

ASSESSMENT OF RESEARCH RELATIONSHIP AND IMPACT OF TOP TEN AUTHORS OF UNIVERSITY OF MADRAS: A BIBLIOMETRIC MAPPING

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This paper is primarily to assess and visualise the top ten prolific authors of University of Madras witnessed in Web of Science citation database in terms of quantum of publications and their respective traditional citation impacts like h-index, g-index, and non-traditional citations *aka* article alternative citations through Altmetric.com. The secondary aim is to focus the research collaboration, emerging topics and its clusters, preferred journals for publications and its frequency so that the fitness of Bradford's Law is tested. Further, the correlation between publication- citations - h-index is analysed. To achieve these objectives the bibliographic data has been extracted from the Clarivate Analytics - Web of Science citation database on 18.03.2020 for all the years indexed since 1989 which extends granularity for descriptive study of prolific ten authors and their associations in the scientific publication, coherently utilising Altmetric.com for non-traditional impact upon the chosen authors. Out of 8264 total records of University of Madras, which scores 119682 citations and h-index was 107, whereas the top ten prolific authors shares 2067 records and author Velmurugan stands first with maximum number of papers (466), and authors Narayanan and Varalakshmi shares top h-index (32 each). There is a least correlation between total publications and h-index, but number of citation and h-index is highly correlated. In alternative citation category, Medical Biochemistry and Microbiology departments' researchers attract good number of mentions through online shares and references.

KEYWORDS: Prolific authors, University of Madras, Citation index, h-index, Altmetrics, Bibliometrics

INTRODUCTION

Teaching, Research, Publication and Extension activities are the basic functionalities of the faculty of the higher learning institutions like universities. Research and publications are considered as one of the performance measures of an individual, institution and the nation as well. The institutional prestige is associated with faculty publication productivity

(Gopikuttan & Aswathy, 2014) that can be measured through bibliometric analysis. There are valuable, standardized and replicable bibliometric indicators developed over a period to measure the scholarly publication and can be classified as quantity indicators (productivity measurement), performance indicators (quality assessment) and structural indicators (h-index, g-index, i10- index etc.) (Luo & Pradhan, 2016). Assessing the research performance through metric studies provides scope for promulgation of effective and efficient authors of an institution based on quantitative as well as qualitative scales. Studying a small group of researchers of departments means micro-level assessment, if we do it for a university it can be a meso-level and macro-level for a country's productivity (Van Raan, 2003). The study concentrated on quantitative measurement viz., total publication counts so as to ranking of the authors accordingly, total citations it implies to citation ranking for traditional and non-traditional citations studies, productive subject fields so as to analysing clusters of topic similarities and number of preferred journals for all publications so that Bradford's Law of Scattering performed both individual authors and for the collective ten authors has been drawn. Apart from this standard quantitative metric, the alternative scholarly citation impact or otherwise known as online research influence assessed through Altmetric.com (Altmetric.com, 2017).

REVIEW OF RELATED LITERATURE

There are large numbers of bibliometric studies have been carried out over the period. Some of the recent studies are reviewed and

presented. Yazit and Zainab (2017) have analysed the publication productivity of the Malaysian authors and institutions in LIS, with aimed at identifying active authors, authorship pattern, channels used to publishing and subject coverage for the period of 40 years (between 1965 and 2005). Another study by Abramo and D'Angelo (2015), investigated the scientific production achieved by all Italian university professors in the hard sciences, results reveals that the active research in the field of Nuclear and Sub-nuclear physics, using new crown indicator - Mean Normalized Citation Score (MNCS) in place of productivity for comparing university performance. The research performance of the Iraqi-Kurdistan Universities was studies by Noruzi and Abdekhoda (2014) using the number of papers appearing in journals and proceedings, and the number of citations received by those papers as covered by Scopus, 1970-2012. This scientometric analysis reveals that the 459 total publications received 1020 citations for 211 (40%) papers; while 248 (60%) papers have no citations received even once. Highly cited papers were from medicine disciplines and the results showed the correlation between the h-index and citation counts is a reliable indicator of research impact and influence.

Babu (2019) assessed the top ten cited papers in *Nature* along with its correlation with Altmetrics and concluded that highly cited paper would have higher alternative scores. Jacobs (2001) studied the publication pattern of a selected group of scientists of Universities in South during 1992-1996. The author used SCI as a data source to study the performance of

scientists. The publication productivity of the scientists was studied with correlation of a scientist position. Kalita et al. (2019) have evaluated the altmetrics influence in citations of Indian research publications seen in PLoS and they categorises altmetric penetration into three as: Social media share viz. Facebook and Twitter; Mention in Scientific Blogs and News Media like Wikipedia, Nature blogs, Science Seeker and F1000 prime; and online readership and saves in Mendely Reference Management software. Kay et al. (2017) have had an in-depth analysis of the strong, significant correlation between h-index and the total number of publication editorial board members of eight top sports medicine journals ($p=0.916$, $P < .0001$) and an even greater correlation between the h-index and total number of citations of the editorial board member had amassed ($p= 0.973$, $P < .0001$). Keshava et al. (2020) carried out an extensive study out of publication output of Tumkur University and they analysed the relative growth rate, authorship pattern, etc. Significantly they emphasised that the preferred channel of publications and frequency of keywords so that the research interest area can be identified.

NEED FOR THE STUDY

Traditionally, research performances of a university are being measured by quantum of research publications, pattern of publications, growth studies and authorship pattern, etc. Analyses such as subject clusters, alternative citation impact and its correlation studies are helpful to expand the research dynamic of the institutions / universities. These metric studies

are used as indicators to assess the performances of individual and institutions. There is no comprehensive study has been carried out on the University of Madras keeping in view of the above aspects. Therefore, an extensive study is warranted to explore the research performance of the University faculty.

OBJECTIVES OF THE STUDY

The aim of this article is to identify the prolific authors of the University of Madras and to study the performance indicators. The specific objectives are:

1. to identify and quantify the publication productivity of the top ten authors of the University of Madras;
2. to study the collaborative pattern of authors;
3. to assess the citation pattern of the chosen authors;
4. to identify the research topics of the chosen authors and their clusters; and
5. to study the correlation between publication, h-index and altmetrics.

HYPOTHESES

The following null-hypotheses have been formulated:

- H₀₁** : There is no significant difference between prolific (publications) authors' h-index and highly cited authors' h-index;
- H₀₂** : Altmetrics score distribution is similar between highly cited papers of prolific authors and highly cited papers of University of Madras.

MEANS AND METHODS

The Clarivate Analytics – Web of Science database and Almetric.com has been chosen to achieve the objectives of the study. The Web of Science database has been searched with a search key ‘Univ Madras’ in ‘Organization Enhanced’ search field to identify and gather items corresponding to publications of the University of Madras. The search results yielded a sum of 8264 items for the whole periods (since 1989 to March 2020) and the records further refined to identify the top ten prolific authors of the University of Madras. This refinement resulted with 2067 records. In parallel, Altmetric Bookmarklet: a free source to capture item level measures from online actions, is visited on the same day to recover the impact of access on the prolific documents of the University of Madras. Tools such as *Microsoft Excel*, *BibExcel*, *Publish*

or *Perish*, *Pajek*, and *SPSS* were used to analyze the data and to achieve the objectives of the study.

DATA ANALYSIS AND INTERPRETATION

Prolific Authors

Based on the number of publications, the top ten prolific authors are identified and presented in the table 1. Faculty members of University of Madras are only considered for the ranking of top ten authors and not considered the collaborators who have been listed in the top ten in the Web of Science database. Velmurugan from the Department of Crystallography & Biophysics stands on the top with maximum articles (466) and his share is 22.54 per cent of the total 2067 publications. Faculty from Physical and Chemical Sciences disciplines are occupied in the top ten positions, except Varalakshmi from Medical Sciences who occupied the seventh position.

Table 1: Prolific Authors based on Publications

Sl. No.	Name	Department	No. of Publications	Percentage (%)
1.	Velmurugan D	Crystallography & Biophysics	466	22.54
2.	Raghunathan R	Organic Chemistry	299	14.47
3.	Ponnuswamy MN	Crystallography & Biophysics	251	12.14
4.	Narayanan V	Inorganic Chemistry	195	9.43
5.	Mohanakrishnan AK	Organic Chemistry	187	9.05
6.	Rajakumar P	Organic Chemistry	179	8.66
7.	Varalakshmi P	Medical Biochemistry	144	6.97
8.	Suthanthiraraj SA	Energy	119	5.76
9.	Kandaswamy M	Inorganic Chemistry	114	5.52
10.	Stephen A	Nuclear Physics	113	5.47
Total			2067	100

Table 2: Publications and Citations of Top Ten Authors

Query	8264	Velumurgan	Ragunathan	Ponnusamy	Narayanan	Mohanakrishnan	Rajakumar	Varalakshmi	Austin Suthanhiraraj.	Kandasamy	Stephen
Source	ISI/WoS	ISI/WoS	ISI/WoS	ISI/WoS	ISI/WoS	ISI/WoS	ISI/WoS	ISI/WoS	ISI/WoS	ISI/WoS	ISI/WoS
Papers	8264	466	299	251	195	187	179	144	119	14	113
Citations	119682	2493	3190	1389	5075	1434	1292	3155	902	2395	4377
Years	31	30	27	31	28	27	31	30	31	27	29
Cites_Year	3860.71	83.1	118.15	44.81	181.25	53.11	41.68	105.17	29.1	88.7	150.92
Cites_Paper	14.48	5.35	10.67	5.53	26.03	7.67	7.22	21.91	7.58	21.01	38.73
Cites_Author	35283.43	472.3	1122.8	308.47	909.5	478.31	467.18	1056.72	339	693.89	843.58
Papers_Author	2680.18	94.68	85.92	55.36	37.72	51.95	65.64	46.54	49.27	31.4	22.05
Authors_Paper	3.92	5.39	4.08	4.89	5.68	4.03	3.26	3.45	2.87	4.2	5.57
h_index	107	23	30	16	32	22	19	32	14	28	27
g_index	167	30	43	30	66	30	24	45	21	43	65
hc_index	56	15	14	9	27	11	10	12	11	15	25
star_count	113	1	1	1	16	0	0	0	0	2	17
year_first	1989	1990	1993	1989	1992	1993	1989	1990	1989	1993	1991
year_last	2020	2020	2017	2019	2020	2019	2020	2009	2020	2018	2020

Source: Prepared by using PoP software and only significant measures tabulated.

Publications and Citation Indices for the entire documents of the Institution and Top Ten authors through *Publish or Perish* (PoP)

The quantum of publications, citations and other metrics are presented in the table 2. Out of 8264 articles indexed in Web of Science, 2067 (25%) documents contributed by the top ten authors. The overall h-index is 107 and g-index is 167 for the University, whereas the authors Narayanan and Varalakshmi secured rich h-index (32), and Narayanan and Stephen scored

significant g-index (66 and 65). The contemporary h-index (hc-index) which gives much weight for article published in the current year rather than earlier. Notably, Stephen is the topper in star count.

Descriptive and Correlation Analysis for the Top Ten Authors' Publications, Citations and h-index

The descriptive statistics of publications, citations and h-index and their correlation is presented in the table 3 & 4. From the table 3, it

Table 3: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Publications	10	113.00	466.00	206.70	109.54
Citations	10	896.00	5074.00	2565.10	1397.93
H-index	10	14.00	32.00	24.30	6.51
Valid N (listwise)	10				

Source: SPSS software

Table 4: Correlational Analysis

			Publication	Citation	H-index
Spearman's rho	Publication	Correlation Coefficient	1.000	.091	.024
		Sig. (2-tailed)	.	.803	.947
		N	10	10	10
	Citation	Correlation Coefficient	.091	1.000	.863**
		Sig. (2-tailed)	.803	.	.001
		N	10	10	10
	h-index	Correlation Coefficient	.024	.863**	1.000
		Sig. (2-tailed)	.947	.001	.
		N	10	10	10
**, Correlation is significant at the 0.01 level (2-tailed).					

is understood that the maximum number of articles published among the top ten authors is 466 and minimum number of articles published by author is 113 as indexed in the Web of Science database. The average number citations are 2565.10 and average h-index is 24.30.

The table 4 depicts the relationship among three variables viz., publication, citations and h-index values and again, it is obvious that there is less correlation among the total publications with

citations (.091) and h-index (.024), whereas strong correlation between citations and h-index (.863).

Co-authorship Pattern among Top Ten Authors

The study of co-authorship pattern can help to understand the relationship between researchers. The relationship between two collaborators exists in different ways viz., intra-department, inter-department, inter-institutions, inter-country, etc.

Table 5: Top Ten Collaboration among Authors

Sl. No.	No. of Papers Collaborated	Authors I	Authors II	Type of Collaboration
1.	135	Ravikumar K	Velmurugan D	Inter – Institution
2.	92	Narayanan V	Stephen A	Inter – Department
3.	62	Raj SSS	Velmurugan D	Inter – Institution (International)
4.	56	Raghunathan R	Velmurugan D	Inter – Department
5.	53	Raghunathan R	Ravikumar K	Inter – Institution
6.	49	Selvanayagam S	Velmurugan D	Intra – Department
7.	41	Ravikumar K	Selvanayagam S	Inter – Institution
8.	40	Narayanan V	Suresh R	Inter – Department
9.	33	Gayathri D	Velmurugan D	Intra – Department
10.	33	Giribabu K	Narayanan V	Intra – Department

The table 5 provides the top ten collaborations among the authors. Velmurugan D has collaborated with Ravikumar K more times (135 times) than others. The nature of collaboration of Velmurugan spreads all types, amongst inter-institutional collaboration is higher than inter-department and within the Department. The topmost prolific author also had international collaboration in producing scholarly literature. Authors namely Raghunathan R, Narayanan V and Stephen A are having inter-departmental collaboration than intra-department

or inter-institutional collaborations. This shows that top ten prolific authors' research focuses on inter-disciplinary nature of research.

Journal Ranking

The ranked list of journals preferred by the top ten authors is given in the table 6. *Acta Crystallographica Section E – Crystallographic Communications* placed in the top. Other sections like C, E of *Acta Crystallographica* occupied in the top ten preferred journals list.

Table 6: Preferred Journals and its Publishers

Sl. No.	Journal Title	Publisher	No. of Articles	Rank
1.	Acta Crystallographica Section E-Crystallographic Communications	Int Union Crystallography	365	1
2.	Acta Crystallographica Section E-Structure Reports Online	Wiley-Blackwell	215	2
3.	Tetrahedron Letters	Pergamon-Elsevier Science Ltd	89	3
4.	Acta Crystallographica Section C-Crystal Structure Communications	Munksgaard Int Publ Ltd	80	4
5.	Synthetic Communications	Taylor & Francis Inc	64	5
6.	Tetrahedron	Pergamon-Elsevier Science Ltd	43	6
7.	Crystal Research and Technology	Wiley-V C H Verlag Gmbh	41	7
8.	Polyhedron	Pergamon-Elsevier Science Ltd	40	8
9.	Acta Crystallographica Section C – Structural Chemistry	Int Union Crystallography	28	9
10.	RSC Advances	Royal Society Chemistry	28	10

Table 7 - Bradford's Law Distribution Analysis

Sl. No.	No. of Journals	Total No. of Articles	Journal %	Cumulative Article	2067/3=689	Bradford's fit and Journal count
1	5	710	1.39	710	Core Zone	710 (5 Journals- 1.39%)
2	40	692	11.08	1410	Second Zone	692 (40 Journals-11.08%)
3	316	665	87.53	2067	Third Zone	665 (316 Journals-87.53%)
Total	361	2067	100			
	361(17.46 %) Journals published 2067 papers				The observed Ratio is 5:40:316 (Ratio 1:8:63) instead of expected 5:25:125(1:5:25)	

The table 7 presents the analysis of the Bradford's Law for 2067 articles shared by ten prolific authors in the area of physics, chemistry and medical biochemistry. The fitness of Bradford

Law is not satisfied because the first one third ($2067/3 = 689$) of core zone is achieved from five journals but the second and third proportions are reached only by 40 and 361 journals

respectively. The formula $1:n:n^2$ insists 5:25:125 but 5:40:361 is achieved. It is far away for the basic phenomena of Bradford's Law. It implies that if the core zone is met by simply five journals (one third of articles of 689) then the second and third zones should have been in the bracket of 25 journals and third zone must be within the containment of 125 journals as per the ratio 1:5:25. whereas our results shows 5 is core but 40 and 316 (ratio 1:8:63) are allied and alien journal groups (Gourikeremath et al., 2017). So, there is no good fit of Bradford's Law of journal scattering for the chosen data.

Authors' Preferred Journals and their Publishing Frequency

The authors' journals preferences have been identified and presented in the table 8. The journal preference and their frequencies are identified and generated a table using *BibExcel* Software.

From the table 8, the best preferred journal and its frequency, and the frequency of other journal preferences can be identified. The topmost ranked author – Velmurugan has chosen *Acta Crystallographica Section E – Crystallographic Communication* for 146 times

Table 8: Journals Preferences and its Frequencies

Best Unit	Authors	Journal Name	Frequency of Publishing	Total Journals	Fit to Bradford's Distribution
146	Velmurugan, D	Acta Crystallographica Section E -Crystallographic Communications	146,54,46,23,22,14,13,6,5x2,4x5,3x8,2x19,1x50=466	92	2,14,76 instead of 2,4,8 (not fit)
88	Ponnuswamy, M N	Acta Crystallographica Section E -Crystallographic Communications	88,32,14x2,12,10,6x2,5x2,4x3,3,2x5,1x20=251	40	1,5,34 instead 1,2,4 (not fit)
75	Ragunathan, R	Acta Crystallographica Section E -Crystallographic Communications	75,63,46,34,18,7,5,4x2,3x4,2x5,1x21=299	39	2,4,33 instead 2,4,8 (not fit)
58	MohanaKrishnan, A K	Acta Crystallographica Section E-Structure Reports Online	58,35,15,13x2,11,7,6,5,4,3x2,2x2,1x10=187	24	2,6,16 instead 2,4,8 (not fit)
26	Kandaswamy, M	Polyhedron	26,12,9,6,4x5,3x4,2x6,1x17=114	36	2,8,26 instead 2,4,8 (not fit)
23	Rajakumar, P	Tetrahedron Letters	23,17,13x2,12,11,9,8,7,5x3,4x3,3x2,2x3,1x27=179	47	4,8,35 instead 4,16,64 (fit)
21	Suthanthiraraj, SA	Ionics	21,11,6x2,5x2,4,6x3,2x9,1x25=119	47	4,13,30 instead 4,16,64 (fit)
18	Varalakshmi, P	Molecular and Cellular Biochemistry	18,15,9x2,8,5x2,4x2,3x9,2x8,1x24=144	50	4,12,34 instead 4,16,64 (fit)
17	Narayanan, V	Journal of the Indian Chemical Society	17,9,8x3,7x2,6x2,5x3,4x4,3x3, 2x14,1x51=195	84	8,21,55 instead 8,64,512 (fit)
9	Stephen, A	Journal of the Indian Chemical Society	9,8,7,6,5,4x3,3x3,2x13,1x31=113	55	6,16,33 instead 6,36,216 (fit)

Top Cited Articles and Altmetric Scores

Table 9 - Top Cited Articles and Altmetrics Scores of the Top Ten Authors

Sl. No.	Authors	Title of the Article	Source	Year Published	No. of Citations	Altmetrics Scores
1	Velmurugan, D et al.	Synthesis and laser properties of 9-alkyl-3,3,6,6-tetramethyl-1,2,3,4,5,6,7,8,9,10-decahydroacridine-1,8-dione derivatives	Journal of the Chemical Society-Perkin Transactions 2	1998	74	0
2	Raghunathan, R et al.	Synthesis, antimicrobial and antifungal activity of a new class of spiropyrrolidines	Bioorganic & Medicinal Chemistry	2003	219	3
3	Ponnuswamy, MN et al.	Design, synthesis and anti-microbial activity of 1H-pyrazole carboxylates	Bioorganic & Medicinal Chemistry Letters	2004	168	0
4	Narayanan, V et al.	Enhanced photocatalytic activity of ZnO/CuOnanocomposite for the degradation of textile dye on visible light illumination	Materials Science & Engineering C-Materials For Biological Applications	2013	515	1
5	Mohanakrishnan, AK et al	Pd-mediated C-H arylation of EDOT and synthesis of push-pull systems incorporating EDOT	Tetrahedron	2007	86	9
6	Rajakumar, P et al.	Synthesis of novel carbazole based macrocyclic amides as potential antimicrobial agents	European Journal of Medicinal Chemistry	2009	51	0
7	Varalakshmi, P et al.	Anti-inflammatory activity of lupeol and lupeollinoleate in rats	Journal of Ethnopharmacology	2001	121	6
8	Suthanthiraraj, SA et al.	Performance of a new polymer electrolyte incorporated with diphenylamine in nanocrystalline dye-sensitized solar cell	Solar Energy Materials and Solar Cells	2008	57	0
9	Kandaswamy, M et al.	Structural, magnetic, electrochemical, catalytic, DNA binding and cleavage studies of new macrocyclic binuclear copper(II) complexes	Journal of Inorganic Biochemistry	2009	135	0
10	Stephen, A et al.	Enhanced photocatalytic activity of ZnO/CuOnanocomposite for the degradation of textile dye on visible light illumination	Materials Science & Engineering C-Materials For Biological Applications	2013	254	1

Table 10: Top Ten Cited Articles of the University of Madras with its Altmetrics

S. No.	Authors	Title of the Article	Source	Year Published	No. of Citations	Altmetrics Scores
1	Padma Krishnan et al.	Emergence of a new antibiotic resistance mechanism in India, Pakistan, and the UK: a molecular, biological, and epidemiological study	Lancet Infectious Diseases	2010	1628	351
2	Kumarasamy, K et al	Clinical epidemiology of the global expansion of <i>Klebsiella pneumoniae</i> carbapenemases	Lancet Infectious Diseases	2013	711	45
3	Kalaichelvan, PT et al.	Biogenic synthesis of silver nanoparticles and their synergistic effect with antibiotics: a study against gram-positive and gram-negative bacteria	Nanomedicine-Nanotechnology Biology And Medicine	2010	610	3
4	Kalaichelvan, PT et al.	Synthesis of silver nanoparticles using <i>Acalypha indica</i> leaf extracts and its antibacterial activity against water borne pathogens	Colloids And Surfaces B-Biointerfaces	2010	593	0
5	Sankar, V et al.	Concise review: Isolation and characterization of cells from human term placenta: Outcome of the first international workshop on placenta derived stem cells	Stem Cells	2008	579	0
6	RAJKUMAR, S et al.	STUDY PROTOCOL FOR THE WORLD-HEALTH-ORGANIZATION PROJECT TO DEVELOP A QUALITY-OF-LIFE ASSESSMENT INSTRUMENT (WHOQOL)	Quality of Life Research	1993	539	6
7	Narayanan, V et al.	Enhanced photocatalytic activity of ZnO/CuO nanocomposite for the degradation of textile dye on visible light illumination	Materials Science & Engineering C-Materials for Biological Applications	2013	515	1
8	Sakthisekaran, D et al.	The Vascular Endothelium and Human Diseases	International Journal of Biological Sciences	2013	370	66
9	Reghunathan, R et al.	Structural conformation and vibrational spectroscopic studies of 2,6-bis(p-N,N-dimethyl benzylidene) cyclohexanone using density functional theory	Journal of Raman Spectroscopy	2006	350	0
10	Riazuddin, S et al.	Usher syndrome 1D and nonsyndromic autosomal recessive deafness DFNB12 are caused by allelic mutations of the novel cadherin-like gene CDH23	American Journal of Human Genetics	2001	350	4

To illustrate the research topics of the top ten authors, the *Pajek* networking software has been used. The figure 1 shows the homogeneous topics and its clusters velocity. The cluster formation was formulated by keyword analysis and cluster pair preparation through *Bibexcel* so that, .net and .clu files created and transformed to *Pajek* to draw network by Energy-Kamada-Kawai-Separate component – Cntl +k. The circle greater intensity (Yellow) means the topic cluster of the publication and its pairing is thicker because of the similarities and smaller (Grey) circle shows minimal topic relationships. There are about 2960 clusters out of 7169 keywords, the most similar keywords viz. ‘Derivatives’ makes 221 units and ‘Crystal-structure’ contributes 97 units. On the other hand, cluster pairs accumulated 6781 out of 9508 occurrences. Significantly, ‘Molecular Structure and Crystal’ stands 18 cluster pairs following that the ‘Azomethine Ylides and Derivates’ shares 15 pairs.

The table 9 presents the highest cited articles of the chosen authors (top ten prolific authors of the University of Madras) in Web of Science and Altmetric.com. The top ten authors’ articles are received relatively good number of traditional citations but only four authors’ articles received altmetric scores. The top most prolific author’s works did not receive any altmetric score. Similarly, the authors such as Ponnusamy, Rajakumar, Kandasamy and Suthanthiraraj have not received any altmetric mentions. However, the other prolific authors have received very minimum number of scores. This shows that the University of Madras prolific authors’ work not being familiar in the social media. While

comparing the top ten cited articles of the University of Madras (Table 10), no top ten prolific authors occupied in the list except authors Narayanan V and Ragunathan R. The top ten cited papers of the University of Madras achieved significant number of alternative metric scores. The first two papers from Microbiology Departments of the University of Madras which received 351 (Padma Krishnan et al.) and 45 (Kumarasamy, K et al) mentions. This shows that there is no relationship between number of publications and number of citations.

To prove that there is no significant difference between prolific (publication) authors’ h-index and highly cited authors’ h-index, Chi-square test was used. The critical value is 3.841 and p value is 0.000 which proves that there is no significant relationship between top ten productive authors’ h-index score and top ten cited authors’ h-index. So null hypothesis is rejected and alternative hypothesis is accepted, which implies that even authors e.g., Varalakshmi, Ramamurthy, Arunakarn are having comparatively less number of publications acquired good h-index because of high citations and not quantum of publications. To find out whether Altmetrics score distribution is similar between cited papers of prolific authors and highly cited papers of the University of Madras, Chi-Square was used. The value 0.130 for productive authors’ citations and altmetrics, whereas 0.922 (p value is 0.0001) for highly cited papers of the institution and its altmetric mention scores. The results shows that prolific authors’ citations didn’t fetch notable altmetrics scores but cited papers of top ten cited authors of institution received significant

altmetrics scores. Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted.

CONCLUSION

Bibliometric indicators are used to assess the performance of an individual, an institution, and the country. Assessing the publication productivity, authorship pattern, citations, etc. will enable to find out the emergence of research areas, research directions, collaborations, etc. Metric studies will also helpful to policy makers to take appropriate decisions like funding, infrastructure developing, and manpower development. This study on the performance measurement of the prolific authors of the University of Madras will be helpful for the University to take certain policy decisions.

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