Citation and self-citation rates of Iranian and Turkish journals indexed in ISI

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Abstract: In recent years,the growth rate of scientific production is increasing noticeabley.Citation analysis is currently one of the most widely used metrics for analyzing the scientific contribution of any units. Self-citation is a common practice but it can differ between disciplines, countries and journals. In this study we evaluated the impact factor (IF), citations and self-citations of Iranian and Turkish journals indexed in Web of Science based on the Journal Citation Report(JCR) 2012.

We used the ISI-database journal citation report from Thomson-Reuters, JCR 2012, to collectjournals` impact factors, number of articles, number of citations and self-citationsfor both Turkey and Iran from 2009 to 2010 (which was used to calculate the impact factor of 2011). The mean, median and percentiles of each variableswere compared between countries using theIndependent Student *t*-test or Mann-Whithney U test in the case of violation of normal distribution. In addition therelationship between the number of publicationsand impact factor was studied by using the pearson correlation coefficient.

Based on the 2012 JCR report, the total number of Iranian and Turkish articles were 4017 and 7260 respectively and themean self-citations were 26% for journals from both countries. The median of total IF was greater in Iranian journals as opposed to the Turkish one's, 0.466 vs 0.349. The figure was similar for IF without self-citations, 0.330 vs 0.243, however both differences were statistically non-significant, p-values>0.05.A significant correlation was seen between the number of published articles and IF without self-citationsfor Iranian journals, r=0.342 and p-value=0.034.

Although self-citation is quite high in both countries, Iranian journals had higher IF (total and without self-citation) compared to the Turkish journals.

Keywords: *Citation, self-citation, Iranian journal, Turkish journal, ISI*

1. Introduction

In recent years,the growth rate of scientific production is increasing noticeabley. Universities and research institutes have had such a great effect on scientific production that lead to development and growth in science and technology.Some organizations measuring a countries' progress using citation analysis of scientific publications especially university publications.Eventhough,this is a quantitive method, measuring the scientific publication demonstrates that higher quality workscould result in higher citation rates.In additionit is assumed that articles with higher citation rates have more impact on their scientific field.As a result,citation in the field of scientific production is a valuable factor indicating the quality of scientific activities and itsanalysis is currently one of the most

widely used metrics for analyzing scientific contributions in different fields(1,2).

Most authors cite their own work in scientific papers,which isan appropriate way of developing a body of researches and building on previous results and insights. Citing one's own papers or articles by fellow scientists from one's institute or country, who also work on similar issues, is named self-citation. Self-citations account for 10-20% of all references which differs between scientific disciplines (3).

Self-citation is a common practice in most sciences which differs between disciplines, countries and journals(3). The self-citation rate is defined as the

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number of journal self-citationstototal journal citations in the year of the study as a percentage(5).Self-citations increase the number of citations andsubsequentlythe h-index of an individual scientist which canalso increase the impact factor of a journal(3).

Ghane et al. showed that 85% of Persian journals have the average self-citation rate of around 61.5%, with a statistically significantrelationbetween the impact factorand self-citation (4).Other studies showed that self-citationis indeed a problem,with 10-30% of all citations being self-citations(5).

Impact factor can be affected by many factors such as the journal self-citations(6) andif this changes naturally or artificially, it would cause the impact factor to also change. Therefore, changing the number of self citations becomes an instrument in the hands of someonewho attempts to raise their journal impact factor(7,8).

One of the most important goals for Iranianscientific publicationsis to be ranked first in the Middle Eastern region. Thus, by comparing the scientific publications of these countries with our own, their strengthsand our weaknesses in designing successful researches can be demonstrated.This provides valuable information for researchers to help conduct major projects for countries to achieve their goals.

In this study, theimpact factor, citations and self-citations of Iranian and Turkish journals indexed in Web of Science were evaluatedbased on the Journal Citation Report(JCR).

2. Material and Methods

We used the ISI-database journal citation report from Thomson-Reuters to gather therequired information.In the option menu, "Iran" and "Turkey" were selected as the designated countries, ,with the name of each country`s journals and their information being recorded. The information included the journal's impact factor, number of articles published from 2009 to 2010 (which was used to calculate the impact factor of 2011), and the number of citations and self-citations.The information was analysed by the Statistical Package for Social Sciences (SPSS 15).Variables in the two groups were compared using the*t*-test and Mann-Whitney U test in the case that normal distribution is violated.The pearson correlation coefficient was used to evaluate the relationship between the number of publications with impact factor and self-citations(P-values less than 0.05 were considered to be statistically significant).

3. Results

Based on the 2012 JCR report, 54 Turkish and 37 Iranian journals were indexed in the ISI. In total 7260 articles were published in Turkish journals compared to 4017 papers in Iranian journals (table 1). Comparison between the number of publications in journals between two countries was not statistically significant (p-value=0.091, Mann-Whitney U test).

Table 1: Distribution of papers published in Iranian and Turkish journals (based on JCR 2012)

	Min	Max	Median	25th Percentile	75th Percentile	Mean	SD
Turkey	34	596	111	88	130	134	90.9
Iran	38	290	92	68	165	109	55.4

The journals' impact factor mean was higher in Turkey compared to Iran, 1.01±4.2 and 0.67±0.6respectively,(P-value=0.6).However because of the lack of normal distribution we compared total IF between countries. The median of total IF in Iranian journals was higher compared to the Turkish journals, table 2. Furthermore Iranian journals' impact factor without self-citation weregreater than Turkish ones,but the differences werenot statistically significant , P=0.085 (table 2).The mean percentage of Iranian and Turkish article self-citations were similar in journals from both countries, 26.4 vs 26.1(P-value=0.9).Turkish journals has greater mean IF compared to the Iranian ones (table 2). There was a Turkish journal with a total IF of 31.677, but its IF without self-citation declined to 2.887 (91% fall).

A weak non-significant positive correlation between thetotal number of published papers and total impact factor for Iranian journals was seen, table 3. However, correlation between the number of published articles and IF without self-citations was positive and statistically significant;r=0.342, p-value=0.038. In contrast correlation between total IF/without self-citation IF and the number of published articles were not statisticaly significant for forthe Turkish journals.

4. Discussions

In this study the total number of Turkish articles was higher compared to the Iranians' and the self-citation rate of journals from both countries weresimilar. For Iraniran journals, there was a positive correlation between the number of articles and impact factors with and without self-citation, in contrast to a negative correlation for the Turkish journals. Minasnyand his colleagues reported a median of 12% forindividual self-citationin 31 soil science journals in Netherland, ranged from 5 to 60% (3).

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Table 2: Impact factors and self-citations in Iranian and Turkish journals (based on JCR 2012)

	Impact Factor*		Impact factor without self-citation**		Percentage of self-citation**	
	Turkey	**Iran**	**Turkey**	**Iran**	**Turkey**	**Iran**
Min	0.036	0.029	0.029	0.022	0	0
Max	31.677	3.051	2.877	1.281	89	77
Median	0.349	0.466	0.243	0.33	19	25
25th Percentile	0.159	0.322	0.126	0.217	6	8
75th Percentile	0.599	0.466	0.243	0.33	43	42
Mean	1.014	0.679	0.369	0.429	26	26
SD	4.27	0.605	0.45	0.327	24	21

**p-value=0.026, **p-value>0.05*
(comparison between countries was done using Mann-Whitney U test)

Table 3: Correlation between total number of articles and total Impact factor and IF without self-citations in Iranian and Turkish journals (based on JCR 2012)

	Turkey		Iran	
	corelation coefficient	P-value	corelation coefficient	P-value
No. of published papers and total IF	-0.123	0.375	0.227	0.177
No. of published papers and without self-citation IF	-0.18	0.194	0.342	0.038

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Biglu et al., evaluated the rate of self-citations in Iranian and Turkish journals from 2000 to 2005. It was shown that the proportion of Turkish journals entering data to the JCR databank was twice than the Iranian journals. From a total number of 6,088 journals in the JCR in 2005, only 3 (0.05%) were published in Iran and the same number was for the Turkey. Out of 847,114 articles published in the JCR, 159 (0.02%) and 352 (0.04%) were from Iranian and Turkish journals respectively. Iranian and Turkish journals' proportion of total citations at the JCR in year 2005, were 214 (0.001%) and 911 (0.004%) respectively (9). In Biglu Article, the mean value of IF for Iranian journals (0.124) in the 2000 was higher than the mean value of Turkish journals (0.075), but the mean value of self-citation rate among Turkish journals (0.22) was 2.75 times more than Iranian journals (0.08). The mean value of IF for Turkish journals (0.373) stayed higher than the IF of Iranian journals (0.233) in the year 2005, whereas the mean value of self-citation rate for Iranian journals (0.18) was 20% higher than the self-citation rate of Turkish journals (0.15) (9). Torabian evalauted the relation between self-citation and impact factor in medical science open access journals in ISI & DOAJ databasesin 2007-08. The results showed a self-citation rate of 28% for the journal. The findings indicate that there is a significant relation between self-citation and impact factor. After omitting self-citation, the level of self-citation in the performance of journals showed that 60% of the titles in the medical science experienced ranking increase, 27% experienced ranking decrease and 13% remained unchanged (10).

The rate of self-citation is about 3 to 36 percent.The institute for scientific information(ISI)considered the rate of self-citation in evaluating processes, if this ratewas less than twenty percent the journal would be evaluated for the citation analysis indexes such as impact factor(11).Among all journals listed in the 2010 *JCR Science Edition*, for example, 85% have self-citation rates of less than 15%. This shows that self-citation is quite normal for most journals. Significant deviation from this normal rate, however, prompts an examination by Thomson Reuters to determine if excessive self-citations are being used to artificially inflate the impact factor. If we determine that self-citations are being used improperly, the journal's impact factor will be suppressed for at least two years and the journal may be considered for deselection from *Web of Science*(12).According to our report that the self-citation rate is more than 20% for Iranian journals,an effort by the editorial boards should be taken to increase the number of total-citation alongside with reducing the number of self-citation.Aksnes et al., evaluated the self-citation of Norwagian scientific products from 1981 to 1996 by evaluating more than 4500 articles(5).However for this 3-year assessment,36% of totalcitations were self-citation, which was decreased for the longer period.They found that the majority of self-citations was belong to less citated articles(8).

Ghane et al.,in a study investigated the correlation of self-citation with IF of medical sciences journals in citation reports of Persian journals.Their results showd that the IF of nearly 58% of journals after excluding self-citations eliminated which is indicated the high rate of self-citations of medical sciences journals(4).This is similar to our results for Iranian and Turkish journals.They suggested the reduction of self-citations of journals as well as articles so that journals would achieve their real placesin rankings acoording to IF(4).

Comparision of self-citations of Iranian articles indexed in Web of Science and Iranian Science Citations Index(ISCI) showed the Iranian articles` average rate of self-citation was about 1.87 and 0.43respectively(13).

Country self-citation means the percentages of the citations received by the papers which come from the same country as from which the papers were published. It includes authors citing papers from fellow scientists of their own country.. The trend seems to be that with every tenfold increase in the number of papers, there is a 10% increase in the number of self-citations. As a result the more papers a country produce, the more likely it will refer to their own papers. This is possibly because of higher chance that people from a country cite more articles from their own country (3).The trend seems to be that with every ten-fold increase in the number of papers, a 10% increase in the number of self-citations occur. Andrade et al. found in the sample of journals whose impact factor increased by at least fourfold over a period of a few years between 1998 and 2006, we found no proof of widespread manipulation of the impact factor through the massive use of journal selfcitations(14).

Goldbeck-Wood et al., showed that American and British authors have more tendency to cite from the authors of their own country(15).Schubert&Glanzel et al., showed that factors such as geographical places,linguistical and cultural communication have influence on citation trends (16).Pasterkamp et al., in order to investigate the relationship between citation donors` and recipients` nationality,evaluate 1200 cardiovascular publications in a 7-year period.He concluded that 8.17% of total citations were self-citation and 31.6% of donors and recipients had the same nationality. They concluded that citations frequency was significantly augmented by nation oriented citation bias(17).

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8.5% of total-citations of Iranian publications are donored by Iranians as well as 49.2% by other nationalities.The results show that 30.73% out of 8.5% are self-citations and 20.2% are other-citations(16).

Morover,self-citation always should not be mentioned as a negative phenomenon.As the sciences in this century is specialized more than ever,it is not unlikey to consider rearchers` projects as an continuous process, so,in order to reducing the size of articles use self-citations.In this situation, the self-citations of researchers are necessities to maintain theire publications` continuity(16).

Although self-citation is an inseparable part of scientific publications,according to the Jokar et al study(15)investigated the proportion of different nationalities in citing Iranians` scientitfic productions, more than 30 percent (around50.8%)of citations were self-citations which seems relatively high.

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