with 1.63% of papers in collaboration with Banaras Hindu University followed by Jawaharlal Nehru Krishi Vishwavidyalaya (JNKV) and Udai Pratap College (UPC) 1.05%. ⁴(**Khiste & Amanullah, 2017**) did scientometric analysis of knowledge management output by harvesting data from Web of Science for ten years period from 2007-2016. The authors found that there are 6084 documents published during the study period and the highest no of publications are produced in 2016. The authors found that the highest number of publications produced on knowledge management belongs to business economics subject amounting to 2334. They also analysed the prolific journals in which the publications occurred and found that highest number of publications appeared in Journal of Knowledge Management (384) followed by Knowledge Management Research Practice (248) and Expert System With Applications (156). The analysis by country wise show that USA is ranked first followed by England and Spain. ⁵(**Amanullah & Khiste, 2018**) studied the productivity on e-learning using scopus database. They found that from the

year 2003 to 2017 a total number of 11948 publications appeared in 13 types of documents where the conference proceedings include 51.78 % of articles. The authors revealed that the rank of United Kingdom is 1 followed by USA in research productivity on e-learning. The study also pointed out that research on e-learning is done in a number of subjects where computer science tops the list followed by social science, engineering and mathematics. ⁶(Gupta & Dhawan, 2019) analysed the publication and “growth of electronic resources in libraries during 1994-2017” and found that 2086 publications of which 25.31% of publication appeared as electronic books followed by 23.87 as electronic journals. India ranks 3rd preceded by UK and USA. The authors also studied the distribution of citation and publication by broad subject area. ⁷(Amanullah, Seethai, Sadik Batcha, et al., 2019) studied the research performance of “Sher-e-Kashmir University of Agricultural Science and Technology, Kashmir (SKAUST-K)” and revealed that 1423 publications are produced during the period of 2004-2018 which have got 997 citations. Dar Z A, Mir S A and Mir MA are among the prolific authors with first, 2nd and 3rd ranks in total publication output. Interestingly Mir M S got the highest citation density of 2.401 seconded by Wani SA with a citation density of 2. The authors revealed that highest number of publications are produced in the field of agricultural science which also have got highest number of citations. ⁸(Gupta & Ahmed, 2019) in a study regarding publication productivity and scientometric trend of *Withania somnifera* found that most of the publications appeared as articles which counts to 80.13%. The authors found that India as a nation has contributed highest number of publications on *Withania somnifera* counting to 70.42% followed by USA (11.35) and Pakistan (4.03). The authors studied the prolific institutions contributing to *Withania somnifera* research and found that Central Institute of Aromatic & Medicinal Plants, Lucknow, India has contributed highest number of publications followed by National Botanical Research Institute, Lucknow, India and Banaras Hindu University, Varanasi, India. ⁹(Amanullah, Seethai, & Batcha, 2019) analysed the research trend of university of Kashmir and University of Jammu by way of comparison. The analysis shows that University of Jammu have produced more publication than university of Kashmir. It showed that 271 articles are cited out of 1064 for university of Jammu and 198 articles are cited out of 915 for University of Kashmir. The highest number of publications comes in Biological Science subject for both the universities. ¹⁰(Bapte, 2020) in a scientometric analysis of growth of Information Literacy literature found that for the study period of 1975-2019, 7070 publications are produced with the highest number of publication in the three year period of 2014-2017 and the highest H-index is for the three year period of 2005-2007. The study revealed that Communications in Computer and Information Science is the most preferred journal for publication of literature on Information Literacy with 380 publications and 455 citations followed by Reference Services Review 316 publications and 3253 citations and Journal of Academic Librarianship with 205 publications and 3416 citations. Of the subject wise distributions of the literature on information literacy the authors found that most of the publications belong to the subject of social science followed by computer science, medicine and engineering. By country the authors found that highest publications came from USA followed by United Kingdom, Australia, Canada and Spain. India doesn't figure in the top 10 most productive nations. ¹¹(Ahmad & Batcha, 2020) in a Scientometric study related to Alopecia Areata Disease found that as many as 48.52% of publications on Alopecia Areata Disease is published as articles while as 20% appeared in meeting abstracts. The authors observed that from the year 2010-2019 the highest no of publications appeared in 2019 counting to 335 though the growth rate 56% for 2013 was the highest.

Research Methodology:

The research is purely based on the data harvested from one of the largest Indexing and abstracting database “Web of Science”. The data is extracted from the core collection of the Web of Science database. The search term used is Ladakh and the search was limited to “In titles”. The data is then interpreted in the form of tables, bar diagrams and graphs etc using different available tools like Histcite, MS Excel and MS Word etc.

Objectives: this study is aimed to find out the exposure of Ladakh to the researchers and the institutions worldwide. The specific aim of this research work is:

1. To find out global publication productivity on from 1989-2018.
2. To find out the organization wise publication productivity on Ladakh.
3. To find out the nation wise research performance on Ladakh.
4. To know the most productive authors.
5. To find out the Journal preferred for publishing research output on Ladakh.
6. To analyze the language in which the publications on Ladakh appeared.
7. To know the document type preferred for publishing.

Findings and discussions:

1. **Chronological publication productivity on Ladakh:** In accordance with the objectives of the study the chronological publication output is analyzed. The data in the table-1 shows the chronological research output on Ladakh, The study shows that the pace of research publication output has consistently increased from 1980’s to 2018. The total publication on Ladakh is 562 during the study period. The highest publications (39) are produced in the year 2017 contributing to 6.9% of the total. The least publication appears in the year 1993 (0.7%). Total of 1340 local citation score and 8449 global citation score is found for the study period. The highest TLCS is found for the year 2000 with 113 citation score and TGCS is found for the year 2004 with 774 score. The analysis shows that considerable citation score is found for the study period.

Table-1 (Publication productivity and citation score chronologically)

S. No	Publication Year	No of Publications	Percentage	TLCS	TGCS
1	1989	8	1.4	98	343
2	1990	11	2.0	50	164
3	1991	13	2.3	28	130
4	1992	13	2.3	0	53
5	1993	4	0.7	16	91
6	1994	10	1.8	40	114
7	1995	5	0.9	8	23
8	1996	10	1.8	31	90
9	1997	14	2.5	89	532

10	1998	9	1.6	17	113
11	1999	18	3.2	29	139
12	2000	14	2.5	113	451
13	2001	15	2.7	76	243
14	2002	18	3.2	50	501
15	2003	14	2.5	37	301
16	2004	17	3.0	102	774
17	2005	20	3.6	37	227
18	2006	25	4.4	67	504
19	2007	24	4.3	78	442
20	2008	21	3.7	82	567
21	2009	31	5.5	86	649
22	2010	24	4.3	43	352
23	2011	32	5.7	76	542
24	2012	27	4.8	24	294
25	2013	24	4.3	22	148
26	2014	29	5.2	16	211
27	2015	19	3.4	10	130
28	2016	29	5.2	8	190
29	2017	39	6.9	7	86
30	2018	25	4.4	0	45
	Total	562	100	1340	8449

2. Organization wise publication productivity on Ladakh: the present study explores the number of institutions involved in research on Ladakh. As many as 462 premiere institutions and as many as 670 departments including the departments of the institutions have made research on Ladakh. The proportion of foreign institutions is as good as the institutions of our country. Data in table-2 shows the top 20 most productive institutions and is in the descending order. As many as 60 publications were comes from Wadia Institute of Himalayan Geology which accounts to 10.7% of the total publication and is followed by Kumaun University , Jammu University and Indian Institute of technology. Some famous institutions like Oxford University, University of Edinburg,

Table-2 (Organization/Institution wise publication productivity on Ladakh)

S. No	Institution	Publications	Percentage	TLCS	TGCS
2	Wadia Institute of Himalayan Geology	60	10.7	145	592
3	Kumaun University	22	3.9	52	291
4	University of Jammu	17	3.0	16	119
5	Indian Inst Technology	15	2.7	61	330
6	Birbal Sahni Institute of Paleobotany	14	2.5	66	262
7	University Oxford	14	2.5	114	803
8	University Edinburgh	12	2.1	104	401
9	University Delhi	11	2.0	39	129
10	Geol Survey India	10	1.8	32	99
11	National Geophysics Research Institute	10	1.8	30	299
12	University Grenoble 1	10	1.8	63	375
13	DRDO	9	1.6	12	101
14	Australian National University	8	1.4	85	279
15	Def Res & Dev Org	8	1.4	4	44
16	Monash University	8	1.4	29	201
17	Wildlife Inst India	8	1.4	30	150
18	Def Inst High Altitude Res	7	1.2	2	17
19	Indian Institute of Astrophysics	7	1.2	16	391
20	Kyoto University	7	1.2	2	39

- 3. Nation wise publication productivity on “Ladakh”:** The analyses suggest that 53% of total publications is being produced by India and is the leading nation amongst all the global nations. A total of 298 documents is being produced by India during the last 30 years on “Ladakh”. India is followed by USA, UK and Australia with 11%, 10.7% and 4.6% of contributions. It’s interesting to note that of more than 30 nations contributing on “Ladakh”, 98.7% of the total publications is shared by the top ten nations of the world. India tops the list in total local citation score and total global citation score followed by UK and then USA and France in TGCS index.

Table-3 (Nation wise global publication trend on Ladakh)

S.No	Country	Documents	Percentage	TLCS	TGCS
1.	India	298	53.0	567	3447
2.	USA	62	11.0	135	1401
3.	UK	60	10.7	313	1899
4.	Australia	26	4.6	158	597
5.	France	26	4.6	200	1313
6.	Japan	24	4.3	53	431
7.	Switzerland	17	3.0	117	780
8.	Canada	15	2.7	23	309
9.	Germany	15	2.7	53	512
10.	Italy	12	2.1	30	209
11.	Total	555	98.7	1649	10898

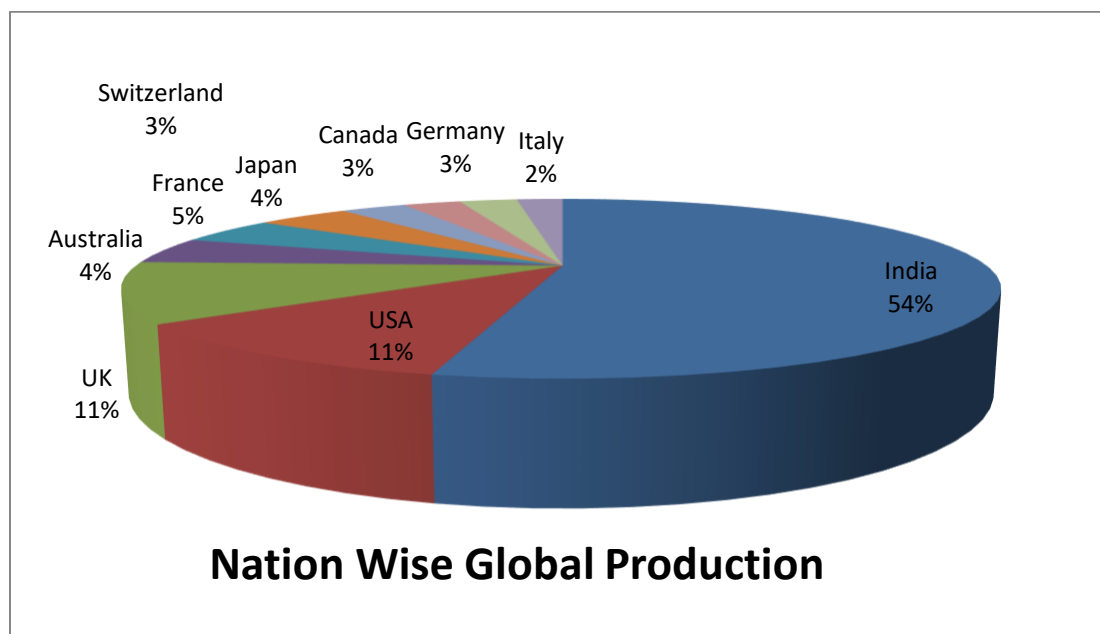


Fig-1

4. Author wise publication productivity: Table-4 analysis the author wise publication performance on “Ladakh”. A total of 1106 authors have contribute their publication on Ladakh in the last 30 years out of which 248 authors have contributed two or more than two publications. Upadhyay R, tops the list with 18 publications followed by Singh SB, Sachan HK and Searle MP with 15, 14 and 14 publications respectively. The analysis shows that interestingly Guillot S ranking 14th in the publication productivity has got the

second highest total global citation score of 631 preceded by Searle MP with 775 total global citation score.

Table 4 (Author wise publication productivity on Ladakh)

S. NO	Author	Publications	TLCS	TGCS
1	Upadhyay R	18	92	212
2	Singh SB	15	13	158
3	Sachan HK	14	44	247
4	Searle MP	14	133	775
5	Ahmad T	13	54	185
6	Srivastava RB	12	4	68
7	Stobdan T	12	7	87
8	Norboo T	11	10	116
9	Rao DR	11	18	63
10	Kumar S	10	9	43
11	Rai H	10	21	66
12	Ahmed Z	9	8	118
13	Phillips RJ	9	74	350
14	Guillot S	8	79	631
15	Masclé G	8	81	399
16	Mukherjee BK	8	23	171
17	Sen K	8	19	40
18	Chaurasia OP	7	10	185
19	Corfield RI	7	73	540
20	Dwivedi SK	7	6	32

- 5. Preferred journal for publications:** the table-5 & fig.-2 depicts the top ten journals that are preferred for publication of scholarly communication on Ladakh. The research publications appeared in as many as 261 journals. The data in the table suggests some publication trends as far as subject is concerned. Most of the research on Ladakh is done in the field of earth science. In the list of journals the Current Science remained the first priority of the researchers in which 48 publications appeared and is followed by journal of geological society of India, Tectonophysics and Indian journal of animal science with 32, 16 and 15 publications each.

Table 5 (Journal wise publication productivity on Ladakh)

S. No	Journal	Publications	TLCS	TGCS
1	CURRENT SCIENCE	48	102	316
2	JOURNAL OF THE GEOLOGICAL SOCIETY OF INDIA	32	66	208
3	TECTONOPHYSICS	16	130	506
4	INDIAN JOURNAL OF ANIMAL SCIENCES	15	5	23
5	JOURNAL OF ASIAN EARTH SCIENCES	13	79	352
6	JOURNAL OF THE GEOLOGICAL SOCIETY	13	94	448
7	INDIAN JOURNAL OF TRADITIONAL KNOWLEDGE	11	14	62
8	ECONOMIC AND POLITICAL WEEKLY	10	0	2
9	HIMALAYAN GEOLOGY	10	3	10
10	LITHOS	8	41	155

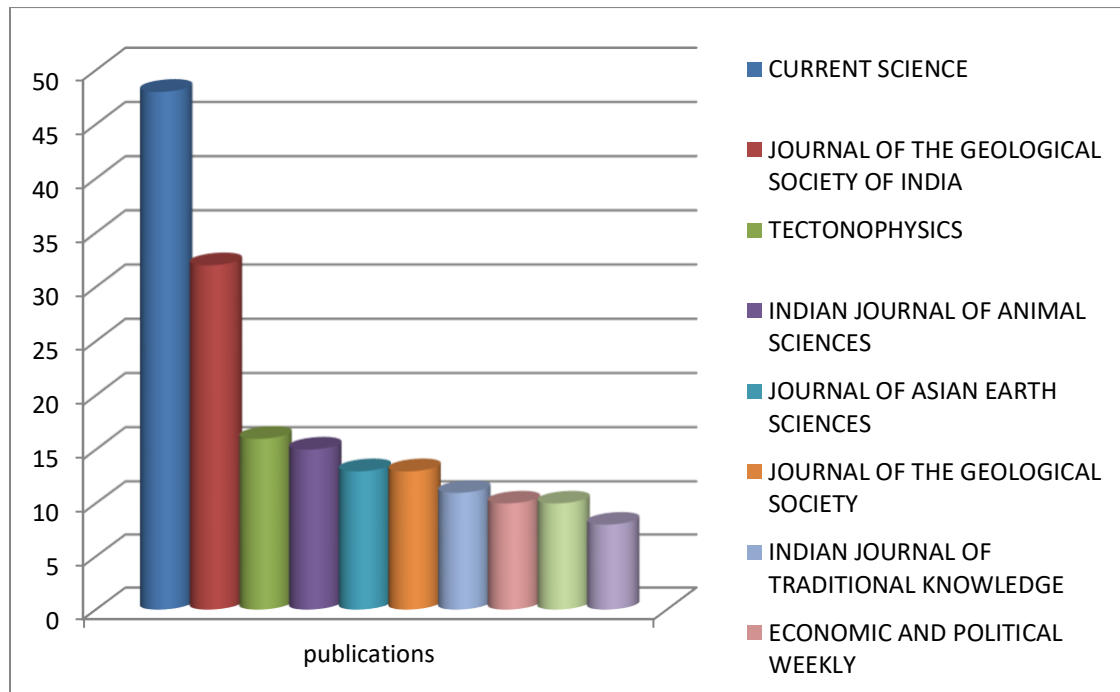


Figure-2

6. **Analysis of preferred languages of publications on Ladakh:** The table-6 depicts the languages in which the publications appeared. The highest number of publications

appeared in English language which contributes to 97.3% of the total publications followed by French and German.

Table 6 (Language wise publication productivity)

S. No	Language	Documents	Percentage	TLCS	TGCS
1	English	547	97.3	1315	8396
2	French	8	1.4	25	53
3	German	7	1.2	0	0
4	Total	562	99.9		

7. **Analysis of publications on “Ladakh” as per document type:** the table-7 shows the preferred document type for publishing. The publications appeared in as many as 15 different types of documents which is ranked first by research articles and last by TV and Radio reviews. Analysis of document type suggests that the highest number of documents have appeared as articles contributing to 72.8% of the total publications and is followed by book reviews ad editorial materials.

Table-7 (Analysis by document type)

S. No	Document Type	Documents	Percentage	TLCS	TGCS
1	Article	409	72.8	1156	7444
2	Book Review	57	10.1	0	2
3	Editorial Material	21	3.7	11	35
4	Article; Proceedings Paper	16	2.8	95	492
5	Letter	16	2.8	6	22
6	Review	16	2.8	67	436
7	Meeting Abstract	11	2.0	0	0
8	Correction	4	0.7	0	0
9	Note	4	0.7	3	15
10	News Item	3	0.5	2	3
11	Discussion	1	0.2	0	0
12	Poetry	1	0.2	0	0

13	Record Review	1	0.2	0	0
14	Reprint	1	0.2	0	0
15	TV Review, Radio Review	1	0.2	0	0
		562	99.9		

Conclusion: the study is based on the data extracted from the Web Of Science database and the scope of the study is limited to the research productivity on “Ladakh” indexed by the Web of Science. The data and analysis suggest that consistent research is being carried out on “Ladakh” in the past. The analysis found that “Ladakh” being a Himalayan desert attracted many researchers from the field of geology, geophysics, and tectonics as well as from the field of plant science. Most of the research contribution has come from India. Current science has emerged as the most preferred journal for publication of on Ladakh. The highest number of publications appears in the form of research articles and English is the most preferred language used by the researchers.

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