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Investigating the Citations Received by Journals of Directory of Open Access Journals from ISI Web of Science's Articles

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Abstract

In this research, the citations received by DOAJ's journals from the ISI Web of Science's articles in 2003 to 2008 were studied and compared. The citations received by the journals in five fields (Arts & Humanities, Social Sciences, Pure Sciences, Technology & Engineering, and Health & Medical Sciences) as well as the difference among the citations received by DOAJ's journals in the above-mentioned five fields were examined. The research method is citation analysis and the research data have been collected by means of Cited Reference Search in the ISI Web of Science. The English-language journals in DOAJ were chosen, and no sampling was used. Findings showed that out of 2953 journals, 321 journals (10.87%) received citations, and the total citations received by these journals were 19050 with the mean of 6.45 per journal; the journals in Pure Sciences received most citations (10116 citations, equal to 53.1%), and the ones in Arts & Humanities received the least citations (701 citations, equal to 3.68%). On the other hand, the findings of Chi-Square test (χ^2) indicate that there is a significant difference among the citations in the above-mentioned five fields.

Keyword: Journals, DOAJ, ISI Web of Science, Citation Analysis.

Introduction

An issue associated with journal articles is research access/impact because these materials are not accessible to all of their users; hence, they are losing potential research impact. The solution is to make all articles open access (Harnad & et. al., 2008).

There is currently an explosion of interest in the promise of open-access scholarship and publishing in the academic and publishing communities (Bethesda Statement on Open Access Publishing, 2003), because issues associated with scientific communication have a basic role in the evolution of the distribution of and access to knowledge (Qane, 2004).

In the recent years, open access journals have been turned into the arena of scholarly communications and publication of scientific literature. The scientific literature which is found only in open access journals is considerable. The increase of open access journals indicates that a rapid evolution of the publication model is occurring (Kousha & Thelwall,

2006). In fact, the demise of traditional scholarly journals has been anticipated (Harnad, 1999).

Statement of the problem

Today, one of the richest databases of the electronic open access journals on the World Wide Web is the *Directory of Open Access Journals* (*DOAJ*)[1] whose managers claim that it delivers free and full-text peer- reviewed scientific and scholarly journals to users, and aims to be comprehensive and include the whole scientific and scholarly journals which use a quality control in order to insure their contents. In October 6, 2008, this directory had over 3700 journals (Directory of Open Access Journals, 2008).

However, one may question do the journals in DOAJ are valid and can be cited? One of the problems with open access journals is the shortage of standards, policies, and background for the establishment of journal's validity. Open access journals have not been still accepted as a style of publication and an exhibition of scholarly works in the public opinion, and their contributions in producing scholarly works is not certain and clear (Montgomery, 2006). Hence, in order to clarify the validity of open access journals, it must be studied comprehensively in terms of citations received by these journals (which is one of the methods for determining the validity of journals).

Research questions

The research questions are:

1. How much are the citations received by DOAJ's journals from ISI Web of Science's articles in Arts & Humanities in 2003 to 2008?
2. How much are the citations received by DOAJ's journals from ISI Web of Science's articles in Social Sciences in 2003 to 2008?
3. How much are the citations received by DOAJ's journals from ISI Web of Science's articles in Pure Sciences in 2003 to 2008?
4. How much are the citations received by DOAJ's journals from ISI Web of Science's articles in Technology & Engineering in 2003 to 2008?
5. How much are the citations received by DOAJ's journals from ISI Web of Science's articles in Health & Medical Sciences in 2003-2008?
6. Is there a significant difference among the citations received by DOAJ's journals in terms of the above-mentioned five fields (Arts & Humanities, Social Sciences, Pure Sciences, Technology & Engineering, and Health & Medical Sciences)?

Methodology

In this research the bibliometric method and citation analysis technique was used. In citation analysis, the citations received by journals or articles are counted (Kumar, 1999). In

fact, the citation analysis that is used for evaluating researches and is one of the techniques for determining the journals' validity studies the amount of the usage of journals or articles (Moed, 2005). In this research, after counting the citations, given to the total citations of each subject and by using percentage, the most cited journals were ranked.

The criterion used for counting the citations is the ISI Web of Science's journal articles, because today, ISI Web of Science is the main tool for determining the impact factor in citation analysis studies (The rise of open access journals, 2007), and it has been used considerably and widely for evaluating scientific researches for a long time (Kousha & Thelwall, 2007); hence, it seems to be a universal and popular criterion.

To conduct a comprehensive study, the whole English-language DOAJ's journals in the whole fields (Arts & Humanities, Social Sciences, Pure Sciences, Technology & Engineering, Health & Medical Sciences) in 2003 to 2008 were studied; hence, no sampling was used and 2953 English-language journals were extracted from DOAJ:

- Arts & Humanities: 654 journals;
- Social Sciences: 519 journals;
- Pure Sciences: 657 journals;
- Technology & Engineering: 443 journals;
- Health & Medical Sciences: 680 journals.

It should be noted that because of the diversity of subjects and disciplines in DOAJ, the above division of fields is based on the ISI's division of sciences.

To gather data the Cited Reference Search in ISI Web of Science was used. Finally, the research data were analyzed by means of SPSS 16. For the research questions 1-5, frequencies, percent, and mean, and for the research question 6 Chi-Square test (χ^2) was used, respectively.

Review of Literature

In recent years, several studies have been done on the amount of citations received by open access journals.

In a study, Harnad & et. al. (2004) claimed that the average ratio of citations received by open access articles was more than non open access articles in each subject; open access articles in Physics received the most citations.

Antelman (2004) found that there was a distinctive difference between the amount of citations received by open access articles and the amount of citations received by non open access articles in 4 subjects including Philosophy, Political Sciences, Electrical & Electronic Engineering, and Mathematics. He stated that, open access articles in Mathematics and Electrical & Electronic Engineering have more citations than Political Sciences and Philosophy.

McVeigh (2004) after studying 192 ISI open access journals stated that the model of

open access contribution had not a considerable effect on the journals' function (positive or negative), and it only changed the path which scholars followed to access the scholarly literatures. Also, accessing an article from every path is a necessary condition for citing it.

Eysenbach (2006) pointed out that the published open access articles on the journal (*Proceedings of the National Academy of Sciences*) website had a higher impact factor than the articles which authors archive (self-archiving) on a personal website. On the other hand, since the open access publishing accelerates the dissemination of research findings it has more benefits for science.

Tonta, et. al. (2007) after dividing selected subjects into 3 groups- the first group (Physics, Mathematics, Chemical Engineering), the second group (Economics, Environmental Sciences, and Biology), and the third group (Psychology, Sociology, and Anthropology), found that open access articles in Biology and Economics received almost half of all citations (25.2% and 20.2%) whereas the ones in Psychology and Sociology did much fewer (3.7% and 3.2%). Open access articles in the second group received more than half (53.7%) of all citations followed by the first group (26.5%) and the third group (19.7%).

Kousha & Thelwall (2007) after selecting the English-language journals in 2001, in the subjects of Education, Psychology, Sociology, and Economics, analyzed 1530 citations received by 492 scholarly articles from 44 open access journals in Social Sciences. They found that about 19% of the web citations were formal citations while about 11% of the citations were informal citations. The average number of citations was 3 formal citations and 2 informal citations per article.

Sotudeh, & et. al (2007), after extracting Iran's scientific products and their citations by means of ISI database, concluded that journals in Metallurgy and Multidisciplinary Sciences received the most citations, and the ones in Physics and Health & Medical Sciences received the least.

Rahimi, & et. al. (2007) found that the amount of citations received by open access journals in Health & Medical Sciences is less than 1 percent, but the amount of citations received by these journals in 2006 is more than that in 2005. Among 369 Medical open access journals, BMC Biochemistry in Biochemistry and BMC Psychiatry in Psychiatry and The Apps Journal and Daru in Pharmaceuticals have the most citations.

Findings

After studying 2953 journals in DOAJ, according to Table1, it was found that totally 321 journals (10.87%) received citations and the total number of citations which had been received by these journals in 2003 to 2008 was 19050. The average number of citations per journal was 6.45.

Table1

Citations to DOAJ's Journals in the Five Fields

Subject	Number of journals studied	%	Number of cited journals	%	Number of citations	%	Mean of citations
Arts & Humanities	654	22.15	62	9.48	701	3.68	1.07
Social Sciences	519	17.58	55	10.59	832	4.37	1.6
Pure Sciences	657	22.25	97	14.76	10116	53.1	15.4
Technology & Engineering	443	15	40	9.02	1436	7.54	3.24
Health & Medical Sciences	680	23.02	67	9.85	5965	31.31	8.77
Total	2953	100	321	10.87	19050	100	6.45

According to Table1, the ranking of the above-mentioned five fields in terms of the received citations (without considering the whole number of journals) is as follows:

1. Pure Sciences (97 cited journals, 10116 citations, equal to 53.1%);
2. Health & Medical Sciences (67 cited journals, 5965 citations, equal to 31.31);
3. Technology & Engineering (40 cited journals, 1436 citations, equal to 7.54%);
4. Social Sciences (55 cited journals, 832 citations, equal to 4.37%);
5. Arts & Humanities (62 cited journals, 701 citations, equal to 3.68%).

However, 2632 journals (89.13%) received no citation. On the other hand, it was also observed that according to Table 2, in the five fields, 57 journals (17.75%) received only 1 citation, 23 journals (7.16%) received 2 citations, 26 journals (8.09%) received 3 citations, and 215 journals (66.98%) received 4 citations or more.

Table 2

Comparison between 1-3-cited Journals and 4 or More-cited Journals

No. of 1-cited journals	%	No. of 2-cited journals	%	No. of 3-cited journals	%	No. of 4 or more-cited journals	%
57	17.76	23	7.16	26	8.1	215	66.98

Now, the research questions will be verified below:

Question1. How much are the citations received by DOAJ's journals from ISI Web of Science's articles in Arts & Humanities in 2003 to 2008?

According to the research findings in Table 3, 62 journals (9.48%) out of 654 ones received citations; totally, these journals received 701 citations, and the average number of citations per journal is 1.07. In this field, the most citations were received by a journal in Arts. On the other hand, the subject of Arts received the most citations (253 citations, equal to 36.09%). This subject has 53 journals (8.1%), out of which 11 ones (20.75%) received citations, Whereas, Geography received the least citations (25 citations, equal to 3.57%), this subject has 20 journals (3.05%) out of which 3 ones (15%) received citations.

Table3

Citations to Arts & Humanities' Journals in DOAJ

Subject	No. of journals studied	%	No. of cited journals	%	No. of citations	%	Mean of citations	Most citations per subject	%
Arts	53	8.1	11	20.75	253	36.09	4.77	177	25.25
Economics & Business	101	15.45	10	9.9	166	23.68	1.64	65	9.27
History & Archeology	96	14.68	3	3.12	54	7.7	0.56	52	7.42
Languages & literature	157	24	20	12.73	120	17.11	0.76	22	3.13
Law & Political sciences	130	19.88	6	4.61	39	5.57	0.3	22	3.13
Philosophy & Religion	97	14.84	9	9.27	44	6.28	0.45	18	2.56
Geography	20	3.05	3	15	25	3.57	1.25	17	2.42
Total	654	100	62	9.48	701	100	1.07		

According to the research findings in Table 3, the ranking of the subjects of Arts & Humanities in terms of citations to them (without considering the total number of journals) is as follows:

1. Arts (11 cited journals, 253 citations, equal to 36.09%);
2. Economics & Business (10 cited journals, 166 citations, equal to 23.68%);

3. Languages & Literature (20 cited journals, 120 citations, equal to 17.11%);
4. History & Archeology (3 cited journals, 54 citations, equal to 7.7%);
5. Philosophy & Religion (9 cited journals, 44 citations, equal to 6.28%);
6. Law & Political Sciences (6 cited journals, 39 citations, equal to 5.57%);
7. Geography (3 cited journals, 25 citations, equal to 3.57%).

After studying the research findings in Arts & Humanities, the most cited journals were identified, which included *Forum, Management, DISP, Geochronometria, Linguistik Online, Politikon*. These journals were ranked in details in table4:

Table4

The Most Cited Journals in Arts & Humanities

Rank	Journal title	Publisher	Subject	No. of citations	%
1	Forum	Forum	Arts	177	25.25
2	Management	University of Primorska	Economics & Business	65	9.27
3	DISP	Eidgenössische Technische Hochschule…	Economics & Business	60	8.55
4	Geochronometria	WIND- J. Wojewoda Publishing Company	History & Archeology	52	7.41
5	Linguistik Online	European University Viadrina	Languages & Literature	22	3.13
…	Politikon	International Association for Political Science…	Law & Political Sciences	22	3.13

Question2. How much are the citations received by DOAJ's journals from ISI Web of Science's articles in Social Sciences in 2003-2008?

According to the research findings in Table 5, 55 journals (10.59%) out of 519 ones received citations; totally, these journals received 832 citations, and the average number of citations per journal is 1.6. In this field, the most citations were received by one journal in Social Sciences (General). On the other hand, the subject of Social Sciences (General) received the most citations (656 citations, equal to 78.84%). This subject has 293 journals (56.45%) out of which 37 ones (12.62%) received citations whereas Education received the least citations (86 citations, equal to 10.34%); this subject has 180 journals (34.68) out of which 12 ones (6.66%) received citations.

Table 5

Citations to Social Sciences' Journals in DOAJ

Subject	No. of journals Studied	%	No. of cited journals	%	No. of citations	%	Mean of citations	Most citations per subject	%
Social Sciences (General)	293	56.45	37	12.62	656	78.84	2.23	234	28.12
Sociology	46	8.87	6	13.04	90	10.82	1.95	29	3.48
Education	180	34.68	12	6.66	86	10.34	.48	44	5.28
Total	519	100	55	10.59	832	100	1.6		

According to the research findings in Table 5, the ranking of the subjects of Social Sciences in terms of citations to them (without considering the total number of journals) is as follows:

1. Social Sciences (General) (37 cited journals, 656 citations, equal to 78.84%);
2. Sociology (6 cited journals, 90 citations, equal to 10.82%);
3. Education (12 cited journals, 86 citations, equal to 10.34%).

After studying the research findings of Social Sciences, the most cited journals were identified, which included *D-Lib Magazine, Ariadne, Horizons, Learning Technology, Qualitative Report, Social Policy Report, IDEAS*. These journals were ranked in details in Table 6:

Table6

The Most Cited Journals of Social Sciences

Rank	Journal title	Publisher	Subject	No. of citations	%
1	D-Lib Magazine	Corporation for National Research Initiatives	Library & information …	234	28.12
2	Ariadne	UKOLN. University of Bath	Library & information …	100	12.01
3	Horizons	Policy Research Initiative, Government of Canada	Social Sciences	55	6.61

Rank	Journal title	Publisher	Subject	No. of citations	%
4	LearningTechnology	IEEE Computer Society	Education Sciences	44	5.28
…	Qualitative Report	Nova Southeastern…	Social Sciences	44	5.28
...	Social Policy Report	Society for Research on…	Social Sciences	44	5.28
5	IDEAS	Fachhochschule Heilbronn	Sociology	29	3.48

Question 3. How much are the citations received by DOAJ's journals from ISI Web of Science's articles in Pure Sciences in 2003 to 2008?

According to the research findings in Table 7, 97 journals (14.76%) out of 657 ones received citations; totally, these journals received 10116 citations, and the average number of citations per journal is 15.4. In this field, the most citations (2491 citations, equal to 24.62%) were received by a journal in Biology. On the other hand, the subject of Biology & life Sciences received the most citations (6009 citations, equal to 59.4%); this subject has 290 journals (44.14%) out of which 53 ones (18.27%) received citations whereas Mathematics and Statistics received the least citations (91 citations, equal to 0.9%); this subject has 119 journals (18.11%) out of which 6 ones (5.04%) received citations. It should be mentioned that the Science (General) which has 1 journal, (0.15%), received 1743 citations (17.23%) and it is ranked as the second journal in terms of received citations in Pure Sciences.

Table 7

Citations to Pure Sciences' Journals in DOAJ

Subject	No. of journals studied	%	No. of Journals cited	%	No. of citations	%	Mean of citations	Most citations per subject	%
Biology & Life Sciences	290	44.14	53	18.27	6009	59.4	20.72	2491	24.62
Chemistry	59	8.98	6	10.17	1061	10.49	17.98	569	5.62
Physics & Astronomy	58	8.83	6	10.34	409	4.04	7.05	212	2.09

Subject	No. of journals studied	%	No. of Journals cited	%	No. of citations	%	Mean of citations	Most citations per subject	%
Mathematics & Statistics	119	18.11	6	5.04	91	0.9	0.76	91	0.9
Earth & Environmental Sciences	130	19.79	25	19.23	803	7.94	6.17	218	2.15
Sciences (General)	1	0.15	1	100	1743	17.23	1743	1743	17.23
Total	657	100	97	14.76	10116	100	15.40		

According to the research findings in Table 7, the ranking of the subjects of Pure Sciences in terms of citations to them (without considering the total number of journals) is as follows:

1. Biology & Life Sciences (53 cited journals, 6009 citations, equal to 59.4%);
2. Science (General) (1 cited journal, 1743 citations, equal to 17.23%);
3. Chemistry (6 cited journals, 1061 citations, equal to 10.49%);
4. Earth & Environmental Sciences (25 cited journals, 803 citations, equal to 7.94%);
5. Physics & Astronomy (6 cited journals, 409 citations, equal to 4.04%);
6. Mathematics & Statistics (6 cited journals, 91 citations, equal to 0.9%).

After studying the research findings of Pure Sciences, the most cited journals were identified which included *BMC Bioinformatics, PLoS ONE, BMC Genomics, Molecules, Planta Daninha*. These journals were ranked in details in Table 8:

Table8

The Most Cited Journals in Pure Sciences

Rank	Journal title	Publisher	Subject	No. of citations	%
1	BMC Bioinformatics	BioMed Central	Biology	2491	24.62
2	PLoS ONE	Public Library of Science)	Science(General)	1743	17.23
3	BMC Genomics	BioMed Central	Genetics	1536	15.18

Rank	Journal title	Publisher	Subject	No. of citations	%
4	Molecules	Molecular Diversity…	Organic Chemistry	569	5.62
5	Planta Daninha	Sociedade Brasileira da Ciência das Plantas…	Botany	281	2.77

Question 4. How much are the citations received by DOAJ's journals from ISI Web of Science's articles in Technology & Engineering in 2003 to 2008?

According to the research findings in Table 9, 40 journals (9.02%) out of 443 ones received citations; totally, these journals received 1436 citations, and the average number of citations per journal is 3.24. In this field, the most citations (256 citations, equal to 17.82%) were received by a journal in Technology (General). On the other hand, the subject of Engineering received the most citations (669 citations, equal to 46.59%). This subject has 242 journals (54.63%) out of which 20 ones (8.26%) received citations whereas Technology (General) received the least citations (366 citations, equal to 25.49%). This subject has 49 journals (11.06%) out of which 2 ones (4.08%) received citations.

Table 9

Citations to Technology & Engineering's Journals in DOAJ

Subject	No. of journals studied	%	No. of cited journals	%	No. of citations	%	Mean of citations	Most citations per subject	%
Agriculture & Food Industries	152	34.31	18	34.61	401	27.92	2.63	107	7.45
Engineering	242	54.63	20	8.26	669	46.59	2.76	119	8.28
Technology (General)	49	11.06	2	4.08	366	25.49	7.49	256	17.82
Total	443	100	40	9.02	1436	100	3.24		

According to the research findings in Table 9, the ranking of the subjects of Technology & Engineering in terms of citations to them (without considering the total number of journals) is as follows:

1. Engineering (20 cited Journals, 669 citations, equal to 46.59%);

2. Agriculture & Food Industries (18 cited journals, 401 citations, equal to 27.92%);
3. Technology (general) (2 cited journals, 366 citations, equal to 25.49%).

After studying the research findings of Technology & Engineering, the most cited journals were identified which included *Interciancia, Informatica, Transport, Bragantia, Metalurgija*. These journals were ranked in details in Table 10.

Table10

The Most Cited Journals of Technology & Engineering

Rank	Journal title	Publisher	Subject	No. of citations	%
1	Interciancia	The Interciencia Association	Technology (General)	256	17.82
2	Informatica	The Slovene Society…	Computer Sciences	119	8.28
3	Transport	Vilnius Gediminas Technical…	Transportation	110	7.66
4	Bragantia	Instituto Agronômico de Campinas	Agriculture (General)	107	7.45
5	Metalurgija	Croatian Metallurgical Society	Mining & Metallurgy	101	7.03

Question 5. How much are the citations received by DOAJ's journals from ISI Web of Science's articles in Health & Medical Sciences in 2003 to 2008?

According to the research findings in Table11, 67 journals (9.85%) out of 680 ones received citations; totally, these journals received 5965 citations, and the average number of citations per journal is 8.77. In this field, the most citations (1469 citations, equal to 24.62%) were received by a journal in Internal Medicine. On the other hand, the subject of Medicine (General) received the most citations (3236 citations, equal to 54.26%). This subject has 480 journals (70.59%) out of which 57 ones (11.87%) received citations whereas Dentistry received the least citations (1 citation, equal to 0.01%). This subject has 25 journals (3.68%) out of which 1 journal (4%) received citation.

Table11

Citations to Health & Medical Sciences' Journals in DOAJ

Subject	No. of journals studied	%	No. of cited journals	%	No. of citations	%	Mean of citations	Most citations per subject	%
Dentistry	25	3.68	1	4	1	0.01	0.04	1	0.01
Medicine (General)	480	70.59	57	11.87	3236	54.26	6.74	952	15.96
Internal Medicine	100	14.8	5	5	1587	26.6	15.87	1469	24.62
Public Health	75	11.02	4	5.33	1141	19.13	15.21	901	15.1
Total	680	100	67	9.85	5965	100	8.77		

According to the research findings in Table11, the ranking of the subjects of Health & Medical Sciences in terms of citations to them (without considering the total number of journals) is as follows:

1. Medicine (General) (57 cited journals, 3236 citations, equal to 54.26%);
2. Internal Medicine (5 cited journals, 1587 citations, equal to 26.6%);
3. Public Health (4 cited journals, 1141 citations, equal to 19.13%);
4. Dentistry (1 cited journal, 1 citation, equal to 0.01%).

After studying the research findings of Health & Medical Sciences, the most cited journals were identified which included *Haematologica, BMC Cancer, BMC Public Health, CMAG, Retrovirology*. These journals were ranked in details in Table 12.

Table12

The Most Cited Journals in Health & Medical Sciences

Rank	Journal title	Publisher	Subject	No. of citations	%
1	Haematologica	Ferrata Storti Foundation	Internal Medicine	1469	24.62
2	BMC Cancer	BioMed Central	Oncology (Medicine General)	952	15.95
3	BMC Public Health	BioMed Central	Public Health	901	15.1
4	CMAG	HighWire	Medicine (General)	494	8.28

Rank	Journal title	Publisher	Subject	No. of citations	%
5	Retrovirology	BioMed Central	Medicine (General)	391	6.55

Question 6. Is there a significant difference among the citations received by DOAJ's journals in terms of the above-mentioned five fields (Arts & Humanities, Social Sciences, Pure Sciences, Technology & Engineering, Health & Medical Sciences)?

In order to examine the significance of the citations in the above-mentioned five fields, a Chi-Square test (χ^2) was taken. The observed and expected frequencies are presented in Table 13.

Table13

Observed and Expected Frequencies Resulted from Chi-Square Test

Field	Observed frequencies	Expected frequencies
Arts & Humanities	701	3810
Social Sciences	832	3810
Pure Sciences	10116	3810
Technology & Engineering	1436	3810
Health & Medical Sciences	5965	3810

According to Table14, Chi-Square is 17999.974, df is 4, and Asymp. Sig. is 0.001; hence, given to statistical rules there is a significant difference between the citations in the above-mentioned five fields (Asymp. Sig.= 0.001<0.05).

Table14

Findings for Chi-Square Test

N	19050
Chi-Square	17999.974
df	4
Asymp.Sig.	.001

Conclusion

Generally, it can be concluded that researchers cited open access journals in the field of Pure Sciences more than the other four fields, and the citations received by the journals in the two fields of Pure Sciences and Health & Medical Sciences is considerably more than the fields of Arts & Humanities, Social Sciences, and Technology & Engineering. In

addition, the journals in Technology & Engineering have received more citations than Arts & Humanities and Social Sciences. These could be caused for two reasons: firstly, the amount of researches is less in the fields with less-cited journals; secondly, the less-cited journals are rarely known in their fields. Moreover, these journals may not be or be a little valid. On the other hand, the findings of Chi-Square test are also indicative that there is a considerable significant difference among the citations in the five fields; of course, the subject-to-subject comparison of the fields may be unlike this; for example, a comparison among Mathematics & Statistics from Pure Sciences and Arts, Economics & Business, and linguistics & literature from Arts & Humanities and a comparison between Mathematics & Statistics and Physics from Pure Sciences and Social Sciences (General) from Social Sciences indicate that the citations to some subjects of Art & Humanities and Social Sciences are more than Pure Sciences or the citations received by the journals in Dentistry are too much less than the whole subjects of Arts & Humanities, Social Sciences, and Technology & Engineering; also, the received citations by journals in Social Sciences (General) are considerably more than the ones by journals in Technology (General) and Agriculture & Food Sciences. Tonta & et.al. (2007) stated that articles in Mathematics received too much less citations than Philosophy and Political Sciences; of course, the research's findings are not in accordance with Tonta's findings, but this statement supports the above- mentioned findings.

Antelman (2004) found that open access articles in Mathematics have more research impact than Political Sciences and Philosophy as the research's findings approved this statement.

Although Sotudeh & et.al. (2007) in their research's conclusion stated that journals in Materials Engineering received citations more than of all and the ones in Physics and Health & Medical Sciences received citations less than that of all, the research's findings are unlike this, as the received citations by journals in Materials Engineering were zero but the ones in Physics were 4.04% within its field (Pure Sciences) and 2.14% among all fields; on the other hand, Health & Medical Sciences was the second field in terms of received citations, as the citations received by this field were 31.31% among all fields; however, Rahimi & et. al. (2007) found that the citations received by the journals in Health & Medical Sciences were less than 1%; of course, in their research, they introduced 2 journals of BioMed Central as the most cited journals, as in this research 3 journals of this publisher in Health & Medical Sciences were identified as the most cited journals.

The findings of this research also indicate that journals in Biology received the most citations among all subjects; however, Harnad & et. al. (2004) stated that articles in physics received the most citations.

A study of the citations in Education, Sociology, Psychology, and Economics showed that the whole journals in these subjects (337 journals) received 322 citations from ISI Web

of Science's articles; however, Kousha & Thelwall (2007) who studied Google's citations to 44 open access journals in these four subjects found that 1530 citations were received by these journals.

One of the considerable points in this research is that the number of the journals in one field or one subject may not determine the number of citations in that field or subject. In other words, we cannot say the more journals in one field or subject the more citations in that field or subject because the citations received by the whole journals in Arts & Humanities and Social Sciences (1173 journals, 1533 citations, equal to 8.04%) are less than the ones received by one second - rank journal (in terms of the number of citations) in Pure Sciences (PLoS ONE, 1743 citations, equal to 9.15%), or the whole citations received by the journals in Social Sciences and Technology & Engineering (962 journals, 2268 citations, equal to 11.9%) are less than the citations received by BMC Bioinformatics (2491 citations, equal to 13.07%) in Pure Sciences. A study of the cited journals in Arts & Humanities, Social Sciences, and Technology & Engineering shows that though the number of cited journals in Technology & Engineering (40 journals) is less than the ones in Arts & Humanities (62 journals) and Social Sciences (55 journals), the number of citations received by the journals in Technology & Engineering is more than that of the two fields. This point could indicate that what may increase the amount of citing to previous researches in different subjects is the amount of researches done in those subjects, the extent of researchers' identification of the journals, and validity of them.

The other point of this research is that the distribution of the most cited journals is diverse in different fields as the first-rank most cited journals in Arts & Humanities, Social Sciences, and Pure Sciences belong to the subjects which in terms of the number of citations are in the first rank. In Technology & Engineering the most cited journal belongs to the subject which in terms of the number of citations is in the last rank (third rank), and in Health & Medical Sciences belongs to the subject which in terms of the number of citations is in the second rank. On the other hand, the distribution of the second-rank to fifth-rank most cited journals is diverse among subjects and from one field to another field.

Another point of this research was that only journals which had one-to-three-word titles received citations as Tables 2, 4, 6, 8, and 10 showed the most cited journals in the whole fields had one-to-three-word titles.

Endnote

1. http://www.doaj.org

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