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Preferences and Citation Impact of Open Access Publishing by Indian Research Community

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Abstract

The study conducted to find the adaption of open access (OA) publishing among the research community of Tumkur University by sourcing the data from Web of Science (WoS) database. An overall 516 articles were published by the faculty of TU between 2011 and 2020 in 203 journals indexed in Web of Science database. 19.57% articles were available in pure OA routes and 63.17% funded articles published in gold route. A significant difference was found between citations of OA & Non-OA articles in last ten years. TU researchers have published articles with other researchers viz 22 articles with Americans, 18 with Canadians, 10 with Taiwanese, 9 with Germans, 5 articles with Chinese and 5 publications with Swedish authors. The top ranked journal “Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy” has published 9.88% followed by the “Journal of Science: Advanced Materials and Devices” published absolute number of articles in OA (15.84%). A significant contribution from the subjects like chemistry (186 articles) and material science (160 articles) was found. An investigation into the percentage of articles published through OA and non-OA routes was done to find out the level of citation impact both routes using “t” test. The results show OA articles mean value 17.32 and non-OA articles mean value of 18.03 at 1759 citations for 101 OA articles and 7483 citations for 415 non OA articles at a p-value of .004 levels between the two routes of publishing which is significant.

Keywords: Open access, OA, OA publishing, Preference in OA, Citation impact, Tumkur university, Citation analysis.

Introduction

The universities, institutions and research organisations are more involved in research and development (R&D) activities than ever in India (Godil et al., 2021). It requires a huge amount of funding for smooth and successful conduct of R&D activities. The funding comes mostly from government agencies through various taxes and levies imposed upon public (Cruz et al., 2018). It implies (Sengupta, 2021) that public have rights to access the research and the results of research free-of-cost. This understanding has become a movement and resulted into the emergence of the concept ‘Open Access (OA)’ with a primary aim to make scientific outcomes to be freely accessible without any restrictions (Ruiz-Pérez & Delgado-López-Cózar, 2017). The major milestone to development of open access are “Budapest Open Access Initiatives, Bethesda Statement on Open Access Publishing, and Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities” (Wikipedia, 2021). The adoption of open access policies has paved the way for many reputed journals to incorporate OA mandates and the articles are available for access to any without any restrictions (Sanjeeva & Powdwal, 2017).

Now-a-days Indian researchers are slowly moving towards to open access publishing (OAP) with the Delhi Declaration on open access policy (Das, 2018), Department of Science and Technology (DST) and Department of Biotechnology (DBT) mandate policies on publicly-funded research to be made freely available (Rao & Rao, 2017), and also next steps that India wants to take in decentralising access to scientific communication, with “one nation one subscription” new policy (Naika & Pathak, 2020). Indian Institute of Technologies (IIT’s) play major role in research and development activities in India. Nazim & Zia, (2019) study on research contribution to open access among IIT’s research community and found that out of 68.70% of OA version articles, 10.26% articles are available through gold OA, remaining 58.44% articles were available through green OA. Article are publishing through OA modes and open platform research results will reach wider research community and it will also get good number of citations compare to non-open access articles (Holmberg et al., 2020b). Many of the backward and under-developing countries research community lagging behind in access for e-resources and thus publishing in OA, due to the lack of IT infrastructure and lack knowledge of publishing policies (Fox & Hanlon, 2015). The insufficient educational administration support to librarians and lack of technological infrastructure support to OA low percentage of African papers found in IR’s and OAJ. The concept of OA is ignored in Czech Republic and Kenya by the state offices, funding agencies and low awareness (Ondrej, 2013) and (Chilimo, Adem, Otieno, & Maina, 2017).

Several studies conducted on citation impact of OA v/s non OA in various fields, Tang et al., (2017) study reveals open access (OA) article received significantly more citations than non-open access articles (NOA). Now, “Altmetric” is the emerging area for evaluating article impact, (Holmberg et al., 2020a) study found that open access (OA) articles having more altmetric attention score compared to non-open access articles, a clear advantage of OA publishing (Björk & Solomon, 2012).

The open access advantage factors motivate authors publishing in OA, (Moksness & Olsen, 2017) and (Weerakkody, Kapoor, Balta, Irani, & Dwivedi, 2017) The authors personal attitude, intention and social norms also influence to choose open access publishing route, (Masrek & Yaakub, 2015) for gaining the advantage of wider visibility, speed, reputation, relevance, citation benefits and familiarity. The research community felt that OA publishing is the first choice (Ramadoss, 2019) as the social networks support to OA journals for channelizing information (Valerio-Ureña & Herrera-Murillo, 2017) by providing platform for wider access and use.

Need for the study

Tumkur University is a one of the developing universities of higher education system in India ranked at 101 for the NIRF rankings 2019-2020. The university is having a total of 22 post-graduation departments spread across arts, science & technology and humanities faculties. As the university is 17 years old, so is the case with faculty members as well. The university has a good number of research scholars involved in R&D activities. Based on the literature review it was found that many studies related adaption of open access and analysis of citation impact have been carried out. But there found a gap of Tumkur University research community’s level of adaption of OA, funding sources for research and citation impact of open access (OA) and non-open access (NOA) articles published by the research community. To fill the gap found in the literature survey, a need was felt to take-up the present study.

Research Questions

1. How to examine the level of acceptance of “open access publishing” by researchers
2. How to identify the proportion of published articles between “OA and funded”
3. Find out the way in assessing geographical collaboration of TUT research community
4. How to assess the correlation between OA v/s non-OA articles for citation impact

Methodology

Tumkur university (TU) was established in 2004 central geographical part of the Tumkuru city and it is recognized as an Institute of National Eminence by the UGC (Tumkur University, 2021). Articles contributed by the researchers in TU are searched using organization enhanced search option in the Web of Science Core Collection database as on March 31, 2021. The search was restricted to journal articles published in the English language for the period of 10 years from 2011 to 2020. A total of 516 articles were retrieved and the articles were exported to MS Excel for further analyses. The better visualization of author keywords accuracy, we used the VOS viewer tool (<https://www.vosviewer.com>). For analysis on citation impact of OA articles and Non-OA articles, we used the SPSS statistical tool and used Mendeley reference management for all referencing purpose.

Results of the study

Table 1: Research published by Tumkur University during 2011-2020

Publication Years	OA articles	NOA articles	Total articles	% (N=516)
2011	5	13	18	3.49
2012	6	26	32	6.20
2013	3	33	36	6.98
2014	4	58	62	12.02
2015	16	67	83	16.09
2016	11	35	46	8.91
2017	20	49	69	13.37
2018	17	41	58	11.24
2019	9	53	62	12.02
2020	10	40	50	9.69
Total	101	415	516	100.00

Data in table 1 shows the year wise distribution of articles published by Tumkur University researchers using both OA and NOA routs. An increasing publishing trend can be seen from 2011 to 2020. Of a total of 516 articles, majority 80.42% articles are NOA access whereas 19.58% are OA articles.

Table 2: Funded v/s Green open access articles

Publication Years	Funded articles	Open access articles	Overall total records
2011	10	5	18
2012	23	6	32
2013	24	3	36
2014	44	4	62
2015	47	16	83
2016	31	11	46
2017	47	20	69
2018	39	17	58
2019	38	9	62
2020	23	10	50
Total	326 (63.17)	101 (30.98)	516 (100.00)

Article processing charges (APC) can be sourced from various means such as project budget, institution budget, library budget and author's own sources. Data in the table 2 shows

that of the 516 total articles, 326 (63.17%) are funded from various funding agencies under the gold OA and 101 (30.98%) articles published through green OA routes.

Figure 1: Geographical collaboration of Authors



Author collaboration is the important aspect in R&D activities, as it will improve strong professional relation with others. Data in the figure 1 depicts that Tumkur University researchers have good collaboration with authors of other countries by publishing articles notably with USA 22, Canada 18 articles, Taiwan 10, Germany 9, China 5 and Sweden 5 respectively for the past ten years.

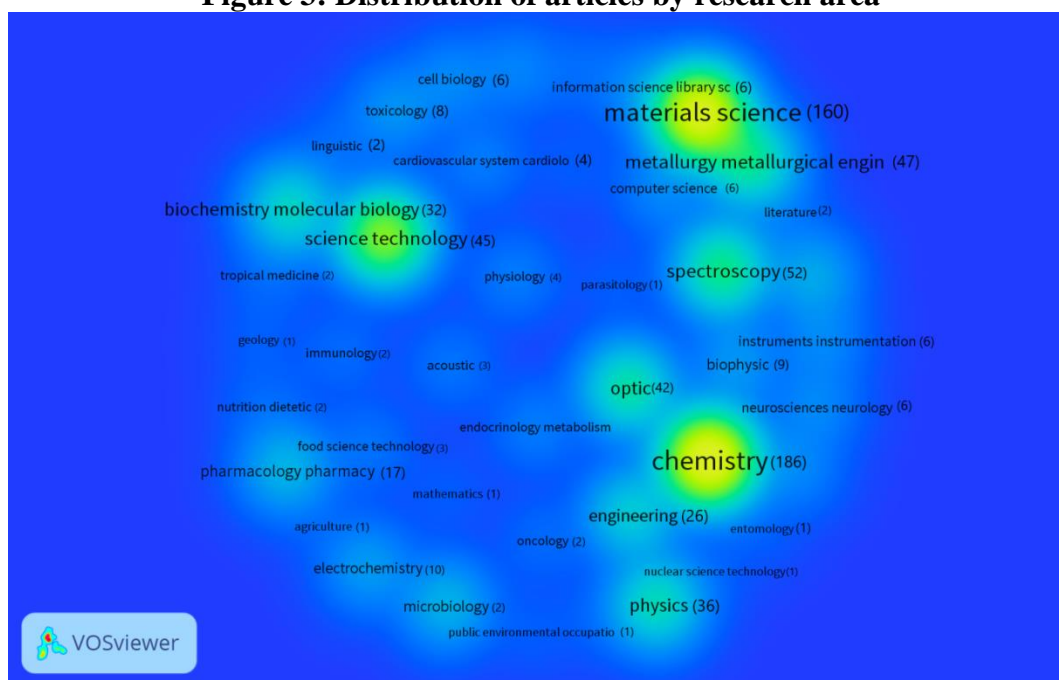
Table 3: Top journals publishing articles

Rank	Name of the journal (N=203)	Total articles	OA articles
1	Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy	51	7
2	The Journal of Alloys and Compounds	41	1
3	Journal of Luminescence	15	1
4	Journal of Molecular Structure	17	3
5	Journal of Science: Advanced Materials and Devices	16	16
6	Materials Research Bulletin	14	0
7	Materials Research Express	14	0
8	Optical Materials	13	0
9	Optik: International Journal for Light and Electron Optics	8	0
10	Arabian Journal of Chemistry	7	7
11	Other Journals	320	66
		516	101

Table 3 shows the most productive journals published at least seven or more articles. A total of 203 journals published 516 articles, of which 37.98% articles published in top ten journals and 19.57% of articles published OA route. The top 1 rank journal “Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy” has published a total of 51 (9.88%) articles and lowest number of articles are published in OA routes. The journal “Journal of Science: Advanced Materials and Devices” has published absolute number of articles in OA

which accounts to 15.84% followed by “Spectrochimica Acta Part A: Molecular and Biomolecular” and “Arabian Journal of Chemistry” with 7 OA articles apiece.

Figure 3: Distribution of articles by research area



The above figure depicts the research community’s involvement in the field of study/ research. It significantly shows that the Tumkur University research community predominantly working on the fields of chemistry (186 articles), material science (160 articles), science and technology (45 articles), spectroscopy (52 articles), optics (42 articles), physics (36 articles), metallurgy metallurgical engineering (47 articles), biochemistry and molecular biology (32 articles) and many more subjects as shown in the figure-3.

Table 3: Citations impact of OA articles v/s Non-OA articles

Description	Access Type	Articles	Citations	Mean	Std. Dev.	p value
Platform	OA	101	1759	17.32	21.764	.004
	NOA	415	7483	18.03	21.477	

To answer the research questions raised, we have investigated the percentage of articles published through OA and non-OA routes by the faculty of Tumkur University. To examine the level of citation impact difference among both routes, we used independent sample “t” test. The results of the study shows OA articles mean value is 17.32 and non-OA articles mean value is 18.03. Hence there is no significant at p=0.004 level between the two routes of publishing.

Discussion, Recommendation and Conclusions

The study period is confined to ten years between 2011 and 2020. An overall 516 articles were published by the faculty of Tumkur University in a total of 203 journals indexed in Web of Science database. Of 516 articles 19.57% article were available through pure OA routes. There are 63.17% funded articles published in gold route out of 516 articles and a significantly less articles were published in green OA route. IIT’s researchers 68.70% of articles found Green and Gold OA routes (Nazim & Zia, 2019).

To the trueness of its nature Tumkur university researchers has a good network among researchers worldwide as author collaboration plays an important role in R&D activities. Tumkur University researchers have published articles with other researchers viz with 22

journal articles with Americans, 18 articles with Canadians, 10 articles with Taiwanese, 9 with Germans, 5 articles with Chinese and 5 publications with Swedish authors respectively for the study period. This indicates that though the university is young so is its faculty, yet made good strides in the collaborative publishing area in science and technology. It is also to be noted that other than science and technology divisions have no significant productivity, hence it is suggested to the arts, social sciences and humanities divisions to work to increase the productivity to be able to get a good ranking for the university as well as author proliferation globally.

The top ranked journal “Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy” has published 9.88%, the journal “Journal of Science: Advanced Materials and Devices” has published absolute number of articles in OA which accounts to 15.84% followed by “Spectrochimica Acta Part A: Molecular and Biomolecular” and “Arabian Journal of Chemistry” with 7 OA articles respectively.

The research community’s involvement in the field of research was assessed and found significant contributions from the fields of chemistry (186 articles), material science (160 articles), science and technology (45 articles), spectroscopy (52 articles), optics (42 articles), physics (36 articles), metallurgy metallurgical engineering (47 articles), biochemistry and molecular biology (32 articles) and many more subjects. There again found a lacking in the research areas other than sciences in the university, efforts to be braced-up to fill the gap from other subject areas is suggested to improve the productivity as well as ranking of the university among other Indian universities.

A significant difference was found between citations of OA & Non-OA articles which are published by Tumkur University research community in last ten years. An investigation into the percentage of articles published through OA and non-OA routes by the faculty of Tumkur University was done to find out the level of citation impact both routes, an independent sample “t” test was used for this purpose. The results show OA articles mean value 17.32 and non-OA articles mean value of 18.03 at 1759 citations for 101 OA articles and 7483 citations for 415 non OA articles at a p-value of .004 levels between the two routes of publishing which is significant.

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