ABSTRACT

Background: The Publons platform provides integrated information on researchers, peer reviewers, publications and certain author metrics. Central Asia is a potentially growing region in terms of young researchers.

Methods: Using the inbuilt Publons search, the top institutes of nine countries of Central Asia and neighbours were identified and data on their reviewers, number of publications, number of peer reviews completed were extracted. These were compared with demographics of the countries such as population, gross domestic product, number of physicians and proportion of population enrolled for higher education.

Results: Amongst the top 15 institutes in Central Asia, China has claim to 12 while Kazakhstan has two and Iran has one. The number of top peer reviewers, number of verified reviews and Web of Science indexed publications from these top institutes varied directly with the number of researchers each had. Afghanistan, Tajikistan and Turkmenistan are not performing well on most of these while China seems to be an outlier on the upper edge of the graphs. There is good correlation between the number of researchers in the top institutes per country and both number of publications and number of completed reviews. The number of total publications per top ten institutes of each country has high correlation with various demographic parameters like total population ($\rho = 0.85$), gross domestic product ($\rho = 0.82$), total number of physicians ($\rho = 0.72$), and number enrolled for higher education ($\rho = 0.93$).

Conclusion: There appears to be much disparity among the rankings, number of researchers, reviewers and published manuscripts across various countries in Central Asia. The gross heterogeneity of Central Asia needs to be minimized by nurturing and mentoring potentially upcoming researchers in publication, peer reviewing as well as in ethics involved.

Keywords: Central Asia; Peer Review; Publications; Publons; Publons Ranking; Universities

INTRODUCTION

Publons is fast emerging as a trusted and integrated resource for various bibliometric data. Though it initially focused on providing credits to reviewers without unblinding, it has expanded its scope in recent years. Now it provides integrated information on researchers’
profiles, citations as well as peer review and editorial credits. It can import and synchronize data from ORCID which enables publication of authors despite the presence of variations in their names. ORCID is also important to recognize an author with multiple emails/affiliations/other variables. It also draws information from the Web of Science (WoS) platform to provide stringent citations and h-index origination only in journals indexed in WoS. It provides an online search interface that can be modified to search for individuals or institutes or even nations.

There is no dearth of young scientists and reviewers in Central Asia who might soon emerge into a global force to reckon with. However, many of them may not have adequate exposure to mentoring and guidance in research, scientific writing, or reviewing. Also, there might be impediments with regard to digital restrictions prevalent in some countries in the region. Thus there appears to be an underrepresentation of Central Asia in world scientific literature.

Recognition for authors and institutes can be measured with various metrics. The citation count and impact factor are just single dimensions of the multi-faceted impact of an article, individual or institute. Various alternative metrics are available that can predict the future citations and practical importance of manuscripts. However, Central Asian countries have variable access to the internet and possibly limited learning opportunities about resources such as Publons. Thus, their research and publications do not garner enough international attention and they are deprived of their deserving credit. An in-depth analysis of the top institutes of these countries can inform us about how well they are being represented at a global level, the number of publications, the number of researchers, and the number of peer reviewers. This can help create awareness as well as devise educational campaigns to propel the best towards global recognition.

Herein, we have utilised the unique resources of Publons to see how researchers and peer reviewers from the top most universities and institutions in Central Asia are represented. We analysed the top 10 institutes of the nine Central Asian countries as per Publons regarding the number of researchers and peer reviewers and publication statistics.

**METHODS**

Central Asia consists of nine countries, namely Afghanistan, China, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan and Uzbekistan in alphabetic order. The top 10 institutes of each country as per Publons rankings was used as a surrogate for representing the research and peer review output for that country.

**Data extraction**

A Publons search was made for top institutes of these nine countries on the 14th of March 2021 using the inbuilt search engine [https://publons.com/institution/?country= {country code} &order_by=num_researchers; where {country code} is specific for each country]. This Publons ranking depends on the number of verified researchers on Publons. The top 10 institutes of each country were identified, and data was imported into MS Excel spreadsheet for analysis. Data imported included the Publons rank for that institute, the number of researchers on Publons, the number of Publons certified “Top Reviewer”, the total number of verified reviews from that institute overall, the number of peer reviews completed in the last 12 months, and number of publications in the WoS core collection from that institute.
Statistics applied

The Shapiro Wilk test was used to examine normality of data. Beyond descriptive statistics, correlation between these variables were explored. Since data was predominantly non-parametric, only Spearman correlation was applied. Also, information on each countries’ population, gross domestic product (GDP), number of physicians per thousand population, and percentage of population ever enrolled in tertiary education were imported on the 26th of March, 2021 from Microsoft Online database using the Geography data function inbuilt in MS Excel. Spearman correlations between number of publications and these data were also explored.

Statistical software used

All data were transferred to R software (ver 3.3) and the ggpubr package was used for statistical analysis while the ggplot2 was used for preparing the figures.

RESULTS

China’s top 10 institutes have the leading number of researchers (n = 15,461), followed those of Iran (n = 10,390) and of Kazakhstan (n = 7,406) while Afghanistan, Tajikistan and Turkmenistan have less than 100 researchers with accounts on Publons (Table 1). China predominates this list with 12 institutes which also contains 2 institutes from Kazakhstan and one from Iran. The top 10 institutes of each country are summarized in Supplementary Table 1. The number of publications from the top institutes is directly proportional to the number of researchers they have registered on Publons (Fig. 1).

Publons provides the number of peer reviews verified by them. China has 6 institutes amongst the top ten with the highest number of completed peer reviews (Table 2). Each of these institutes with top ten number of reviews have at least 20 peer reviewers who have achieved the distinction of being a “Publon Top Reviewer”. The total number of reviews completed correlates directly with the number of researchers in each institute (Fig. 2).

The total number of publications from the top 10 institutes of each Central Asian nation in alphabetic order ranges from 0 to more than 327 thousand (Table 3). Four out of the nine countries have less than 1,000 manuscripts logged on the Publons.

Table 1. Top 15 universities of Central Asia as per the Publons ranking

| Publons rank | Institute                                                | Researchers | WoS indexed publications | Country         | Country rank |
|--------------|----------------------------------------------------------|-------------|--------------------------|-----------------|--------------|
| 29           | Al-Farabi Kazakh National University                      | 2,952       | 4,963                    | Kazakhstan      | 1            |
| 53           | Tsinghua University                                      | 2,087       | 48,899                   | China           | 1            |
| 63           | Zhejiang University                                      | 1,966       | 40,527                   | China           | 2            |
| 76           | Shanghai Jiao Tong University                            | 1,717       | 33,395                   | China           | 3            |
| 79           | L.N. Gumilyov Eurasian National University               | 1,710       | 2,519                    | Kazakhstan      | 2            |
| 94           | University of Tehran                                     | 1,597       | 21,478                   | Iran            | 1            |
| 107          | University of Science & Technology of China              | 1,510       | 43,141                   | China           | 4            |
| 109          | Xi’an Jiaotong University                                | 1,480       | 28,950                   | China           | 5            |
| 113          | Peking University                                        | 1,468       | 36,729                   | China           | 6            |
| 138          | Sun Yat Sen University                                   | 1,334       | 17,661                   | China           | 7            |
| 139          | Huazhong University of Science & Technology             | 1,333       | 25,013                   | China           | 8            |
| 140          | Harbin Institute of Technology                            | 1,327       | 19,911                   | China           | 9            |
| 153          | Shiraz University of Medical Sciences                    | 1,293       | 19,687                   | Iran            | 2            |
| 166          | Xiamen University                                        | 1,239       | 33,438                   | China           | 10           |
| 184          | Isfahan University of Medical Sciences                   | 1,170       | 13,228                   | Iran            | 3            |

WoS = Web of Science.
Top Central Asian Educational Institutions on Publons

Fig. 1. Number of publications from the top 10 institutes per nation is proportional to the number of their reviewers, the countries being stratified by colour coding.

Fig. 2. Total number of peer reviews logged from the top 10 institution of each country is proportionate to the number of researchers per institute.

Table 2. Top institutes with the maximum number of verified reviews

| Publons rank | Institute                          | Publons top reviewers | Total reviews | Reviews in last 12 months | Country          | Country rank |
|--------------|------------------------------------|-----------------------|---------------|---------------------------|------------------|--------------|
| 63           | Zhejiang University                | 41                    | 12,071        | 3,850                      | China            | 2            |
| 94           | University of Tehran               | 33                    | 10,473        | 3,096                      | Iran             | 1            |
| 53           | Tsinghua University                | 37                    | 9,536         | 3,191                      | China            | 1            |
| 76           | Shanghai Jiao Tong University      | 25                    | 8,772         | 2,909                      | China            | 3            |
| 139          | Huazhong University of Science & Technology | 35                           | 7,937         | 2,473                      | China            | 8            |
| 193          | Tehran University of Medical Sciences | 23                           | 6,616         | 2,340                      | Iran             | 4            |
| 109          | Xi'an Jiaotong University          | 30                    | 6,252         | 1,973                      | China            | 5            |
| 138          | Sun Yat Sen University             | 22                    | 5,751         | 1,856                      | China            | 7            |
| 140          | Harbin Institute of Technology      | 24                    | 5,641         | 1,768                      | China            | 9            |
| 107          | University of Science & Technology of China | 24                           | 5,346         | 1,540                      | China            | 4            |
Fig. 2 shows the total number of peer reviews logged from the top 10 institution of each country is also proportionate to the number of researchers per institute.

The number of manuscripts from the top institutes of each Central Asian country had high correlation with the population ($\rho = 0.85; P = 0.006$), GDP ($\rho = 0.82; P = 0.010$), total number of physicians in the country ($\rho = 0.72; P = 0.037$) and total number of citizens ever enrolled for tertiary education ($\rho = 0.93; P < 0.001$).

**DISCUSSION**

There appears to be much disparity among the rankings, number of researchers, reviewers and published manuscripts across various countries in Central Asia. China appears to rule the roost with the highest rankings and numbers in almost all categories. This may reflect national policies in matters of scientific publications. The number of publications from China has crossed those of the United States that puts China as the country with the maximum number of scientific publications.\(^\text{10}\) China’s spending on research and development is supposed to be more than that of the European Union combined.\(^\text{11}\) In most of the analyses, China is an outlier with enormous number of researchers, peer reviewers, publications and verified reviews.

Behind the top three countries, China, Iran and Kazakhstan, the other six countries have less than 2,000 researchers from their top institutes on Publons. Thus, it is not surprising that all of these countries have less than 1,500 publications indexed on WoS from their top 10 institutes (Uzbekistan being an exception with more than 7,000). Though these countries have active researchers and authors, they may be handicapped by a lack of proficiency in anglophonic skills\(^\text{12}\) or the knowledge to avoid predatory journals.\(^\text{13}\) Publishing in predatory journals may lead to wastage of energy and demotivation for the upcoming authors.\(^\text{14}\) Excluding China, Mongolia and Iran, the other countries publish mostly in English while Russian is the second most common language.\(^\text{15}\) Being non-native speakers of English, certain authors may face some difficulty in publishing in WoS indexed journals that are mostly in English. They also need to be aware of the concept of plagiarism to avoid inadvertent errors.\(^\text{16}\) Ethical post-publication promotion of their work can help bring better recognition to researchers.\(^\text{17}\) Younger authors from Central Asia also need to be aware of how and when to declare potential conflicts of interests.\(^\text{18}\)

Previously, other authors have analysed publications from Central Asia using the SCImago Journal & Country Rank database. These publications have shown an association of the
number of publications with GDP and population size. However, the data available on Publons, has the added advantage of including researcher and reviewer numbers. It also provides information on number of peer reviews performed and limits publication counts to only journals indexed on WoS. In our analysis, we have shown that interdependent variables like population, GDP, number of physicians and number of persons enrolled for higher education are all associated with the number of WoS publications. It has been shown that GDP influences the spending on research and development (R&D) in countries. Asian countries spending more on R&D have more universities and indexed journals. The same factors show a similar association even in East Asia and in Europe.

Kazakhstan and Uzbekistan seem to have increased their publications in recent years from non-indexed to indexed journals. This should provide an example to the other neighbouring countries that have less than 2,000 WoS indexed publications each. These countries are gradually opening up to leaning English and increasing internet availability. There is much potential for education and research once these countries embrace the internet. Even the World Bank is counting on microeconomy development in this region via global connections to expand research and education. Non-anglophone authors do commit common errors while writing in English and these may put off editors and reviewers. Thus, with increasing skills in English, the acceptance rates for these authors may increase. Also, various national and international bodies supporting research and education like the Central Asian Research and Education Network can help connect and support researchers. It is also important to create awareness among local scientists so that they can avail help from various online education resources for both research and publications.

The number of verified reviews is also proportionate to the number of researchers from the top universities. Affiliation to a reputed university seems to predict better peer review output. All authors can act as reviewers if they are aware of research reporting standards and ethical standards. It has been suggested that peer reviewing can be a part of online education. Often the reviewer is blamed for a rejection. These will only improve once awareness and mentoring for peer review is available.

A limitation of Publons is that researchers need to actively start their accounts on the platform. Various Central Asian countries might be having active researchers who do not have Publons account and are thus missed in such analyses.

Ultimately, there is a wide divide between the leader, China, and the other countries in terms of institute ranking, number of reviewers, number of indexed publications, reviewers and number of completed peer reviews. Iran, Kazakhstan, and Uzbekistan appear in the middle rung while the other will need to take a leaf out of these three nations' approaches and increase their impact in terms of publications and presence on platforms such as Publons.

Thus, there are glaring differences between the top institutes of the countries of Central Asia and their neighbours. These correlate with population parameters, education and GDP. Concrete steps must be taken to ensure equity in the region.
Supplementary Table 1
Top 10 Institutes of each Central Asian country with their corresponding overall Publons rank

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