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Research Article

Correlation between the Articles Citations in Web of Science (WoS) and the Readership Rate in Mendeley and Research Gate (RG)

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ABSTRACT

Introduction: Today, the dissemination methods of scientific publications and Web access ways to them have changed. It is essential to use the new altmetric measurements to assess the impact of research products in addition to traditional indicators. **Purpose:** The purpose of this study was to investigate and compare the correlation between the number of citations of Iranian scholars' articles indexed in WoS and their readership rate in the two social networks of Mendeley and RG. **Methods:** The quantitative methods used in this analytical-descriptive survey such as the scientometric / altmetric and correlation study. The statistical population consisted of scientific articles by the Iranian scholars in WoS. The sample of the research was 165 retrieved articles with 200 citations or more, in WoS with the address "Iran". Data was collected from WoS, Mendeley and RG and analyzed by using Excel and SPSS software. **Findings:** The findings showed that the correlation between the number of citations of the articles and the degree of readership in Mendeley was 0.352 based on the Spearman's correlation coefficient. The correlation between the number of citations of the articles and the rate of readership in RG was 0.177. The findings indicated a positive and moderate correlation with a confidence level of 99% for Mendeley and a positive, but poor correlation for RG with 95% confidence. There was a significant correlation between the readability of articles in two Mendeley and RG based on Spearman coefficient (correlation of 0.382 at 0.01 significance level) with a positive and average correlation. **Conclusion:** It was concluded that altmetric can be used as a complementary indicator beside traditional indices. Mendeley is an appropriate tool to evaluate the research work of scholars, universities and institutes and countries. **Originality/Value:** For the first time, correlation is measured between the articles' citations in Web of Science (WoS) and the readership rate in Mendeley and ResearchGate (RG). The results of this research clear the value of academic social networks in the dissemination of scientific productions. These networks can increase the use of authentic scientific works. The results of this study encourage scientists to share their scientific productions on these networks.

Keywords: Scientometric, Webometric, Iranian scholars, Altmetric, Mendeley, ResearchGate (RG), Web of science (WoS), Citation, Readership.

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INTRODUCTION

The scientific works needs to evaluate and calculating the influence of them on the development of science. At present, citation-based indicators are more useful in evaluating scientific researches. The evaluation process takes a lot of time using these indicators. It is only limited to the use of citation-induced writers and these works lose much time to get citation. On the other hand, when a researcher refers to a resource for evaluating a journal or article, it is not really possible to accurately evaluate. Usually it uses the Impact Factor (IF) and other scientometric indicators. In recent years, social web has had a great impact on research communication between researchers from different communities. "The European Commission's Expert Group on Altmetrics reported an outlines a framework for next-generation metrics in the context of the EC's Open Science agenda. It included a series of recommendations for how responsible metrics can be built into the design and evaluation of the EU's Ninth Framework Programme (FP9)".[1] "Social networking sites can seem frivolous and pointless to academics, but specialized academic social networking sites are gaining popularity in certain disciplines and with certain faculty. The academic social networks are the new intersec-

tion between social media and scholarly publishing".[2] Social networks have increased international collaborations. "Social media continues to evolve, grow and undergo metamorphosis. The use of online tools and cutting-edge technology is growing among scientists, but their adoption and acceptance remains limited across the wider research community".[3] The use of scientific works has increased in these networks. The extent of using these works shows their scientific value. While citation indices are still the main criterion for measuring impact in many cases. Even in international rankings, these indicators are very influential. Unfortunately, universities and higher education centers emphasize citation statistics in our country. Although they do not pay attention to citation indices, they have a lot of lives in our country. Academic regulations and regulations are considered only to citation indicators for promotion and promotion. So far, our effort has been inadequate to moderate these indices and use other complementary indicators, such as altmetric. All these indicators can be combined to provide an appropriate method for evaluation, taking into account all the benefits and benefits. In addition to the number of citations, Altmetric examines the article, other measures such as the number of bookmarks, received links, downloads, article views and more. In this research, the main issue arose from the same issue in the Iranian universities and higher education institutions. The main concern of faculty members is citation statistics. We may have a good scientist with poor citation for a variety of reasons, but the same scientist has his/her readership is high on social networks. Apart from the marginal issues, these statistics show the scientific value of these works. This article attempted to prove this claim. The main goal in this article was determining of the correlation between the number of citations of Iranian scholars' articles in WoS[1] and their readership rate in Mendeley[2] and RG.[3]

Literature Review

The scientific publishing industry has witnessed a plethora of innovations across the life cycle of writing, publishing and archiving of scientific journals. Open access is only the visible tip of an iceberg that contains new players and new services and modes of publishing—which span from new review processes, online citation indexes and social media tools—that have become available over the past 20 years.[4] Various researches have been done in this area. The importance of and relationship between research impact, visibility and unique author identifiers have been discussed.[5] Research on the correlation between altmetric and citation is a competition in determining the validity of these indices in the field of scientometric. Several studies have been conducted in this area. Some of them are expressed here. Garcia-Milian *et al*.[6] presented a detailed comparison of four researcher networks: VIVO, Epernicus, Research Gate and Mendeley. Bando[7] overviewed the emergence, present situation, relationship with both social media and open access and opportunities of "altmetrics". He believed that researchers shifted their venues of professional communications and research workflow to the Web. To become popular, these new metrics would need to work together with open access for mutual harmony and benefit. Nández and Borrego[8] aimed to analyse various aspects of an academic social network: the profile of users, the reasons for its use, its perceived benefits and the use of other social media for scholarly purposes. They examined the profiles of the users of an academic social network. They found that social sciences scholars accounted for nearly half of all users. Academics used the service to get in touch with other scholars, disseminate research results and follow other scholars. Other widely employed social media included citation indexes, document creation, edition and sharing tools and communication tools. Users complained about the lack of support for the utilisation of these tools. Zahedi, Costas and Wouters[9] did a cross-disciplinary analysis of the presence of 'alternative metrics' in scientific publications. They collected metrics for 20,000 random publications from the WoS. The results show that altmetrics source provides the most metrics is Mendeley. It with metrics on readerships for 62.6% of all the publications studied, other sources only provide marginal information. In terms of relation with citations, a moderate spearman correlation (r=0.49) has been found between Mendeley readership counts and citation indicators. Shohrowardhy and Hassan[10] attempted to determine the students' perception of social networking on their academic purpose. A survey was conducted by 480 self-administrative questionnaires given to a sample of students from the business faculties of different public and private universities in Chittagong. Most of the respondents report a positive impact of social networking on their academic purposes and there is a favorable perception of social networking taking different nuances. Van Noorden[11] investigated that why the scholars use social media. He stated about online collaboration between scientists and the social networks. The results confirmed that ResearchGate is certainly well-known. More than 88% of scientists and engineers said that they were aware of it — slightly more than had heard of Google+ and Twitter — with little difference between countries. Just under half said that they visit regularly, putting the site second only to Google Scholar and ahead of Facebook and

1 Web of Science provides you access to the most reliable, integrated, multidisciplinary research connected through linked content citation metrics from multiple sources within a single interface (www.webofknowledge.com).

2 Mendeley is a free reference manager and an academic social network (https://www.mendeley.com).

3 ResearchGate is built by scientists, for scientists. It founded in 2008 by physicians Dr. Ijad Madisch and Dr. Sören Hofmayer and computer scientist Horst Fickenscher, ResearchGate today has more than 14+ million members (https://www.researchgate.net/about).

LinkedIn. Almost 29% of regular visitors had signed up for a profile on ResearchGate. Hausetin *et al*.[12] studied about Tweets vs. Mendeley readers. They determined difference of two social media metrics. A set of 1.4 million biomedical papers was analyzed with regards to how often articles are mentioned on Twitter or saved by users on Mendeley. This analysis shows in how far they differ and compare to traditional citation impact metrics based on a large set of PubMed papers. The results showed that there is a significant correlation between the number of citations of Medline articles and the number of bookmarks in Mendeley in different subject areas. It is found that the most correlation is related to engineering and technology and the least correlation is related to the field of human sciences. Orduna-Malea *et al*.[13] used various methods to estimate the current size (number of indexed documents) of Google Scholar (May 2014) and to determine its validity, precision and reliability. They presented, applied and discussed three empirical methods: an external estimate based on empirical studies of Google Scholar coverage and two internal estimate methods based on direct, empty and absurd queries, respectively. The results show that place the estimated size of Google Scholar at around 160–165 million documents. Ortega[14] detected and described disciplinary differences in the users and use of several social networking sites by scientists. Results show that Academia.edu is massively populated by humanists and social scientists, while RG is popular among biologists. Disciplinary differences are observed across every platform. Thus, scientists from the humanities and social sciences and natural resources show a significant activity contacting other members. On the contrary, biologists are more passive using social tools. Kraker and Lex[16] presented an assessment of the ResearchGate score as a measure of a researcher's scientific reputation. This assessment is based on well-established bibliometric guidelines for research metrics. It is found that ResearchGate Score has three serious shortcomings: (1) the score is intransparent and irreproducible, (2) the score incorporates the journal impact factor to evaluate individual researchers and (3) changes in the score cannot be reconstructed. They concluded that ResearchGate Score should not be considered in the evaluation of academics in its current form. Shrivastava and Mahajan[16] followed twofold in their paper. First, the study aims to investigate the relationship between the altmetric indicators from RG and the bibliometric indicators from the Scopus database. Second, the study seeks to examine the relationship amongst the RG altmetric indicators themselves. The study showed that most of the RG metrics showed strong positive correlation with the Scopus metrics, except for RGScore (RG) and Citations (Scopus), which showed moderate positive correlation. It was also found that the RG metrics showed moderate to strong positive correlation amongst each other. Martín-Martín *et al*.[17] presented a method for capturing the structure of an entire scientific community (the Bibliometrics, Scientometrics, Informetrics, webometrics and Altmetrics community) and the main agents that are part of it (Scientists, Documents and Sources) through the lens of Google Scholar Citations (GSC). They found that it is feasible to depict an accurate representation of the current state of the Bibliometrics community using data from GSC (the most influential authors, documents, journals and publishers). Lastly, they presented a taxonomy of all the errors that may affect the reliability of the data contained in each of these platforms, with a special emphasis in GSC, since it has been our main source of data. Mohammadi, Thelwall and Kousha[18] in response to this question that "Can Mendeley bookmarks reflect readership?" did a survey of 860 Mendeley users. It shows that it is reasonable to use Mendeley bookmarking counts as an indication of readership because most (55%) users with a Mendeley library had read or intended to read at least half of their bookmarked publications. It is concluded that Mendeley bookmark counts seem to be indicators of readership leading to a combination of scholarly impact and wider professional impact. Martín-Martín *et al*.[17] discussed the advantages and disadvantages of major profile platforms and look at the role of ego in how these services are built and used. Scholars validate these services by using them and should be aware that the portraits shown in these platforms depend to a great extent on the characteristics of the "mirrors" themselves. Jeng *et al*.[19] presented a study based on data collected from ResearchGate. Adopting a mixed-method design by conducting qualitative content analysis and statistical analysis on 1,128 posts collected from ResearchGate Q and A, we examine how scholars exchange information and resources and how their practices vary across three distinct disciplines: library and information services, history of art and astrophysics. Our results show that the effect of a questioner's intention (i.e., seeking information or discussion) is greater than disciplinary factors in some circumstances. Dorsch[20] introduced a re-interpreted scientometric indicator called "visibility," which is the share of the number of an author's publications on a certain information service relative to the author's entire œuvre based upon his/her probably complete personal publication list. The introduced indicator represents a more realistic view of an author's visibility in databases than the currently applied absolute number of hits in those databases. Thelwall and Kousha[21] assessed samples of ResearchGate articles uploaded at specific dates, comparing their views in the site to their Mendeley readers and Scopus-indexed citations. This analysis shows that ResearchGate is dominated by recent articles, which attract about three times as many views as older articles. View counts for uploaded articles have low to moderate positive correlations with both Scopus citations and Mendeley readers, which is consistent with them tending to reflect a wider audience than Scopus-publishing scholars. Bhardwaj[22] compared four popular academic social networking

sites (ASNSs), namely, ResearchGate, Academia.edu, Mendeley and Zotero. The study found that performance of ASNSs using the latest features and services is not up to the mark and none of the site is rated as "Excellent". The sites lack in incorporation of session filters; output features; privacy settings and text display; and search and browsing fields. Availability of bibilographic features and general features is poor in these sites. Further, altmetrics and analytics features are not incorporated properly. User interface of the sites need to improve to draw researchers to use them. Thelwall and Kousha[23] assessed the whether the number of citations found for recent articles is comparable to other citation indexes using 2675 recently-published library and information science articles. The results show that in March 2017, ResearchGate found less citations than did Google Scholar but more than both WoS and Scopus. This held true for the dataset overall and for the six largest journals in it. ResearchGate correlated most strongly with Google Scholar citations, suggesting that ResearchGate is not predominantly tapping a fundamentally different source of data than Google Scholar. Nevertheless, preprint sharing in ResearchGate is substantial enough for authors to take seriously. Shrivastava and Mahajan[24] carried out an altmetric analysis of faculty members and research scholars of Department of Physics and Astrophysics, University of Delhi (India) (Univ.Delhi P and A) who are members of the academic social networking site ResearchGate. ReserachGate is a rich source of altmetric indictors such as publications, reads, profile views, citations, impact points, RGScore, followers and following, etc. The RGScore, unique to ResearchGate, was further explored in depth in the study. Maflahi and Thelwall[25] reported a longitudinal weekly study of the Mendeley readers of articles in 6 library and information science journals from 2016. The results suggest that Mendeley readers accrue from when articles are first available online and continue to steadily build. For journals with large publication delays, articles can already have substantial numbers of readers by their publication date.

Asemi and Rasti[26] assessed the number of reading the Published Papers (PP) in nursing e-journals in 2009 and 2010 in Mendeley, in comparison with the number of Received Citation (RC) in the Scopus. They found that although the performance of the Mendeley and Scopus is similar in some ways but there are still differences in their cases assessed and therefore the test result showed a moderate correlation between them.

A review of the background showed that several studies have been conducted in this regard. In this study, the relationship between the number of citations and the readership rate was examined for Iranian cited articles in WoS.

Research Questions

The purpose of this study was to investigate and compare the correlation between the number of citations of Iranian scholars' articles indexed in WoS and their readership rate in the two social networks of Mendeley and RG. To reach this aim, the following questions were answered:

- What is the readership rate of Iranian scholars' articles in Mendeley?
- What is the readership rate of Iranian scholars' articles in RG?
- Is there any meaningful relationship between the number of citations and readership rate of Iranian scholars' articles in Mendeley?
- Is there any meaningful relationship between the number of citations and readership rate of Iranian scholars' articles in RG?
- Is there any meaningful relationship between readership rate of the Iranian high-cited articles in RG and Mendeley
- The correlation between readership rate of the Iranian scholars' high-cited articles in RG and Mendeley?

METHODS

The research was descriptive-survey. The research method was scientometric in the first part of the study and the second part of the study used of correlation study. The statistical population included all published scientific articles by Iranian scholars in WoS with high citation. The high citation articles included the articles with 200 citations or more. The sample included 165 recovered papers with the registered address "Iran" for the scholars. The research has done in two levels. First level included sixth steps: First, the articles were searched in WoS by selecting "Iran" as the address and all available articles were retrieved with this condition. Second, the articles ordered by "Sorted by" tool based on the number of citation. Third, the articles extracted, with 200 citations or more. The number 165 articles specified with 200 citations or more. Forth, the data entered in Excel and the items excluded from the study, with a citation value of less than 200. Fifth, the bibliographic specifications of the articles extracted using the "Result Analyze" tool. These data included information such as publication date, articles type, language, subject area, source of publication and country. Sixth, citation data extracted using "Citation Report" tool and this information included the total number of citations of articles, H index and the number of self-citations. The second level included to determine the amount of readership of 165 papers in Mendeley and RG. First, all articles searched in "Title" field. Second, the number of readership determined. Third, the data entered in Excel. It is notable that some articles were registered with

different spelling in each of Mendeley and RG. For example: this article "Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC", which was the most cited Iranian article, has recorded in other spelling: "Observation of a new boson at a mass of 125 {GeV} with the CMS experiment at the LHC ". Sometimes it has caused that an article to be recorded for several times. Therefore was searched all the spelling of these articles. Finally, the number of readership was summed up in different titles. The start date for extracting data from WoS was May 2016 and extracting data from Mendeley and RG was June 2016. After entering data to Excel from WoS, Mendeley and RG, used of descriptive statistics and inferential statistics for data analysis. In descriptive statistics were used of frequency, percentage and drawing figure. In inferential statistics was used of correlation analysis between the number of citations and the rate of readership in Mendeley and RG. Correlation was also found between the rate of readership in Mendeley and RG using SPSS software.

Findings

The articles were retrieved from Iranian scholars on the WoS from 1989 to 2015. The number of received citations were 60117. Table 1 shows the analytical statistics of these articles on the WoS. These articles were also recorded in Mendeley and were read by users. The average and Standard Deviation (SD) of the rate of readership in Mendeley was 216.56 and 296.84, respectively. The lowest and highest number of readership was 2 and 1937. Only one article was not registered in Mendeley and it had 221 citations and deducted from a total of 165 articles (Table 1).

The highest readership rate was 1937 times in Mendeley. It belonged to the following article:

"Murray, *et al*. (2012). Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. The Lancet, 380 (9859). 2197-2223".

Its impact factor was 44, with 1574 citations in WoS. This article is read 638 times in RG and it is an article with very high-citation. The lowest readership rate was 2 times in Mendeley. It belonged to the following article:

"Chatrchyan *et al*. (2011). Observation and studies of jet quenching in PbPb collisions at √ SNN = 2.76 TeV. Phys. Rev. C 84, 024906".

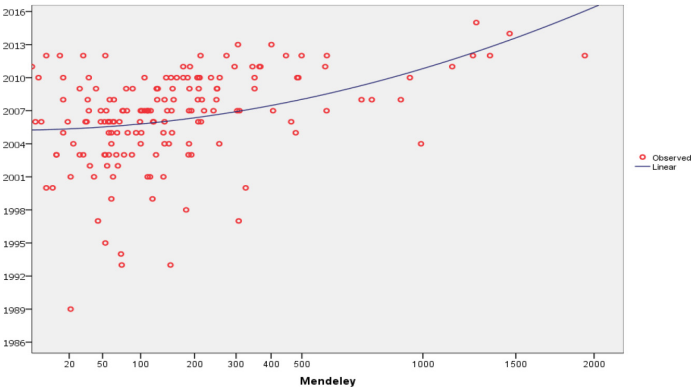

Figure 1: Distribution readership rate based on the publication year in Mendeley.

Its impact factor was 146/3 and its citation was 214 times in WoS. This article is read 132 times in RG. It is located at the bottom of the table in terms of the number of citations. The average of the readership rate calculated 216.56 for high-cited articles in Mendeley. The average citation was 373.16 for each article.

Readership rate of the articles in Mendeley in different years of publication. The highest density has been between 20 and 500 times for articles readership in Mendeley. They have published in the years 2001 to 2013. The readership rate of the published articles between 1989 and 2001 has been 1426 times (4% of the total number of readership). This rate has been 2739 times for two published articles on Mendeley in 2014 and 2015. Only 6 articles from 165 articles have been read more than 1000 times. The highest rate of readership has been 6673 times for high-cited articles in 2012. This rate in 2010 has been 5021 times and in 2007, 3873 times. The published articles at years in 1989 have been 21 times, at year 1995, 53 times and at 1994, 72 times (Figure 1).

The analytical statistics are shown in Table 2 on the rate of readership of WoS based articles in RG. According to this table, 165 of the 164 articles were recorded in RG. The only the following article with 406 citations wasn't in RG.

"Vernant, Ph. *et al.* (2004). Present-day crustal deformation and plate kinematics in the Middle East constrained by GPS measurements in Iran and northern Oman. Geophysical Journal International. 157 (1). 381–398".

Table 1: Statistical analysis of the rate of readership in Mendele.

Readership in Mendeley	Number	Avg.	SD	Max.	Min.	Total
	164	216.56	296.84	1937	2	35516

Table 2: Statistical analysis of the readership of the high-cited articles in RG.

Readership in RG	Number	Avg.	SD	Max.	Min.	Total
	164	39.499	749.36	6091	8	64697

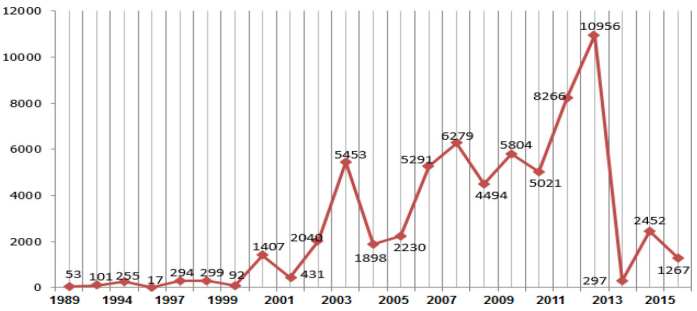

Figure 2: The readership rate of the published articles in RG based on the publication year.

Out of 164 recorded articles RG, all of them were read by the users. The lowest and highest of the readership rate was 8 and 6091 in RG, respectively. The average and SD was obtained 394.49 and 749.36 related to the readership rate of the articles in RG. These values were for the number of citations, the lowest 373.16 and the highest 334.15.

Table 1 shows the statistical analysis of the readership rate of the high-cited articles in Mendeley. By comparing it with Table 2, it was found that the total amount of readership was 64697 in the RG and it is 1.82 times more than Mendeley. The highest and lowest the readership rate in the RG were 3.14 and 4 times more than Mendeley.

The following article is cited 499 times in WoS. It has read 6091 times in RG and 1351 times in Mendeley. The article is published in "Autophagy" with IF 9.108. This article has been used in all three places and has a highest rating.

"Klionsky, DJ. (2016). Guidelines for the use and interpretation of assays for monitoring autophagy (3rd edition). Autophagy. 12(1):1-222".

The following article is cited 236 times in WoS. It has read 8 times in RG and 3 times in Mendeley. The article is published in "International Journal of Nonlinear Sciences and Numerical Simulation" with IF 0.89. This article has been used in all three places and has a lowest rating.

Ganji, D. and Sadighi, A. (2011). Application of He's Homotopy-perturbation Method to Nonlinear Coupled Systems of Reaction-diffusion Equations. International Journal of Nonlinear Sciences and Numerical Simulation, 7(4), pp. 411-418.

Figure 2 shows the readership rate of the published articles for the years 1989 to 2015 in RG. According to this figure, the highest readership rate belonged to 12 published articles in 2012 with 10956 times readership. Subsequently, they had 8266 and 6279 times readership in 2011 and 2007, the second and third rankings, respectively. The published articles with the lowest readership rate belonged to 1995 with 17 times, 1989 with 53 times and 1999 with 92 times readership.

Table 3: Correlation between the number of citations and readership rate of Iranian high-cited articles in Mendeley based on Spearman correlation coefficient.

Spearman Correlation			Citation	Mendeley
Spearman's rho	Citation	Correlation Coefficient	1.000	.352**
		Sig. (2-tailed)	.	.000
		N	165	164
	Mendeley Readership	Correlation Coefficient	.352**	1.000
		Sig. (2-tailed)	.000	.
		N	164	164

**. Correlation is significant at the 0.01 level (2-tailed)

Table 4: Correlation between the number of citations and readership rate of Iranian high-cited articles in RG based on Spearman correlation coefficient.

			Citation	RG
Spearman's rho	Citation	Correlation Coefficient	1.000	.177*
		Sig. (2-tailed)	.	.024
		N	165	164
	RG	Correlation Coefficient	.177*	1.000
		Sig. (2-tailed)	.024	.

*. Correlation is significant at the 0.05 level (2-tailed).

Table 5: The correlation between readership rate of the Iranian high-cited articles in RG and Mendeley based on Spearman correlation coefficient.

			Mendeley	RG
Spearman's rho	Mendeley	Correlation Coefficient	1.000	.382*
		Sig. (2-tailed)	.	.000
		N	164	163
	RG	Correlation Coefficient	.382*	1.000
		Sig. (2-tailed)	.000	.
		N	163	164

*. Correlation is significant at the 0.01 level (2-tailed).

Firstly, the data tested for normally distributed in SPSS in order to investigate the relationship between the number of citations and the readership rate of Iranian scholars' papers in Mendeley and RG. It is found that data were not normal and the data were skewed. These variables were considered as discrete quantitative variables, so Spearman's correlation coefficient used to determine their correlation rate. According to Table 3, the correlation rate was 0.352 between the number of citations and the readership rate of the articles in Mendeley. It is significant at level 0.01. This correlation shows a positive,

significant and moderate correlation between the number of citations and the readership rate in Mendeley.

According to Table 4, the correlation coefficient based on Spearman coefficient was 0.177 and significant between the number of citations and the readership rate in RG with a confidence level of 95%. This amount indicates a positive and a weak correlation between the two declared variables.

Table 5 shows the correlation between the readership rate of the high-cited articles of the Iranian scholars in Mendeley and RG based on Spearman correlation coefficient. Using this coefficient to determine the correlation is due to the lack of normal data and their skewness. According to Table 5, the correlation between the readership rate in Mendeley and RG was 0.382 based on the Spearman correlation coefficient at the level of significant 0.01. This correlation shows a positive and moderate correlation.

Implications

This research show an exploratory path of scientific thought and experiences. It can to raises a number of opportunities for future research, both in terms of the academic tools development and validation. Altmetrics can be used along with common indicators for evaluating research outcomes. Of course, more research will be necessary to refine and further elaborate the findings. We need to provide an environment in academic social networks that makes it easy to access and use multilingual information. Iranian scholars, like many other scholars all over the world, have a non-English mother tongue. Language is the most important communication and thinking tool. Scientists convey meaning through this social product. This research could initiate social networking research and development in the presentation of appropriate tools for non-English speaking scholars. Hence, the use of these networks will be wider and the hidden knowledge will be shared among the countries.

CONCLUSION

From the findings, it is concluded that scholars have interest to read the articles on the social networks. The articles have more chance to read if they have written in collaboration with researchers from different countries. Mendeley social network was established in 2008 and its user's number are higher than other citation management software. It seems that the reason for the welcome of the users in this social network is the subject coverage, the existence of demographic information of users such as the name of the country and the job position. Users save most of their research works and outputs in Mendeley with attention to the comprehensiveness of the subject of this social network. They use recorded articles on this social network and cite to them. Therefore, the number of citations of the recorded articles rises in this network. In front of this social network, there is RG as a research-driven social network. It is one of the most reputable social networks available for free to discuss and debate the researchers. Due to its capabilities, this network has attracted a lot of users. These capabilities include: Creating private discussion groups on a specific topic, the possibility of asking and answering other questions in the field of specialization, observing related occupations in the field of user, searching for researchers and articles, ranking and evaluating of the users, evaluating articles with the RG score index, calculating H-index and IF of the people and articles, etc. These facilities have led to an increase in the number of research outputs indexed in this network. Based on the findings of this research, Mendeley in comparison with RG is more suitable in using altmetric. The lack of familiarity of Iranian scholars with this scientific social network has prevented their articles from being recorded in this software. Of course, 164 articles from 165 articles have been recorded in Mendeley. The main reasons for this are: 1. Focus on publishing articles in scientific journals and accessing through the journal's or publisher's Website, regardless of their publication and recording on the scientific social networks, 2. the scholars' scientific collaboration with other researchers from advanced countries and the papers have been recorded by the co-sponsors on this social network. It was concluded that reinforcement is necessary in the familiarity and use of researchers from this social network. In sum, it can be concluded that altmetrics can be used along with common indicators for evaluating research outcomes. In recent years, some world ranking systems, such as the Kivas and Times ranking systems, have mentioned the use of complementary indicators for citation-based indicators. Some of the Iranian organizations such as the Ministry of Health and Medical Education have also used the new measures and encourage scholars to use of the valid social networks. For example, faculty members are required to create an account at RG and Google Scholar and recording of their articles on these networks. Therefore, it can be said that some policymakers and planners are aware of the importance of using complementary indicators. They are taking steps to achieve this goal, but the attention to these indicators in the Ministry of Science, Research and Technology is still poor and it does not pay enough attention.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

1. Wilsdon JR, Bar-Ilan J, Frodeman R, *et al*. Next-generation metrics: responsible metrics and evaluation for open science. Report European Commission Brussels. 2017.
2. Ovadia S. ResearchGate and Academia. edu: academic social networks. Behavioral and Social Sciences Librarian. 2014;33(3):165-9.
3. Bik HM, Goldstein MC. An introduction to social media for scientists. PLoS Biology. 2013;11(4):e1001535.
4. Ponte D, Klein S. Research and Web 2.0: Technology, Innovation and Actor Constellations. In: Research 2.0 and the Impact of Digital Technologies on Scholarly Inquiry. 2017. DOI: 10.4018/978-1-5225-0830-4.ch002
5. Wagner AB. Research Impact, Visibility and ORCID Author Identifiers: Relationships. Foster/Chemistry Colloquium Presentation University at Buffalo Chemistry Department. 2017;10.
6. Garcia MR, Norton HF, Davis V, Holmes KL, Blackburn K, Tennant MR, *et al*. A detailed comparison of four researcher networks: VIVO, Epernicus, Research Gate and Mendeley. Poster session presented at Special Libraries Association Conference, Philadelphia, PA. 2011. http://ufdc.ufl.edu/IR00000452/00001.
7. Bando K. Altmetrics: alternative ways of measuring scholarly impact based on the social web. Journal of Information Processing and Management. 2012;55(9):638-46. http://doi.org/10.1241/johokanri.55.638.
8. Nández G, Borrego A. Use of social networks for academic purposes: a case study. The Electronic Library. 2013;31(6):781-91.
9. Zahedi Z, Costas R, Wouters P. How well developed are altmetrics? A cross-disciplinary analysis of the presence of 'alternative metrics' in scientific publications. Scientometrics. 2014;101(2):1491-513.
10. Shohrowardhy HS, Hassan HMK. Students' perception of social networking for academic purposes in Bangladesh. Management and Marketing. 2014;9(4):459-70.
11. Van NR. Online collaboration: Scientists and the social network. Nature. 2014;512(7514):243. DOI: 10.1038/512126a.
12. Hausetin S, Larivière V, Thelwall M, Amyot D, Peters I. Tweets vs. Mendeley readers: How do these two social media metrics differ?. IT Information Technology. 2014;56(5);207-15.
13. Martín MA, Orduna ME, Ayllón JM, Delgado LCE. The counting house: measuring those who count. Presence of Bibliometrics, Scientometrics, Informetrics, Webometrics and Altmetrics in the Google Scholar Citations, ResearcherID, ResearchGate, Mendeley and Twitter. EC3 Working Papers. 2016;21.
14. Ortega JL. Disciplinary differences in the use of academic social networking sites. Online Information Review. 2015;39(4):520-36.
15. Kraker P, Lex E. A critical look at the ResearchGate score as a measure of scientific reputation. Proceedings of the Quantifying and Analysing Scholarly Communication on the Web workshop (ASCW'15). Web Science Conference. Oxford. 2015;1-3.
16. Shrivastava R, Mahajan P. Relationship amongst ResearchGate altmetric indicators and Scopus bibliometric indicators: The case of Panjab University Chandigarh (India). New Library World. 2015;116(9):564-77.
17. Martín MA, Orduna ME, Delgado LCE. The Role of Ego in Academic Profile Services: Comparing Google Scholar, ResearchGate, Mendeley and ResearcherID. 2016. Available at SSRN: https://ssrn.com/abstract=2745892.
18. Mohammadi E, Thelwall M, Kousha K. Can Mendeley bookmarks reflect readership? A survey of user motivations. Journal of the Association for Information Science and Technology. 2016;67(5):1198-209.
19. Jeng W, DesAutels S, He D, and Li L. Information exchange on an academic social networking site: A multidiscipline comparison on researchgate Q and A. Journal of the Association for Information Science and Technology. 2017;68(3):638-52. doi:10.1002/asi.23692.
20. Dorsch I. Relative visibility of authors' publications in different information services. Scientometrics. 2017;112(2):917. https://doi.org/10.1007/s11192-017-2416-9.
21. Thelwall M, Kousha K. ResearchGate articles: Age, discipline, audience size and impact. Journal of the Association for Information Science and Technology. 2017a;68(2):468-79. doi:10.1002/asi.23675.
22. Bhardwaj RK. Academic social networking sites: Comparative analysis of ResearchGate, Academia.edu, Mendeley and Zotero. Information and Learning Science. 2017;118(5/6):298-316. https://doi.org/10.1108/ILS-03-2017-0012.
23. Thelwall M, Kousha K. ResearchGate versus Google Scholar: Which finds more early citations?. Scientometrics. 2017b;112(2):1125. https://doi.org/10.1007/s11192-017-2400-4.
24. Shrivastava R, Mahajan P. An altmetric analysis of ResearchGate profiles of physics researchers: A study of University of Delhi (India). Performance Measurement and Metrics. 2017;18(1):52-66. https://doi.org/10.1108/PMM-07-2016-0033.
25. Maflahi N, Thelwall M. How quickly do publications get read? The evolution of mendeley reader counts for new articles. Journal of the Association for Information Science and Technology. 2018;69(1):158-67. doi:10.1002/asi.23909.
26. Asemi A, Rasti P. Mendeley readership altmetric for the articles in nursing area. In Press. 2018.
27. Mendeley. 2017. Available at: www.mendeley.com (accessed on 12 Oct. 2017)
28. Orduna ME, Ayllón JM, Martín MA, López CED. Methods for estimating the size of Google Scholar. Scientometrics. 2015;104(3):931-49.
29. ResearchGate. 2017. Available at: www.researchgate.com (accessed on 15 Oct. 2017)
30. Web of Knowledge. 2017. Available at: www.webofknowledge.com (accessed on 10 Oct. 2017).