

## A snapshot of open access journals in science

Open access (OA) publishing which eliminates various restrictions on access has greatly changed the landscape of scientific publishing<sup>1</sup>. OA publishing is now widely acknowledged to accelerate the knowledge production and dissemination. Accompanying the changing global research landscape<sup>2-4</sup>, the volume of OA publications has also risen rapidly over the past decade<sup>5</sup>.

The *Journal Citation Reports* of Thomson Reuters began to provide the open access filter to identify the full OA journals in 2015 (for more information

please refer to <http://ipscience-help.thomsonreuters.com/incitesLive/JCR/whatsNew-Group/whatsNew/JCR.html>). This new update facilitates the study focusing on the development of OA publishing. This study used the *Journal Citation Reports-Science Edition* of the last 15 years from 2001 to 2015 to depict the trajectories of OA academic publishing in science. We collected the raw data on 15 July 2016 from the library of Shanghai Jiao Tong University, China.

As illustrated in Figure 1, the volume of OA journals was relatively low con-

sidering both the absolute number and relative share among all the *Science Citation Index Expanded (SCIE)* journals in 2001. The following eight years witnessed the smooth growth of OA journals from 154 in 2001 to 395 in 2008. Besides the coverage expansion of *Web of Science (WoS)-SCIE*, the share of OA journals among all the *SCIE* journals has doubled from 2.7% in 2001 to 6.0% in 2008. The rapid growth in OA journals can be witnessed during 2009 and 2010. Although this can be partly attributed to the rapid coverage expansion of *WoS*, the

**Table 1.** Distribution of journals and publications among four JIF quartiles

JIF quartile	OA journals		Publications in OA journals		All SCIE journals		Publications in all SCIE journals	
	#	%	#	%	#	%	#	%
Q1	189	17.7	85,603	43.4	2,380	27.1	608,064	44.0
Q2	214	20.0	35,563	18.0	2,168	24.7	362,177	26.2
Q3	287	26.8	41,165	20.9	2,089	23.8	235,301	17.0
Q4	379	35.5	35,075	17.8	2,141	24.4	177,722	12.8
Total	1,069	100.0	197,406	100.0	8,778	100.0	1,383,264	100.0

JIF, Journal impact factor; OA, Open access; *SCIE*, *Science Citation Index Expanded*; #, Number of journals or publications; %, Share of journals or publications.

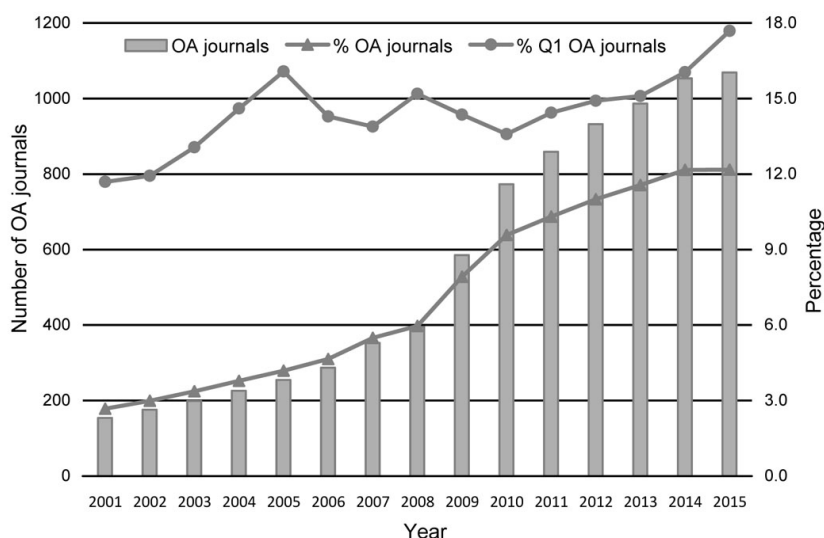
Data source: 2015 *Journal Citation Reports-Science Edition*, only two citable items (articles and reviews) were considered.

**Table 2.** Top 10 OA journals

Journal	Publisher	JIF	Category	Publications	Share (%)
<i>PLoS ONE</i>	Public Library of Science	3.057	Multidisciplinary sciences (11/63)	28,114	14.2
<i>Scientific Reports</i>	Nature Publishing Group	5.228	Multidisciplinary sciences (7/63)	10,642	5.4
<i>Optics Express</i>	Optical Society of America	3.148	Optics (14/90)	3321	1.7
<i>Biomed Research International</i>	Hindawi Publishing Corporation	2.134	Biotechnology and applied microbiology (81/161); Medicine, research and experimental (72/124)	3179	1.6
<i>International Journal of Clinical and Experimental Medicine</i>	e-Century Publishing Corporation	1.075	Medicine, research and experimental (102/124)	2913	1.5
<i>Mathematical Problems in Engineering</i>	Hindawi Publishing Corporation	0.644	Engineering, multidisciplinary (59/85); Mathematics, interdisciplinary applications (81/101)	2260	1.1
<i>Medicine</i>	Lippincott Williams & Wilkins	1.206	Medicine, general and internal (77/151)	1989	1.0
<i>International Journal of Clinical and Experimental Pathology</i>	e-Century Publishing Corporation	1.581	Oncology (176/213); Pathology (46/78)	1927	1.0
<i>International Journal of Molecular Sciences</i>	MDPI AG	3.257	Biochemistry and molecular biology (110/289); chemistry, multidisciplinary (51/163)	1725	0.9
<i>Sensors</i>	MDPI AG	2.033	Chemistry, analytical (36/75); Electrochemistry (16/27); Instruments and instrumentation (12/56)	1649	0.8

JIF, Journal Impact Factor of 2015; Numbers in parenthesis represent the ranking of JIF among a specific category; Pubs, Number of articles and reviews published in 2015; Share, Publications of a specific journal/all publications from OA journals.

Data source: 2015 *Journal Citation Reports-Science Edition*.



**Figure 1.** Open access (OA) journals identified by *Journal Citation Reports-Science Edition*. % OA journal, share of OA journals among all SCIE journals; % Q1 OA journal, share of Q1 OA journals among all OA journals.

relative share of OA journals has also risen quickly from 6.0% in 2008 and 7.9% in 2009 to 9.6% in 2010. After this quick expansion, the OA journals returned to a stable growth in the last phase. The number of OA journals rose from 859 in 2011 to 1069 in 2015, with relative share from 10.3% to 12.2%. The evolution of OA journals echoes the findings of Liu and Li<sup>5</sup> which focused on the booming of OA publications.

We probed the OA journals from the impact perspective by introducing journal impact factor (JIF) quartile (from the highest Q1 to the lowest Q4; for more information please refer to <http://ipscience-help.thomsonreuters.com/incitesLive/9053-TRS.html>). Accompanying the quick rise in OA journals, we can also see the growth of Q1 (high impact factor) OA journals from 18 in 2001 to 189 in 2015. However, the shares of Q1 journals among all the OA journals during the past 15 years, fluctuating between 11% and 18%, were lower than the benchmark value of 25%. The relatively low share of Q1 journals demonstrates the limited share of high impact factor OA journals. However, in Figure 1, we can see the upward trend of the share of Q1 OA journals.

We also explored the distribution of journals and publications among the four quartiles using the latest 2015 *Journal Citation Reports-Science Edition*. For journals with more than one quartile, only the higher quartile is allocated to them to avoid double counting<sup>6</sup>. Table 1 shows the distribution of journals and publications of both OA journals and all SCIE journals among the four quartiles. The data show that only 17.7% of the OA journals have high impact factor (Q1); however, more than 60% of the OA journals have relatively low impact factor (Q3 and Q4). It is surprising to find that the limited Q1 OA journals (17.7%) have 43.4% of all publications in OA journals. Comparatively, 27.1% of SCIE journals fall in Q1 and 44.0% of all the 1,383,264 SCIE papers are published in Q1 journals.

Table 2 captures the top 10 OA journals with the largest number of publications in 2015. *PLoS ONE* has published 28,114 papers in 2015, which account for 14.2% of all OA SCIE publications. Following this is *Scientific Reports* published by Nature Publishing Group with 10,642 papers. These two mega journals can partly explain the uneven distribution of OA publications among the four

JIF quartiles. Besides, the top 10 OA journals have published 29.2% of all 197,406 papers, which indicates the extremely uneven distribution of publication volume among OA journals.

This study is a snapshot of OA publishing in science. The quick development of OA publishing has greatly changed the landscape of academic publishing. Our observations may evoke further considerations, such as how to evaluate research using different publishing models more reasonably? How to improve the impact of the majority low impact factor OA journals?

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