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Publication delay of manuscripts in periodicals published by Indian Academy of Sciences

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*The pr*esent study examines the publication delay in 10 scholarly journals published by the Indian Academy of Sciences. The study examined 2986 articles published in these ten journals in the years 2014 and 2018. The analysis shows that the publication delay varied with discipline and from one journal to another journal. The highest time delay was for the *Proceedings of Mathematical Sciences* (PMS) in 2014 as well as in 2018 and lowest for *Current Science* (7.1 ± 3.2 months) in 2014 and *Journal of Chemical Science* (JCS) in 2018. The total publication delay varied between (11.1± 5.3 months) and (12.8 ± 7.0 months) in 2014 and 2018, respectively. In most of the journals, the reason for the delay was editorial (delays between receipt of the manuscript and its revision) in 2014 and technical (revision and its later publication) in 2018.

Keywords: Scholarly journals; Peer review; Review time; Editorial delay; Technical delay

Turning a scientific study into an article and reaching all the interested readers in the scientific realm is not only desired but is also a requirement of scientists. However, an increased number of submissions to scientific journals has added to the workload of journal editors and reviewers, causing publication delays. The time taken from manuscript submission to manuscript publication varies among disciplines and journals.

Delays in the publication of a scientific manuscript might delay the introduction of new knowledge or technology and even prevent a pioneering idea from entering the field on time. Also, the number of citations of an article— a significant indicator of the importance of the article might also be adversely affected. The delay between submission of a manuscript to a scientific periodical and its eventual publication in print or electronic form varies from a few months to years, depending upon the periodical and the discipline. Many factors contribute to such delays. One of them is the elaborate editorial and peer-review process, which varies across journals and disciplines. Sometimes the review process involves extensive and repeated revisions of manuscripts before acceptance in final form and publication.

Publication speed is an important consideration influencing an author's decision when choosing a journal for submitting his/her article. Publication delay can be defined as the total time lag between the submission of an article to a journal and its final publication either in electronic or printed form.

This article presents an analysis of publication delays for ten science journals published by Indian Academy of Sciences (Bangalore) for two different periods, *i.e.* 2014 and 2018.

Indian Academy of Sciences and its journals

The three prominent science academies in India are Indian National Science Academy, New Delhi; Indian Academy of Sciences, Bangalore and National Academy of Sciences, Allahabad. Sir C V Raman founded Indian Academy of Sciences in 1934 and it was registered as a Society on 27 April 1934 with its headquarters at Bangalore. Publication of scientific journals has been a major activity of the Academy since its formation in 1934. The Academy today publishes 12 journals, several of which grew out of the original Proceedings. The journals published by Academy uses an online submission and review management system. Papers are peer-reviewed and published content is made available online and in open access. The journals published by the academy are: *Proceedings – Mathematical Sciences, Sadhana – Academy Proceedings in Engineering Sciences, Journal of Chemical Sciences, Journal of Earth System Science, Journal of*

Genetics, Pramana – Journal of Physics, Bulletin of Materials Science, Journal of Astrophysics and Astronomy, Journal of Biosciences, Current Science, and Resonance – journal of science education. The Academy also publishes two online-only journals – the *Indian Academy of Sciences Conference Series* (first online in December 2017) and *DIALOGUE: Science, Scientists, and Society* (first online in January 2018). For details and history of these journals, readers can access the website of the Indian Academy of Sciences.

Among the above listed 11 journals, ten journals except for *Resonance – Journal of Science Education* is being co-published with Springer and are indexed in the Web of Science. Among the above-listed journals, *Resonance – Journal of Science Education* has not been included in the study as it does not provide information about dates of receipt and acceptance.

Objective of the study

- To quantify publication delay in the ten scientific periodicals published by the academy at three stages, *i.e.* delay from receipt of a manuscript to its revision, from revision to publication and total delay from receipt to publication in months.

Data and method

It is a general practice now for journal articles to include dates of receipt, revision, acceptance, and online publication. However, all journals do not publish manuscripts online. Periodicals published by Indian Academy of Sciences also provide this information. However, ten periodicals included in the study provide four different types of information about the dates. An examination of the information provided by these journals indicates that the *Journal of Astronomy and Astrophysics (JAA)* and *Current Science (CS)* only provide the date of receipt and acceptance. In addition to these two dates, *Journal of Biosciences (JB)* also provides the date of online publication. Three journals namely *Bulletin of Material Science (BMS), Journal of Chemical Sciences (JCS)* and *Journal of Earth System Sciences (JESS)* provide three separate dates for manuscripts, i.e. received, revised and accepted dates. However, in addition to these three dates, *Sadhana (SADH), Journal of Genetics (JG), Pramana-Journal of Physics (PJP), and Proceedings of Mathematical Sciences (PMS)* also provide dates of online publication. An analysis of dates for the studied journals indicates that date of revision is usually the date of acceptance. The published date is one in which the article appeared in the journal either in an online publication or printed version of the journal. To maintain uniformity of data, authors have used only three dates, i.e. date of receipt, date of acceptance and publication of the manuscript in the journal. These dates were manually recorded for 2986 papers published in 2014 and 2018. Information was recorded from the respective websites of the journals under study in MS Excel sheet. In this study, the gap between receipt of a manuscript and the date of revision has been recorded as editorial delay (ED). The gap between revision and its subsequent publication in the journal as technical delay (TD) and the total publication delay (TOD) was also recorded and is the sum of these two dates. The study is similar to the study by Garg[1] on publication delay of manuscripts in periodicals published by CSIR-NISCAIR, Amat[2] on the delay of papers published in 14 food science journals and Bagla and Mishra[3] on five Indian biomedical journals.

Review of the literature

In the past decade, several studies have been reported in the literature dealing with publication delay in journals of science, technology and medicine (STM) as well as social sciences. However, the quantum of these studies is much less, unlike bibliometric studies related to cross-national assessment or bibliometric assessment of individual countries. The reason for this is that the data collection on individual papers for the delay is time-consuming compared to that for cross-national assessment or assessment of output of individual countries, which can now be downloaded with a click of a button if one has access to a database, unlike earlier times when the data was collected manually. However, several authors from abroad have examined publication delays in different disciplines; while only two studies related to publication delays have been reported in the literature from India[1,3].

Diospatonyi *et al.*[4] examined publication delays in 10 major analytical chemistry journals for the period 1985–1999. They found that the average delay between receipt of an article and its publication was 7.1 months. Majority of journals showed good average performance. The *analyst* was found to be the leader in publication speed. Carroll[5] examined publication delay for six journals in the discipline of statistics and found a slight decrease from 25.2 months in 1994 to 22.3 months in1999. The reason for this decline as pointed out by him was electronic publishing in later periods. Bjork andTurk[6] examined

three journals in the discipline of civil engineering and found that the delay for OA journals was 6.7 months, whereas, for conventional journals, it was between18 and 18.9 months.

Bjork and Solomon[7]examined publication delay in 2700 papers published in 135 journals sampled from Scopus database indifferent disciplines of STM, social sciences and arts/humanities, and business and economics. They found that the shortest overall delay occurred in STM and the longest in social sciences and arts/humanities, and business and economics. Recently, Kalcioglu *et al*.[8] examined publication delay in 9,765 publications submitted to 37 international otolaryngology journals published during 1999-2013. Comparisons of the acceptance and publication times for both original research papers and case reports revealed that these times have become shorter over the years. Authors also found that journals with higher impact factors likely have larger workloads in terms of articles, and consequently, their acceptance and publication times might be longer.

The present study tries to quantify the delay between receipt of a manuscript for publication and subsequent publication in different journals published by Indian Academy of Sciences and to compare the results of the study with the publication delay of CSIR-NISCAIR journals.

Results and analysis

Table 1 presents the distribution of 10 periodicals by their disciplines along with the summary statistics on the frequency of publication of journals, the total number of papers published and the gap between different stages of publication of papers for each journal for 2014 and 2018. Here ED (editorial delay) reflects the delay between peer review and revision process, and TD (technical delay) reflects the time taken from revision to publishing, and TOD (total delay) is the total time taken from receipt of the paper to publication in the concerned journal. The journals in Table 1 have been arranged in decreasing order of total time delay (TOD) taking 2014 as the reference year. The ten journals studied have been classified into eight broad disciplines. These are mathematics, engineering and technology, material sciences, earth sciences, physics, biology, chemistry and multi-disciplinary. In all disciplines, only one journal was published except biology and physics. In these two disciplines, two journals each were published. During the period under study, the ten journals published 2986 papers. Of these, 1280 papers were published in the year 2014, and the number of publications increased to 1706 in 2018. The highest number of papers was published in *Current Science (CS)* in both the periods, which has been classified under multidisciplinary sciences. We have included only those papers in the analysis which provided information regarding dates of receipt and acceptance. For instance, *Journal Astronomy and Astrophysics (JAA)* published special issues publishing proceeding of the international conference, which has not been included in the analysis as it did not have any date regarding receipt and acceptance.

Time delay by disciplines

Analysis of the data presented in Table 1 indicates that the total average delay for the ten journals in the eight disciplines was 11.1 ± 5.3 months in 2014 and the same increased marginally to 12.8 ± 7.0 months in 2018. The average editorial delay in 2014 was 5.1 ± 3.8 months, and the average technical delay was 6.0 ± 4.2 months. In 2018, the average editorial delay increased to 7.0 ± 6.1 months and technical delay to 5.8 ± 3.8 months. This indicates that the editorial delay increased considerably in 2018, while technical delay decreased marginally. The total time delay varied significantly from one discipline to another. For instance, the highest 17.5 ± 2.9 months total delay was for mathematical sciences in 2014, which increased to 26.3 ± 4.5 months in 2018. This time delay is similar to results obtained for the total time delay in the discipline of statistics by Carroll[5].

The delay in mathematical sciences was followed by engineering and technology for which the total delay was (16.2 ± 5.3 months) in 2014, which increased to 17.6 ± 8.0 months in 2018. The time delay in engineering and technology is similar to results obtained by Garg[1] for three journals in the discipline of engineering and technology journals published by CSIR-NISCAIR in 2015. Total delay observed for material sciences was 16.2 ± 3.7 months in 2014, but the total delay for material sciences decreased considerably in 2018 to 12.6 ± 3.7 months. This decrease may be due to a decrease in the number of papers published by the journal in 2018, resulting in a decrease in technical delay in 2018. The total delay for earth sciences increased in 2018 as compared to 2014 but was less than a total delay in earth sciences for CSIR-NISCAIR journals[1]. The lowest 7.1 ± 3.2 months time delay was observed for multidisciplinary sciences in 2014, but the same almost doubled to 13.7 +/- 6.9 months in 2018. One possible reason for this may be a large increase in the number of papers published in 2018 as compared to

2014. This may have caused an increase in the editorial and technical delay resulting in a total delay in 2018. The lowest total delay (4.9 ± 1.7 months) in 2018 was for the discipline of chemistry. The time delay for chemistry is less than the time delay for two chemistry journals published by CSIR-NISCAIR[1].

Time delay by individual journals

As seen in Table 1, it is observed that the total delay varied from one journal to another in both the periods for which the data was examined. The total delay was more than average total delay for 2014 as well as 2018 for three journals namely *Proceedings of Mathematical Sciences (PMS)*, *Sadhana – Academy Proceedings in Engineering Sciences (SADH)*, and *Journal of Earth System Sciences (JESS)*. For the remaining seven journals, the total time delay was less than the total average time delay except for *Current Science (CS)*.

In the case of *Current Science (CS)*, the total time delay increased significantly in 2018 as compared to 2014. The reason for the increase in total delay for

Table 1—Average time gap (in months) for various stages of publication of manuscripts in 2014 and 2018

Journal	Frequency	Number of papers	Editorial delay		Technical delay		Total delay	
			Mean	SD	Mean	SD	Mean	SD
Mathematics								
PMS 2014	Q	52	4.2	4.2	13.2	2.6	17.5	2.9
PMS 2018	5 issues/year	↑65	↑8.9	5.6	↑17.4	6.8	↑26.3	4.5
Engineering & technology								
SADH 2014	Bi-M	89	9.8	5.1	6.4	2.1	16.2	5.3
SADH 2018	M	↑210	↑11.5	8.6	↓6.1	2.3	↑17.6	8.0
Materials Sciences								
BMS 2014	Bi-M	197	3.4	2.6	12.9	3.3	16.2	3.7
BMS 2018	7 issues/year	↓165	↑4.7	3.8	↓7.8	2.4	↓12.6	3.7
Earth Sciences								
JESS 2014	8 issues/year	140	7.2	3.9	5.8	1.7	13.0	4.4
JESS 2018	8 issues/year	↓119	↓7.0	3.7	↑8.3	0.9	↑15.3	3.9
Physics								
JAA 2014	Q	24	3.9	1.7	3.6	1.8	7.5	2.4
PJP 2014	M*	80	6.0	3.8	6.9	1.7	12.9	4.1
For both journals		104	5.5	3.5	6.1	2.2	11.6	4.4
JAA 2018	Bi-M	72	3.2	2.3	2.5	1.3	5.7	2.7
PJP 2018	M*	171	5.1	3.1	6.2	1.0	11.3	3.3
For both journals		↑243	↓4.5	3.0	↓5.1	2.0	↓9.6	4.0
Biology								
JB 2014	5 issues/year	58	6.2	3.6	3.3	0.9	9.5	3.9
JG 2014	3 issues/year	113	4.4	2.9	6.3	1.3	10.7	3.0
For both journals		171	5.0	3.3	5.3	1.8	10.3	3.4
JB 2018	5 issues/year	73	5.3	2.8	3.7	1.0	9.1	3.1
JG 2018	5 issues/year	147	4.2	2.6	7.4	2.2	11.6	3.7
For both journals		↑220	↓4.6	2.7	↑6.2	2.6	↑10.8	3.7
Chemistry								
JCS 2014	Bi-M	195	3.9	3.0	3.9	1.7	7.8	3.3
JCS 2018	M	↓167	↓2.7	1.6	↓2.2	0.8	↓4.9	1.7
Multidisciplinary								
CS 2014	F	332	4.9	3.0	2.2	1.1	7.1	3.2
CS 2018	F	↑517	↑9.2	6.7	↑4.5	2.4	↑13.7	6.9
For all 10 journals 2014		1280	5.1	3.8	6.0	4.2	11.1	5.3
For all 10 journals 2018		↑1706	↑7.0	6.1	↓5.8	3.8	↑12.8	7.0

↑ Indicate an increase and ↓ indicate a decrease.

Current Science (CS) has been explained above 'under delay by disciplines'. Further analysis of data indicates that the total time delay was highest 17.5 ± 2.9 months and 26.3 ± 4.5 months, respectively for *Proceedings of Mathematical Sciences (PMS)* in 2014 and 2018. The total time delay in 2018 is almost one and a half times more to that of 2014 for *Proceedings of Mathematical Sciences (PMS)*. The total delay in case of *Proceedings of Mathematical Sciences (PMS)* might be due to an increase in the number of papers in 2018 as compared to 2014. The increase in the number of papers in 2018 resulted in an increase in time for ED as well as TD, resulting in total time delay (TOD). The time delay of *Proceedings of Mathematical Sciences (PMS)* was followed by *Sadhana – Academy Proceedings in Engineering Sciences (SADH)* with 16.2 ± 5.3 months and 17.6 ± 8.0 months) time delay in 2014 and 2018 respectively.

In case of *Sadhana – Academy Proceedings in Engineering Sciences (SADH)* also, the number of papers published were more than double the number of papers published in 2014, resulting in an increase of ED and thus in TOD. The next in order of time delay was *Bulletin of Material Science (BMS)* and *Journal of Earth System Sciences (JESS)*. The total delay for *Journal of Earth System Sciences (JESS)* increased, due to an increase in technical delay in 2018 as compared to 2014. The time delay for *Bulletin of Material Science (BMS)* was (16.2 ± 3.7 months) for 2014, but the same decreased to (12.6 ± 3.7 months) in 2018. An exploration of data indicates that the number of papers published in *Bulletin of Material Science (BMS)* decreased in 2018, which resulted in a decrease in time for technical delay and finally in total delay.

For remaining five journals namely Journal of Biosciences (JB), Journal of Genetics (JG), Journal of Astronomy and Astrophysics (JAA), Journal of Chemical Science (JCS) and Pramana-Journal of Physics (PJP), the total time delay was less than the average of 10 journals in 2014 as well as 2018. It was lowest for the Journal of Astronomy and Astrophysics (JAA) and Journal of Chemical Science (JCS) in 2014. However, in 2018, the lowest time delay was observed for Journal of Chemical Science (JCS), Journal of Astronomy and Astrophysics (JAA) and Journal of Biosciences (JB) in that order.

The total delay has decreased for Journal of Biosciences (JB), Journal of Astronomy and Astrophysics (JAA) and Journal of Chemical Science (JCS) in 2018 as compared to 2014. The total delay for Journal of Biosciences (JB), Journal of Astronomy and Astrophysics (JAA) and Journal of Chemical Science (JCS) is less than Indian Journal of Experimental Biology (IJEB), Indian Journal of Biotechnology (IJBT), Indian Journal of Pure and Applied Physics (IJPAP), and Indian Journal of Chemistry-B (IJC-B) published by CSIR-NISCAIR. However, time delay for Journal of Chemical Science (JCS) is more than Indian Journal of Chemistry-A (IJC-A) for 2014, but less in 2018. Figure 1 shows average editorial delay and technical delay duration for ten journals in 2014 and 2018.

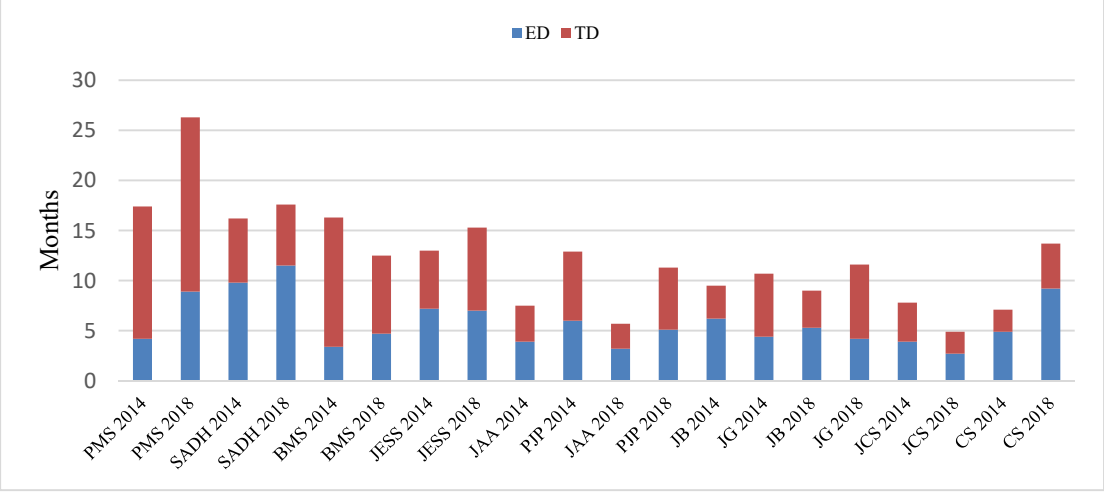

Figure 1 — Average editorial (ED) and technical (TD) delay for 2014 and 2018 respectively for 10 journals. *PMS: Proceedings of Mathematical Sciences; SADH: Sadhana – Academy Proceedings in Engineering Sciences; BMS: Bulletin of Materials Science; JESS: Journal of Earth System Sciences; JAA: Journal of Astrophysics and Astronomy; PJP: Pramana – journal of Physics; JB: Journal of Biosciences; JG: Journal of Genetics; JCS: Journal of Chemical Sciences and CS: Current Science.*

Suggestions and conclusion

The study examines publication delay for ten journals published by Indian Academy of Sciences during 2014 and 2018 and compared the delay with journals published by CSIR-NISCAIR during 2015. Based on the study, it can be concluded that there is a remarkable difference between total delays between different journals. For instance, the total delay was highest (17.5 ± 2.9 months) and (26.3 ± 4.5 months) respectively for *Proceedings of Mathematical Sciences (PMS)* in 2014 and 2018. The highest total time delay for PMS was due to more than average time delay for the editorial delay and technical delay for several articles. The total time delay was lowest for *Current Science* (7.1 ± 3.2 months) in 2014, while in 2018 it was lowest for *Journal of Chemical Science (JCS)* in 2018.

It is also observed that for some individual articles, the delay time is excessively large compared to other articles in the same journal, which has increased total delay. For instance, the editorial delay (ED) time in *Current Science* for 52 articles in 2018 was more than 20 months, and the average delay for these articles were almost 24 months. Similarly, the average editorial delay (ED) for 20 papers and TD for 41 papers was more than the actual average for *Proceedings of Mathematical Sciences (PMS)*. However, the online publication of papers by *Sadhana (SADH)* and *Proceedings of Mathematical Sciences (PMS)* may reduce the total delay of publication in these journals.

The present study might serve some useful purpose to the management of journals being published by the Indian Academy of Science. The above analysis indicates that the editorial delays remains the most time-consuming element and seems to be, on an average, seven months. It is suggested that editors of journals and their staff should devote time and resources to reduce the time gap in the publication of manuscripts. Journals can avoid delayed publication if they publish papers online. The academy has already started continuous article publication mode from 2019, details of which are available on the website of the journals. The publication delay can be reduced by increasing the frequency of publication of the journals. Editors should also promote review by those reviewers who are prompt in reviewing the manuscripts.

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