

Intellectual output of the SRTM University indexed in the Web of Science

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Abstract

Teaching, research and extension are the fundamental duties of the university. These activities, research in particular, generate research outcome which is the intellectual output of the university. This year, Swami Ramanand Teerth Marathwada University has celebrated its silver jubilee year. This paper presents analysis of intellectual output of the Swami Ramanand Teerth Marathwada University in the last twenty five years as represented in the Web of Science.

Keywords: SRTMU, Research productivity, Web of Science, Intellectual output.

Introduction

Research output of a university is one of the effective measures in evaluating the efficacy of a Higher Education Institution as a space for higher learning, apart from other criteria such as teaching methodologies adopted, performance of the students, their placements, etc. According to the index published by the Nature (2019), India stands at 12th position in the world raking in terms of its research output for the current year. The Times Higher Education World University Rankings 2020 published recently (Economic Times, 2019), contained a list of 56 Indian institutions among the top world institutions, a raking based on citation impact score, improvements in research and teaching environment and industry income. However, quite dishearteningly, not a single Indian university could make up to the top 300 list. While premier institutions like, IISc, IITs take lion's share in the India's research contribution, even the conventional universities established with a primary mandate to provide access to higher education to one and all such as the SRTMUN, are also not lagging behind and are contributing significantly to the research wealth of the country. This paper describes the research output of the SRTMUN as published in research journals indexed in the Web of Science as a measure to evaluate the intellectual output of the university in the past twenty five years.

Definitions of key concepts

Intellectual output

Research articles authored by the researchers for publication in reputed research journals.

SRTMU

The university that was established on 17th September 1994 in Nanded after bifurcating the then Marathwada University and which is recognized by the UGC under 12(b) and 2(f) catering to the educational needs specifically to the districts of Nanded, Latur, Parbhani and Hingoli. The university is re-accredited as "A" grade University by NAAC.

Web of Science: is a publisher-independent global citation database with a powerful research engine. It has a collection of over 1.7 billion cited references from over 159

million records gathered from over 9,000 leading academic, corporate and government institutions and contributions from millions of researchers.

Objectives of the paper

1. To review growth in intellectual output of the SRTM University.
2. To compare intellectual output of the university campus schools.
3. To rank the university campus teachers based on their publications.
4. To verify authorship pattern and calculate degree of collaboration.
5. To prepare rank list of highly cited papers.

Hypothesis

1. There is continuous growth in publications of the university.
2. Science schools are more productive in publications.
3. More number of teachers publish their papers in collaboration.

Methodology

The research method applied for the present paper is descriptive and survey. Data is collected from the web of science online database and analyzed with the help of MS-Excel.

Scope and Limitations

The study covers entire publication output of the Swami Ramanand Teerth Marathwada University teachers in the last twenty five years as covered by the Web of Science.

Growth in intellectual output

When Swami Ramanand Teerth Marathwada University was established on 17th September 1994, there were very few teachers in the campus. It took two to three years for the university to well establish the schools, departments and appoint the faculty. Table 1 shows growth in the intellectual output of the university since its establishment.

Table 1: Growth in intellectual output

Year	No. of Publications	Cumulative	Percentage papers	Rank
Y 1994	0	0	0.00	20
Y 1995	0	0	0.00	20
Y 1996	0	0	0.00	20
Y 1997	0	0	0.00	20
Y 1998	7	7	1.15	18
Y 1999	6	13	0.99	19
Y 2000	16	29	2.63	12
Y 2001	14	43	2.30	14
Y 2002	7	50	1.15	18
Y 2003	7	57	1.15	18
Y 2004	9	66	1.48	17
Y 2005	6	72	0.99	19
Y 2006	19	91	3.13	11
Y 2007	15	106	2.47	13
Y 2008	20	126	3.29	10
Y 2009	12	138	1.97	16
Y 2010	26	164	4.28	9
Y 2011	32	196	5.26	8
Y 2012	47	243	7.73	5
Y 2013	39	282	6.41	7
Y 2014	44	326	7.24	6
Y 2015	54	380	8.88	4
Y 2016	71	451	11.68	2
Y 2017	68	519	11.18	3
Y 2018	76	595	12.50	1
Y 2019	13	608	2.14	15
	608		100	

It can be observed from the table and figure that there were no publications in first four years since 1994 to 1997. It took over four years for the university to begin its contribution to the body of knowledge. The First paper published in a Web of Science indexed journal was in 1998. In that year alone, 76 papers were published, followed by 71 in 2016 and 68 in the year 2017, with an average of 24.32 papers published per year. It took about 21 years to publish 53.62 % of total number of papers published, whereas rest of the 46.38% papers were published in just five years. It may be observed that the growth rate of publications improved significantly after 2010. Hence the first hypothesis, "There is continuous growth in publications of the university" accepted.

School wise intellectual output

Since its inception, Swami Ramanand Teerth Marathwada University adopted School system for knowledge dissemination instead of departments. There are fourteen Schools in campus Viz. School of Chemical Sciences, Life Sciences, Physical Sciences, Interdisciplinary, Media studies, Mathemetiactal Sciences, Computer Sciences, Commerce & Management, Language, Literature & Culture studies, Social sciences, Pharmacy. There are schools in university sub campus at Latur also. The School wise distribution of papers is shown in table 2. There were 608 papers on Web of Science published by the authors from Swami Ramanand Teerth Marathwada University.

Table 2: School wise distribution of Intellectual output

S. No	School	No. of Papers	Cumulative	% papers	% Cumulative	Rank
1	Chemical	217	217	35.69	35.69	1
2	Physical	211	428	34.70	70.39	2
3	Life	102	530	16.78	87.17	3
4	Pharmacy	22	552	3.62	90.79	4
5	Earth	21	573	3.45	94.24	5
6	Mathematics	16	589	2.63	96.88	6
7	Computational	12	601	1.97	98.85	7
8	Social	5	606	0.82	99.67	8

9	Sub Center	2	608	0.33	100.00	9
		608		100.00		

School of Chemical Sciences ranks first with 217 (35.69%) papers. School of Physical Sciences (34.7%) and Life Sciences (16.78%) with 211 and 102 papers respectively and secured second and third rank. Two schools i.e. School of Chemical Sciences and Physical Sciences published 428(70.39%) papers. From the table it can be observed that 98.85% publications are from science schools, hence second hypothesis, "Science schools are more productive in publications" accepted.

Ranking of authors

Table 3

S. No	Authors	No. of papers	Cumulative	%	% Cumulative	Rank
1	Bandgar, BP	88	88	12.38	12.38	1
2	Mane, RS	78	166	10.97	23.35	2
3	Kumbharkhane, AC	57	223	8.02	31.36	3
4	Kamble, VT	37	260	5.20	36.57	4
5	Khobragade, CN	37	297	5.20	41.77	4
6	Gacche, RN	34	331	4.78	46.55	5
7	Deosarkar, SD	28	359	3.94	50.49	6
8	Dawane, BS	26	385	3.66	54.15	7
9	Chaudhari, A	24	409	3.38	57.52	8
10	Khairnar, RS	20	429	2.81	60.34	9
11	Puyad, AL	18	447	2.53	62.87	10
12	Mahabole, MP	13	460	1.83	64.70	11
13	Pathak, AP	12	472	1.69	66.39	12
14	Karade, NN	11	483	1.55	67.93	13
15	Muley, AA	11	494	1.55	69.48	13
16	Panaskar, DB	10	504	1.41	70.89	14
17	Yemul, O	10	514	1.41	72.29	14
18	Pinjari, RV	9	523	1.27	73.56	15
19	Kadam, TA	9	532	1.27	74.82	15
20	Patil, MK	9	541	1.27	76.09	15
21	Pawar, DD	9	550	1.27	77.36	15
22	Zubaidha, PK	8	558	1.13	78.48	16
23	Gattani, SG	8	566	1.13	79.61	16
24	Wagh, V. M.	8	574	1.13	80.73	16
25	Sarode, AV	7	581	0.98	81.72	17
26	Makone, SS	6	587	0.84	82.56	18
27	Bhosle, HJ	6	593	0.84	83.40	18
28	Gunturu, KC	6	599	0.84	84.25	18
29	Bogle, KA	6	605	0.84	85.09	18
30	Zore, GB	6	611	0.84	85.94	18
31	Sagar, AD	5	616	0.70	86.64	19
32	Bhalchandra, P	5	621	0.70	87.34	19
33	Surwase, BS.	5	626	0.70	88.05	19
34	VijayaKumar, K	4	630	0.56	88.61	20
35	Pandey, AK	4	634	0.56	89.17	20
36	Suryawanshi, SA	4	638	0.56	89.73	20
37	Gyananath, G	4	642	0.56	90.30	20
38	Barik, BC	4	646	0.56	90.86	20
39	Karuppayil, SM	4	650	0.56	91.42	20
40	Wankhede, DS	4	654	0.56	91.98	20
41	Patwekar, S	4	658	0.56	92.55	20
42	Ghole, VS	3	661	0.42	92.97	21
43	Tale, RH	3	664	0.42	93.39	21
44	Bhosle, AB	3	667	0.42	93.81	21
45	Chavan, SP	3	670	0.42	94.23	21

46	Butle, SR	3	673	0.42	94.66	21
47	Wadher, SJ	3	676	0.42	95.08	21
48	Jain, RS	3	679	0.42	95.50	21
49	Deshmukh, N	3	682	0.42	95.92	21
50	Chandra, S	2	684	0.28	96.20	22
51	Khamitkar, S	2	686	0.28	96.48	22
52	Mulani, RM	2	688	0.28	96.77	22
53	Fadewar, HS	2	690	0.28	97.05	22
54	Dhawale, SC	2	692	0.28	97.33	22
55	Humbe, VT	2	694	0.28	97.61	22
56	Choudhari, AL	2	696	0.28	97.89	22
57	Vidyasagar, PB	2	698	0.28	98.17	22
58	Kumar, P	1	699	0.14	98.31	23
59	Kaplay, RD	1	700	0.14	98.45	23
60	Patode, HS	1	701	0.14	98.59	23
61	Deshpande, UD	1	702	0.14	98.73	23
62	Yedekar, DB	1	703	0.14	98.87	23
63	Nimse, S	1	704	0.14	99.02	23
64	VijayKumar, T	1	705	0.14	99.16	23
65	Kodgire, VD	1	706	0.14	99.30	23
66	Shaikh, A. I.	1	707	0.14	99.44	23
67	Pekamwar, SS	1	708	0.14	99.58	23
68	Darkunde, N	1	709	0.14	99.72	23
69	Chowdhary, G.	1	710	0.14	99.86	23
70	Reddy, BS	1	711	0.14	100.00	23

Seventy teachers of the university have published at least one paper in the journal indexed by Web of Science. Professor Dr. B. P. Bandgar from School of Chemical Sciences (later on he served as a Vice Chancellor of the Solapur University) ranked first with 88(12.38%) papers followed by Professor Dr. R. S. Mane from School of Physical Sciences (10.97%) with 78 papers (Presently Director, Innovation, incubation) and Prof. A. C. Kumbharkhane (8.02%) with 57 papers ranked second and third respectively. Thirteen authors have written single paper. The number of authors with two, three or four paper contributions each is at eight.

There were 14 teachers each from School of Chemical and Life Sciences, 11 teachers from Physical Sciences, 7 teachers from Earth sciences, 6 teachers from Pharmacy, 5 teachers each from Computational sciences and Mathematics, 4 vice chancellors who wrote research papers in journals indexed in Web of Science.

Authorship pattern

Table 4

No. of authors	No. of Papers	Cumulative	Percentage	Cumulative percentage	Rank
Single	16	16	2.63	2.63	VIII
Two	118	134	19.41	22.04	II
Three	138	272	22.70	44.74	I
Four	117	389	19.24	63.98	III
Five	74	463	12.17	76.15	IV
Six	45	508	7.40	83.55	V
Seven	40	548	6.58	90.13	VI
Eight	32	580	5.26	95.39	VII
Nine	13	593	2.14	97.53	IX
Ten	11	604	1.81	99.34	X
Eleven	2	606	0.33	99.67	XI
Fifteen	2	608	0.33	100.00	XI
	608		100.00		

The papers under study have maximum 15 authors. Maximum 138(22.7%) papers are in collaboration with three authors, followed by 118(19.41%) papers in collaboration of two authors and 117 papers in collaboration of four authors. Only 16

(2.36%) papers are solo i.e. written by single author. Rest of the 592 (97.37%) papers are in collaboration. Hence the third hypothesis, "More number of teachers publish their papers in collaboration" accepted.

Degree of Collaboration

Numerous studies have been conducted in the past by various researchers to find the degree of collaboration and collaboration co-efficient. Subramanian (1983) enunciated the formula $C = \frac{Nm}{Ns + Nm}$, where C is the degree of collaboration, Ns is the number of single authored papers, Nm is the number of multi-authored papers. In the present case,

$$C = \frac{16}{16+592}$$

$$= \frac{16}{608}$$

$$= 0.02632$$

Hence the degree of collaboration of papers is 0.2632.

Highly cited papers (Top five ranks, 21 papers)

Citation is a general concept applied in research writing. It specifies the reference of the paper that has been read, referred by the researcher. The author analyzed and ranked papers under study as per their citations count.

Table 5

S. No	Title	Authors	Citations	Rank
1	Synthesis of polyhydroquinoline derivatives under aqueous media	Bandgar, B. P.; More, P. E.; Kamble, V. T.; Totre, J. V.	29	1
2	Null Structural Behavior of Alcohol-1,4-Dioxane Mixtures through Dielectric Properties Using TDR	Kumbharkhane, Ashok C.; Shinde, M. N.; Mehrotra, Suresh C.; Oshiki, Noriaki; Shinyashiki, Naoki; Yagihara, Shin; Sudo, Seiichi	29	1
3	Synthesis and biological screening of a combinatorial library of beta-chlorovinyl chalcones as anticancer, anti-inflammatory and antimicrobial agents	Bandgar, Babasaheb P.; Gawande, Shrikant S.	28	2
4	Ultra-sensitive polyaniline-iron oxide nanocomposite room temperature flexible ammonia sensor	Bandgar, D. K.; Navale, S. T.; Naushad, M.; Mane, R. S.; Stadler, F. J.; Patil, V. B.	28	2
5	A convenient method for the preparation of benzopyrano- and furoprano-2-isoxazoline derivatives using hypervalent iodine reagents	Das, B; Holla, H; Mahender, G; Venkateswarlu, K; Bandgar, BP	28	2
6	Coumarin Schiff-bases: As antioxidant and possibly anti-inflammatory agents	Gacche, RN; Gond, DS; Dhole, NA; Dawane, BS	28	2
7	Influence of Bi ³⁺ -doping on the magnetic and Mossbauer properties of spinel cobalt ferrite	Gore, Shyam K.; Mane, Rajaram S.; Naushad, Mu.; 8Jadhav, Santosh S.; Zate, Manohar K.; Alothman, Z. A.; Hui, Biz K. N.	28	2
8	In Vitro screening of tomato genotypes for drought resistance using polyethylene glycol	Kulkarni, Manoj; Deshpande, Uday	28	2
9	An ion exchange mediated shape-preserving strategy for constructing 1-D arrays of porous CoS _{1.0365} nanorods for electrocatalytic reduction of triiodide	Patil, Supriya A.; Shinde, Dipak V.; Lim, Iseul; Cho, Keumnam; Bhande, Sambhaji S.; Mane, Rajaram S.; Shrestha, Nabeen K.; Lee, Joong Kee; Yoon, Tae Hyun; Han, Sung-Hwan	28	2
10	Organic reactions in water: Transformation of aldehydes to nitriles using NBS under mild conditions	Bandgar, BP; Makone, SS	27	3
11	Purification and characterization of extracellular lipase from a new strain - pseudomonas aeruginosa srt 9	Borkar, Prita S.; Bodade, Ragini G.; Rao, Srinivasa R.; Khobragade, C. N.	27	3
12	Synthesis and antimicrobial activity of novel pyrazolo[3,4-d]pyrimidin derivatives	Khobragade, Chandras N.; Bodade, Ragini G.; Konda, Shankaraiyah G.; Dawane, Bhaskar S.; Manwar, Anand V.	27	3
13	Phytochemical and medicinal importance of Ginkgo biloba L.	Mohanta, Tapan Kumar; Tamboli, Yasinalli; Zubaidha, P. K.	27	3
14	Electrochemical supercapacitor development based on electrodeposited nickel oxide film	Navale, S. T.; Mali, V. V.; Pawar, S. A.; Mane, R. S.; Naushad, M.; Stadler, F. J.; Patil, V. B.	27	3
15	Interfacial Engineering Importance of Bilayered ZnO Cathode Buffer on the Photovoltaic Performance of Inverted Organic Solar Cells	Ambade, Rohan B.; Ambade, Swapnil B.; Mane, Rajaram S.; Lee, Soo-Hyoung	26	4

16	Montmorillonite K-10 catalyzed synthesis of beta-keto esters: condensation of ethyl diazoacetate with aldehydes under mild conditions	Bandgar, BP; Pandit, SS; Sadavarte, VS	26	4
17	Antioxidant and anti-inflammatory related activities of selected synthetic chalcones: Structure-activity relationship studies using computational tools	Gacche, Rajesh; Khsirsagar, Mansi; Kamble, Srikant; Bandgar, Babasaheb; Dhole, Nagesh; Shisode, Kavita; Chaudhari, Ajay	26	4
18	Naphthalenediimide amphiphile based colorimetric probe for recognition of Cu ²⁺ and Fe ²⁺ ions	Ghule, Namdev V.; Bhosale, Rajesh S.; Puyad, Avinash L.; Bhosale, Sheshanath V.; Bhosale, Sidhanath V.	26	4
19	Revisiting Metal Sulfide Semiconductors: A Solution-Based General Protocol for Thin Film Formation, Hall Effect Measurement, and Application Prospects	Shinde, Dipak V.; Patil, Supriya A.; Cho, Keumnam; Ahn, Do Young; Shrestha, Nabeen K.; Mane, Rajaram S.; Lee, Joong Kee; Han, Sung-Hwan	26	4
20	Synthesis and biological evaluation of beta-chloro vinyl chalcones as inhibitors of TNF-alpha and IL-6 with antimicrobial activity	Bandgar, Babasaheb P.; Patil, Sachin A.; Korbadi, Balaji L.; Nile, Shivraj H.; Khobragade, Chandrasekhar N.	25	5
21	VC3H3 organometallic compound: A possible hydrogen storage material	Wadnerkar, Nitin; Kalamse, Vijayanand; Chaudhari, Ajay	25	5

Conclusion

In the twenty five years of its noteworthy existence, Swami Ramanand Teertha Marathwada University Nanded has been able to contribute its might to the body of knowledge with significant contributions from its teachers and researchers. A spike in the research contributions is evident since 2010. The last five years have produced almost half of the overall research outputs of the university. It is also evident that collaborative authoring of the research papers is the choicest mode of authorship for most of the researchers. With its mission to achieve continuous excellence, the Swami Ramanand Teerth Marathwada University is all set to achieving new heights in the research outputs in the years to come.

Acknowledgement

The paper is a partial outcome of the Minor Research Project under title "Scientometric portrait of teachers of SRTM University" sanctioned by the University. Author of the paper is highly grateful to Hon. Vice Chancellor Dr. U. V. Bhosle and Pro Vice Chancellor Dr. J. M. Bisen for their motivational support and authorities of the University for sanctioning the project.

Source of Funding

None.

Conflict of Interest

None.

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How to cite this article: Kulkarni JN. Intellectual output of the SRTM University indexed in the Web of Science. *Indian j Libr Sci inf techno* 2019;4(2):95-100.