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International visibility of Armenian domestic journals: The role of scientific diaspora / Gzoyan, E., Mirzoyan, A., Sargsyan, A., Yeghikyan, M., Maisano, D.A.F., Sargsyan, S.. - In: JOURNAL OF DATA AND INFORMATION SCIENCE. - ISSN 2543-683X. - ELETTRONICO. - 8:2(2023), pp. 93-117. [10.2478/jdis-2023-0011]

Availability:
This version is available at: 11583/2981102 since: 2023-08-16T07:57:51Z

Publisher:
SCIENDO

Published
DOI:10.2478/jdis-2023-0011

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18 November 2026

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Research Paper

International visibility of Armenian domestic journals: the role of scientific diaspora

Edita Gzoyan[1], Aram Mirzoyan[1], Anush Sargsyan[1], Mariam Yeghikyan[1], Domenico A. Maisano[2], Shushanik Sargsyan[1†]

[1] Center for Scientific Information Analysis and Monitoring (CSIAM), Institute for Informatics and Automation Problems, National Academy of Sciences of the Republic of Armenia (IIAP NAS RA). 1 Paruyr Sevak str., 0014 Yerevan, Armenia

[2] Department of Management and Production Engineering (DIGEP), Politecnico di Torino (Italy), Turin, Italy

Citation: Gzoyan, E., Mirzoyan A., Sargsyan, A., Yeghikyan, M., Maisano, D. A., & Sargsyan, S. (2023). International visibility of Armenian domestic journals: the role of scientific diaspora. *Journal of Data and Information Science*, 8(2), 93–117. https://doi.org/10.2478/jdis-2023-0011

Received: Feb. 13, 2023
Revised: Mar. 20, 2023; Apr. 14, 2023
Accepted: Apr. 19, 2023

Abstract

Purpose: Nearly 122 scientific journals are currently being published in Armenia—of which only six are indexed by WoS and/or Scopus databases. The majority of the national journals are published in the Armenian language, solely possessing abstracts written in English, although there are also English-language and multi-language journals with articles not only in Armenian but also in other foreign languages. The aim of this article is to study the visibility of the (non-indexed) national Armenian journals in the WoS database through citation analysis. In consideration of the existence of a relevant Armenian "diaspora" in the world, this article also attempts to estimate its impact in terms of citation statistics.

Design/methodology/approach: For this end, we have identified citations to the national/domestic Armenian journals in the WoS database in comparison with the share of citations received from "diaspora" researchers (researchers of Armenian origin born in foreign countries and those originally from Armenia who have emigrated to foreign countries).

Findings: Among the 116 Armenian domestic journals analyzed (not indexed by WoS), only 47 were found to be cited in WoS. Of these journals, almost 12% are citations by "diaspora" researchers, most of which concern Social Science and Humanities journals.

Research limitations: Although the surnames of Armenians end with -i(y)an, sometimes, the Diaspora Armenians, surnames are changed or modified or they are not ending with -i(y)an, in this case we may fail to identify them.

Practical implications: This study can help to build new, more deep and comprehensive relations with scientific diasporas.

† Corresponding author: Shushanik Sargsyan (Email: shushaniksargsyan8@gmail.com; ORCID: 0000-0002-7929-8887).

Research Paper

Originality/value: This study offers a new understanding of multifaced research collaboration with scientific diasporas and their role in internationalization of domestic journals.

Keywords: Citation analysis; National/domestic journal; Armenian diaspora; Scientific diaspora

1 Introduction

Globalization is erasing borders in nearly every aspect of human life, and there are few forums more evident of this erasure than the sciences. In this context, the quality, efficiency and responsiveness of research are constantly improving: research results are becoming increasingly available to the professional, amateur and business public, fostering the development of scientific networks and the formation and development of links between science and industry. Meanwhile, barriers still hinder the proliferation of scientific knowledge: language barriers, lack of necessary technologies, absence of links to international scientific databases, etc. The need to publish in journals indexed by international citation databases is another issue relative to the spread and proliferation of scientific knowledge.

Today, the WoS database is globally recognized as a leading dataset of trusted scientific content (Rollins & Yan, 2018). Despite this, there is a lot of criticism relating to the geographic (mainly US-based in the United States) and language coverage (mainly English) of the sources indexed by this database (Aksnes & Siversten, 2019), as the vast majority of national/domestic scientific journals are not covered in this repository. Although some regional and national indexes (e.g., SciELO Citation Index and KCI-Korean Journal Database) have been included in WoS, there is still a disproportionate underrepresentation of national/domestic journals and non-Anglophone journals.

A number of researchers admit the role of the English language as a modern *lingua franca* in science (Montgomery, 2016; O'Neil, 2018) and there is a constant growth of Anglophone scientific content across disciplines (Kumar et al., 2016; Liu, 2017). However, according to data from UNESCO (UNESCO, 2021), the number of non-English language contributions is also growing. These contributions are published in national/domestic journals and are used predominantly by researchers from the corresponding country to disseminate their research results "internally", at the risk of remaining unnoticed by the wider scientific community. In a recent article, Pölönen et al. (2020) claim that journals not indexed by the WoS and Scopus databases should also be recognized, as they too can contain many well-researched and scholastically rigorous publications (Demeter, 2017; Sasvári et al., 2019). Chavarro et al. (2017) discuss how this approach impacts scholarship produced in low and middle-income

countries and hinders the development of locally-oriented scholarship—which often goes unpublished in mainstream journals. Furthermore, as addressed by Solana and Liberatore (2018), very few domestic journals have international visibility; a domestic journal's visibility is often solely determined by citations from sources indexed by international citation databases. As a solution to these two competing approaches, Sivertsen (2018) offers an approach of *balanced multilingualism* that combines the internationalization of research with support for scholarship that addresses issues of unique importance in a local context. Noting that science needs to communicate with societies where different languages are spoken and written, Sivertsen claims that "science needs to be multilingual."

According to Moed et al. (2021), national journals are defined as periodical publications which are produced locally – in which the publisher, editor, reviewer, authors and readers all live in the same location – and address a topic of local/regional interest in the local language of a particular country or region. The authors note that national journals lack some of the necessary characteristics of scholarly communication at times, which may warrant bibliometric/scientometric research.

1.1 Citation Analysis

A weakness of non-English language documents is the fewer number of citations they tend to receive (Di Bitetti & Ferreras, 2017; Fung, 2008; Moskaleva & Akoev, 2019). This may have consequences for such documents, as the number of citations is commonly used as an indicator of the efficiency and impact of publications, individual researchers, research groups, institutions, countries and journals (Milojević, 2017; Moed, 2005; Sangwal, 2013a; Waltman, 2016).

Several studies deal with differences between the citations of papers in English and non-English languages. It has been clearly demonstrated that the average citations per paper of English journals are higher than in non-English journals (Fung, 2008; Garfield, 1978; Gonzalez-Alcaide et al., 2012; Liang et al., 2013; Mueller et al., 2006; Poomkottayil et al., 2011; Sangwal, 2013a, b; van Raan, van Leeuwen et al. 2011). Thus, due to the expansion of popularity and legitimacy of English publications in a globalized world, one of the main impacts of globalization on the sciences was the pressure on researchers to cite more articles from international-indexed journals at the expense of their own "national" articles (Kirchik et al., 2012). Meanwhile, there is additional evidence that suggests that researchers are more likely to cite papers in national languages when publishing in national journals, rather than when publishing in international journals (Garfield, 1978; Liang et al., 2013; Lin & Zhang, 2007). Additionally, researchers themselves may be inclined to publish "their best papers to [...] journals with a high impact factor." Journals with high impact

ratings are often international in scope and scale, which may leave national journals with difficulties "attract[ing] stellar research" (Salager-Meyer 2014 and 2015). Given these circumstances, governments may work towards the internationalization of their national/domestic journals (Kulczycki et al., 2019; Larivière, V., & Warren, J. 2019; Li & Zhang 2003; Reza Davarpana & Behrouzfar 2009).

Until now, little work has been done to study the presence of citations to national journals in international citation databases (Abrizah et al., 2013; Andreis & Jokic, 2008; Herero Solana & Liberatore, 2008; Quental & Lourenço, 2012; Yuan & Hua, 2011; Zainab et al., 2012).

One of the aims of this article is to highlight this discrepancy and fill (at least partially) this gap by studying the citations of Armenian national journals in the WoS database.

Thus, the purpose of this paper is to study the visibility of the (non-indexed) national/domestic Armenian journals in the WoS database through citation analysis. Meanwhile, taking into consideration the existence and presence of a relevant Armenian diaspora around the world, this article also attempts to estimate its impact in terms of citation statistics. To accomplish this goal, we have identified external citations of the national/domestic Armenian journals in the WoS database followed by the share of citations received from diaspora researchers (researchers of Armenian origin born outside the Republic of Armenia and those originally from Armenia who have emigrated to foreign countries). For that, we have compiled the list of all Armenian national journals not indexed in the WoS and then used the WoS database to retrieve the citations to those Armenian domestic journals. This was accomplished by searching for textual strings corresponding to the names of the official journals, as provided on the journals' websites, their English equivalent and/or translation; in case of an absence of such information, the textual strings included their possible Anglophone translation or transliteration, as well as other possible ways of spelling the journal names, their shortened versions and abbreviations.

Section 2 of the article briefly describes the emergence of the Armenian diaspora to demonstrate how it becomes a factor in the Armenian case, concentrating on the scientific diaspora. Section 3 illustrates the methods used, while Section 4 presents and analyses the results and findings. The concluding remarks can be found in the conclusion of the article.

2 Armenian scientific diaspora

Traditionally, the notion of diaspora was connected with the forced removal of certain national, ethnic, cultural, and religious communities from their homelands and their dispersion to host states throughout the world (Walaszek, 2001). This con-

cept was further expanded to include communities and clusters of migrants within host states that formed as a result of voluntary migration (Brubaker, 2005; Vertovec, 2006). In this case, the motivations for migration and the development of a diasporic community are varied, from economic to political, to even scientific ones.

In contemporary context of the term "diaspora," links with the homeland (or kin state) are often mentioned (Cohen, 2008; Scheffer, 1986; Werbner, 2022). While the development of a diaspora consciousness (Vertovec, 1997) creates an imagined transnational community (Redclift, 2017) connected by ties of moral co-responsibility (Werbner 2022).

In the contemporary era, the Armenian diaspora is considered as an archetypal, prototypical, ideal, traditional and classical diaspora (Nieczuja-Ostrowski & Rafał Raczyński, 2020). As pointed out by Paweł Nieczuja-Ostrowski and Rafał Raczyński, diasporality (i.e., the fact that the majority of a nation's representatives live abroad) is one of the defining characteristics of the Armenian nation. The emergence of the Armenian diaspora was connected with a set of voluntary and compulsory emigrations of Armenians throughout several centuries: the Armenian Genocide constituting the catalyst of these diasporic movements. The next big wave of emigration from Armenia, following the Armenian Genocide, was connected with the collapse of the USSR and the deep economic crisis that ensued. This wave of migration further expanded the geographical distribution of the Armenian diaspora.

Scientific diasporas, sometimes referred to as "intellectual diaspora networks," "diaspora knowledge networks," or "expatriate knowledge networks" (Brown, 2002; Meyer & Wattiaux, 2006; Séguin et al., 2006) are defined as "self-organized communities of expatriate scientists and engineers working to develop their home country or region, mainly in science, technology, and education" (Barré et al., 2003). The above definitions imply that scientific diasporas are in some ways beneficial to their respective homelands.

Scholarly publications can be used to estimate the impact of scientific diaspora in terms of productivity and scientific collaboration (Anand et al., 2009; Basu, 2014; Marmolejo-Leyva et al., 2015). These publications can also be used to analyze the economic impact of brain drain, as well as possible opportunities to increase the economic potential of the home nation (Barré et al., 2003; Meyer, 2001; Rabinowitz & Abramson, 2022; Tejada & Bolay, 2010; Tejada et al., 2013).

Armenia's scientific diaspora can be understood as consisting of several groups of individuals that developed in "waves" of establishment: the first is formed by second- or third-generation emigrant scientists who grew up and were educated in Western countries. The second "wave" consists of scientists who left their homeland in the 1990s following the collapse of the Soviet Union, effectively beginning

the brain-drain process which continues to the present day. It is estimated that this process resulted in a reduction of the Armenian scientific community by about five times, to the current nearly 3,000 researchers.

The third "wave" of scientific migration is more recent and related to new opportunities involving bilateral and multilateral scientific agreements between the Republic of Armenia and world-leading institutions/organizations.[①] A high degree of mobility is one of the defining characteristics of the modern scientific community; a trait which is reflected in the flow and exchange of information and researchers across borders. Several studies demonstrated how academic mobility improves scientific performance, including citations, international co-authorship, and publications of researchers (Aksnes et al., 2013; Fangmeng 2016; Liu et al., 2021).

Generally, scientific migration is considered as a positive factor for the development of science across disciplines. While in most developed countries scientific mobility implies a simultaneous emigration and immigration of researchers in order to preserve intellectual human capital, in Armenia this process was and currently remains one-sided, as Armenian scientists tend to leave their country; often, the most promising young, highly qualified specialists with strong scientific credentials travel abroad for permanent residence, losing professional ties and contacts with their home institutions in the process. Thus, on the one hand, scientific mobility implies a unilateral migration of researchers from Armenia with a negative effect of losing ties with the homeland; on the other hand, scientific mobility facilitates an approach of using scientific diaspora to strengthen the sciences in the homelands. The following sections will attempt to assess the impact of the Armenian scientific diaspora on the strength of contemporary Armenian publications through the citation analysis of domestic Armenian journals.

3 Data and methods

As of 2023, there are nearly 122 journals published in Armenia from which only six are currently indexed in the international citation databases WoS and Scopus (see overview in Table 1). Although these databases are gradually extending their coverage also to national/domestic journals, their indexing of national/domestic journals

[①]Today, the scientific community of Armenia comprises approximately 3,136 researchers who work in research institutions and HEIs. The National Academy of Sciences of Armenia currently has 32 research institutions and centers within its jurisdiction which perform research in nearly all scientific fields. For more information, see https://www.sci.am/orgs.php?langid=2.

In addition to these institutes within the National Academy of Sciences, there are also several independent research institutes outside this organization. There are 41 state and 26 non-state HEIs in Armenia, and scientific research may not be performed in some of these institutes (e.g. teaching-centric universities). See at https://escs.am/am/news/4706 and https://escs.am/am/news/4832.

remains generally very low.

Table 1. Armenian journals indexed in WoS and /or Scopus with some bibliometric data.

No.	Journal Title	Subject Category	Start Year in WoS/ Scopus	Impact Factor/SJR (2021)	Journal Quartile (2021)
1	Astrophysics	GEOS	2004/1965	0.673/0.230	Q4/Q4
2	Journal of Contemporary Physics-Armenian Academy of Sciences	GEOS; PHYS	2010/2007	0.486/0.218	Q4/Q4
3	Journal of Contemporary Mathematical Analysis-Armenian Academy of Sciences	MATH	2010/2009	0.494/0.255	Q4/Q4
4	New Armenian Medical Journal	CLIN II; CLIN I; BIOS; BIOL; BIOM	2020/2009	-/0.135	-/Q4
5	Wisdom[②]	ART&HUM	2020/2018	-/0.394	-/Q1
6	Armenian journal of Mathematics	MATH	2020/2019	-/0.159	-/Q4

The remaining 116 titles are national journals—the majority of which publish articles in a range of foreign languages (predominantly Russian and English), in addition to Armenian. We have classified those journals as "multi-language" (Figure 1). The majority of articles in the Armenian domestic journals are, however, in Armenian with abstracts in English (primarily) and Russian (secondarily). All Armenian domestic journals are open access and their content is near-fully accessible on their websites or other open-access repositories.

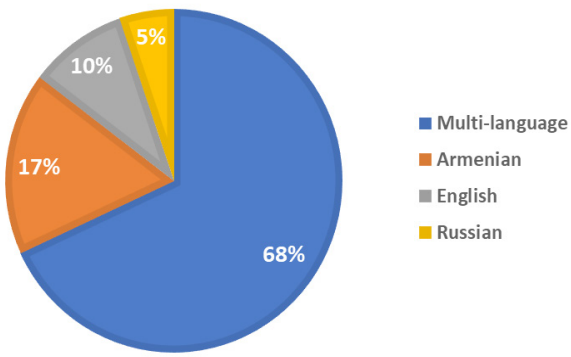


Figure 1. Armenian domestic journals by their language of publication.

It is worth noting that the Armenian language is spoken by relatively few people around the world: it is used near-exclusively within the Republic of Armenia, the Republic of Artsakh and by some Diaspora Armenians, though third or fourth gen-

[②]In 2022 the journal coverage was discontinued in SCOPUS, https://www.scopus.com/sourceid/21100873483.

erations of Diaspora Armenians may not read, understand and speak the language.

The focus of this research centers on the 116 Armenian domestic journals which are not indexed by WoS and/or Scopus. The background information regarding these domestic journals was collected from the Center for Scientific Information Analysis and Monitoring (CSIAM) (http://csiam.sci.am/en/magazines/) and the Supreme Certifying Committee of Armenia (https://bok.am/en/journals). The subject fields of the aforementioned journals are further classified into 15 scientific fields, according to the classifications provided by Glänzel and Schubert (2003).

Clarivate Analytics' WoS was used to retrieve the citations to the above Armenian domestic journals. The time range of citations and cited documents include 1975-2022. This was accomplished by searching for textual strings corresponding to the names of the official journals as provided on the journals' websites, their English equivalent and/or translation into another language; in case of an absence of such information, their possible English translation or syntactic technique was indexed, as well as other possible ways of spelling the journal names, their shortened versions and potential abbreviations. For example, the Historical-Philological Journal was searched as "Historical-Philological Journal", "Պատմաբանասիրական հանդես", "ՊԲՀ", "HPHJ", "Hist.-Phil.", etc. Different forms of transliteration were also used to be able to search for as many deviations in title form as possible. However, the authors are aware that there may be citations unidentified stemming from failures of indexing due to improper citations or failures to cite articles correctly. Following this indexing, the following data were collected for each of the domestic journals: list of citing articles indexed by WoS, quartile of the corresponding citing journal, and authors of the citing papers.

Then, the focus shifted to the authors of the citing papers in an attempt to find their origin. This was done to identify the share of Diaspora scientists within the citation count. Diaspora scientists are defined as scientists in foreign countries who are of the Armenian origin, those who were born and raised in those countries or moved there from Armenia later. As the Armenians mostly have identifiable surnames ending in "ian" "iants" and sometimes "unts", they are quite easily detectable. The difficulty here was that some Persian and sometimes Indian surnames were also ending in "ian", however, those were again easily detectable as non-Armenians, because of their peculiar names and surnames. Moreover, the origins of citing authors were detected through manual web searches and the databases on Diaspora scientists developed by the Center for Scientific Information Analysis and Monitoring. Once possible Armenian citing authors were identified, they manually checked their affiliations and other information available online (first/second name, CV, etc.). In this way, we were able to identify the percentage of citing authors who have Armenian

origin or ancestry.

After identifying the citations and the citing authors, we analyzed the results based on the language of journals and articles, subject fields of the journals, countries of publishers and citing authors, etc.

4 Findings and discussions

4.1 Citations by age

The citation analysis reveals that several Armenian domestic journals have a degree of visibility in the WoS database: 47 out of 116 journals accumulated at least one citation in the WoS database (Table 2 in Appendix). Precisely, a total of 1,697 citations were identified from WoS-indexed contributions to these (unindexed) 47 Armenian domestic journals. The citations linked to the oldest Armenian journals of interest refer to cited contributions from 1938 in the fields of biology, biomedical research and bioscience (in line with the field categorization by Glänzel and Schubert). Of course, this number tells little about the wider context of the era, as Armenia was Sovietized in 1920; after the establishment of the Soviet Union in 1922, the rare journals that appeared in the international scientific databases were usually categorized as published within the Soviet Union (USSR), rather than by its constituent republics. However, we were able to locate those citations by searching for individual journal names, rather than by country affiliation. Additionally, we point out that beyond the domestic journals of interest, there will be other (mostly aged) Armenian journals that have attracted citations not considered in this analysis.

After a gap of nearly 10 years, we have located further citations. Interestingly, during the next 15 years (1947-1962) the citations indexed in our study only reference Armenian domestic journals in Social Sciences and Humanities (SSH). The general tendency of citing journals in the fields of biology, biomedical research and bioscience and SSH continues until 1997 after which the distribution appears somewhat even, which is likely due to an increase in the number of domestic journals and increasing variance in their direction of study. This growth became possible as Armenia regained its independence in 1991. After the first several years of turbulence, the number of domestic journals sharply increased.

As mentioned, the majority of articles in the Armenian domestic journals are in Armenian with abstracts in English (primarily) and Russian (secondarily). Not all English and/or Russian-language abstracts are written in an accepted way and illustrate the clear content and findings of the articles (this relates specifically to the older publications, the majority of which do not have abstracts at all). Although we have not researched separately whether the citations are to the foreign language abstracts

or main text, as it is out of the scope of the current research, our preliminary findings show that generally, main texts were cited.

4.2 Citations by scientific field

Figure 2 illustrates the distribution of journals by categorization of their scientific fields and citations (in percentages). The leading position consists of journals in the fields of Biology, Bioscience, and Biomedical Research, followed by journals classified in SSH. Given these findings, it should be noted that the cited prevalence of journals in the field of biology/medicine is not necessarily an indication of greater scientific activity in these fields. This interesting phenomenon also may emerge from the fact that the propensity to cite in these scientific fields is much greater than in other fields (Granger et al., 2020): for reference, seven journals that specialize in these three fields have jointly aggregated 961 citations. As the subject fields of the journals often intermingled, it is impossible to provide more details about each field separately.

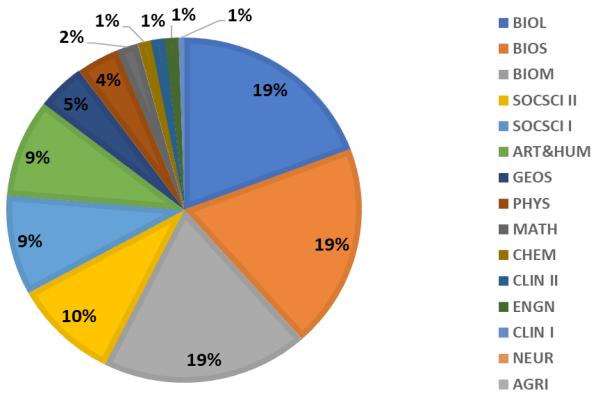


Figure 2. Armenian domestic journals by their scientific fields and citations from the WoS.

The second cluster of data includes journals in Social Sciences I, Social Sciences II, and Arts & Humanities; this second cluster comprises journals with mostly intermingled scientific fields, although it also includes a few journals that can be attributed to specific fields. Twenty-eight journals in SSH accumulated 480 citations, which is nearly two times less than the number of citations accrued by Biology, Bioscience & Biomedical Research journals. The remaining citations have been distributed among Geosciences, Physics, Mathematics, Chemistry, Clinical, Experimental Medicine II, Engineering, etc; these scientific fields have jointly accumulated only 256 citations, despite physics and chemistry historically being among the most developed scientific fields in Armenia from the Soviet period-onwards. This is because

the majority of contemporary researchers in those fields are likely to publish in international journals; thus, the number of domestic journals in the field is relatively low. Domestic journals, in this context, are mainly used by young researchers in the early phases of their careers to disseminate their research results.

Another explanation for the distribution of citations between disciplines is that it somehow reflects different citation propensities (e.g., citations in biology and medicine are much higher than in mathematics) (Maisano et al., 2020).

4.3 Citations by language of cited papers

In order to understand the correlation between the language of the domestic journals and their citations in the WoS, we have further clustered the journals by their language. The majority of the cited journals are classified as multi-language journals, as they may also publish articles in languages other than Armenian. 28 multi-language journals received 1,359 citations, while the 10 journals published only in English received 265 citations; the remaining 9 Armenian language journals have received only 25 citations. No Russian-language journal received any citation. As the number of multi-language journals was substantial, we deepened the analysis to the article level, identifying the language of each cited article in those 47 national journals. The results are depicted in Figure 3[②].

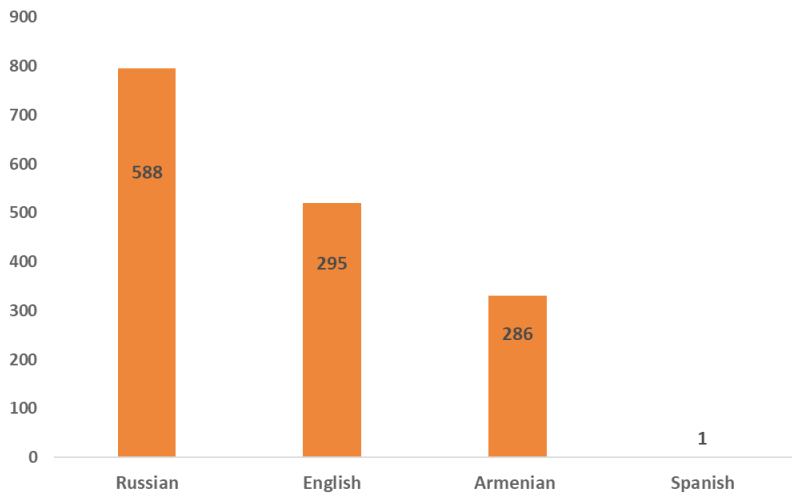


Figure 3. Distribution of cited articles in the domestic journals by their language.

The linguistic assumptions suggested by this data differ strongly from that car-

[②]In Figure 4, the total number of citations is 1649 and not 1697 (cf. Sect. 4.1), since for three journals it was not possible to detect the language of publications in WoS.

ried out at the academic journal level. The leading language of these cited articles is Russian: 588 articles written in the Russian-language received 796 citations in total. Conversely, the number of citations received by the 295 English-language articles in the study totals 521. Furthermore, the number of citations to the 286 articles in the Armenian language is 331—and one article written in Spanish has received one citation. Thus, although there are no purely Russophone domestic journals within Armenia that received citations in the WoS, Russian-language articles are the most cited among the 28 multi-language journals. This implies that Russian, together with Armenian and English, is a language of science in Armenia. First, many scientific articles in Armenia are written in Russian, while many Russian-language publications are used and cited by Armenian scholars. This can be explained by the fact that Russian continues to be the second language in Armenia because of a nearly-70-year history of being part of the Soviet Union. Despite the increasing adoption of English within Armenia, Russian remains the second language taught in Armenian primary schools. It is still an international scientific language for Armenian researchers located in both Armenia and the Armenian Diaspora (those who have emigrated after the collapse of the Soviet Union); for older generations of scholars, it is the only international scientific language they may use. Furthermore, as Chavarro (2017) argues: in some research areas and for some purposes of communication, Spanish journals with Spanish-speaking authors and readers could be more important than English language journals. In this line of thought, the Russian language articles could have the same role in the Armenian scholastic context.

As Russian also continues to be a language of science in the majority of the post-Soviet countries, it further expands the readership and citation frequency of Russophone publications.

Finally, among the 1,697 citations to the Armenian domestic journals identified in WoS, it was found that only 331 citations are to the articles written in Armenian language. The findings of this data suggest that the majority of articles that were cited in the WoS were non-Armenian language publications in national journals.

4.4 Citations by country, quartile and publication type

In the next part of our analysis, we concentrated on the citation sources and worked to find the country of the citing author, their quartile, publication type, etc. The data on the nationalities and home countries of the citing authors is presented, according to their national affiliations (Figure 4). The citing articles are from 83 countries and Armenian affiliations are in the top position, which means that the domestic journals that are cited by the Armenian authors published abroad, or that articles have been written by groups of authors that have an Armenia-based co-author. There is more

than a twofold gap between Armenia (473) and the country in the second position - Russia (224 articles). The US ranks third with 118 articles, followed by Germany (69 articles) and India (53 articles).

As in the case of articles: where the Russian language articles were the most cited, here we have the second largest affiliations from Russia from where the Armenian domestic journals were cited. This can be explained by the facts discussed above plus Armenians in Russia are the largest Armenian diaspora community outside Armenia with nearly 2.5 million people. There is also a huge and strong scientific diaspora community in Russia, while many researchers who have immigrated to Russia from Armenia have maintained close scientific ties with the Armenian research institutions.[④] For them also Russian is the main international language.

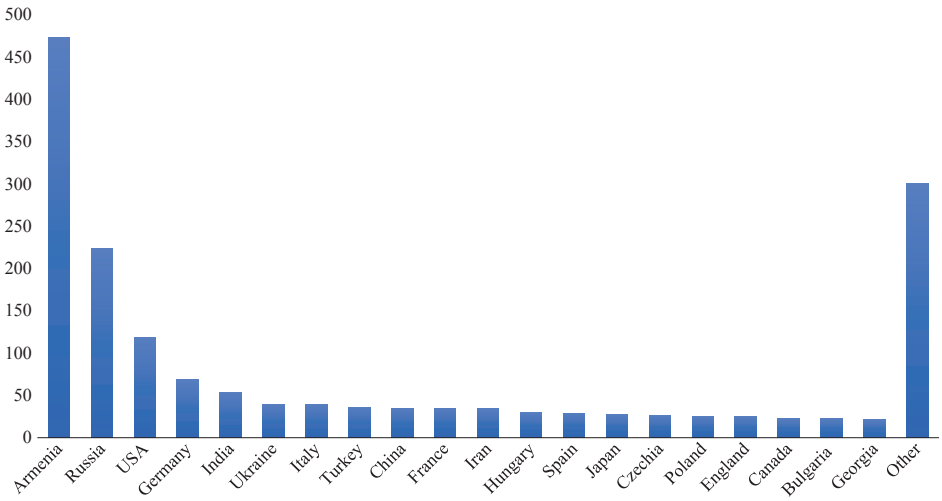


Figure 4. Distribution of citing articles by affiliation of their authors.

Figure 5 presents the representation of citing journals by quartiles, according to WoS. The authors are aware that the quartile is a dynamic metric because it changes over time. To simplify the analysis, we have conventionally considered the quartile of the journal at the time of the analysis (i.e., Autumn 2022). Not all journals have been categorized in quartiles, so we have only considered the 962 journals categorized as such. The distribution of journals into the quartiles reveals that the majority of citing journals (419) are from the 4th quartile. 200 citing journals are from the 3rd quartile, and then nearly equal numbers of journals were published from the 2nd (171) and 1st quartiles (172).

④The assumptions about the close ties of researchers of the Armenian origin in Russia with their counterparts in Armenia are underpinned by the observations of the authors.

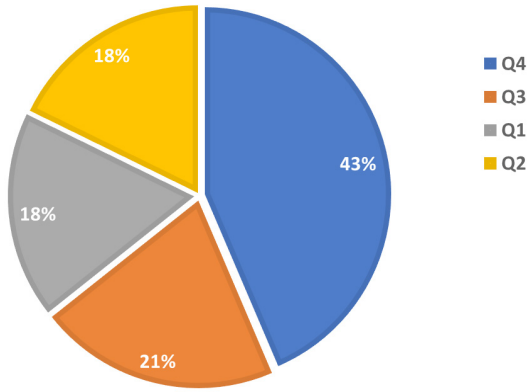


Figure 5. Distribution of citing journals by their quartiles.

Lastly, the analysis of the citing source's publication type/category reveals that the majority of citations come from research articles followed by conference proceedings, reviews and book chapters (Figure 6). Only in the field of Engineering do conference proceedings prevail over the articles. Not surprisingly, there is a big share of book chapters for SSH.

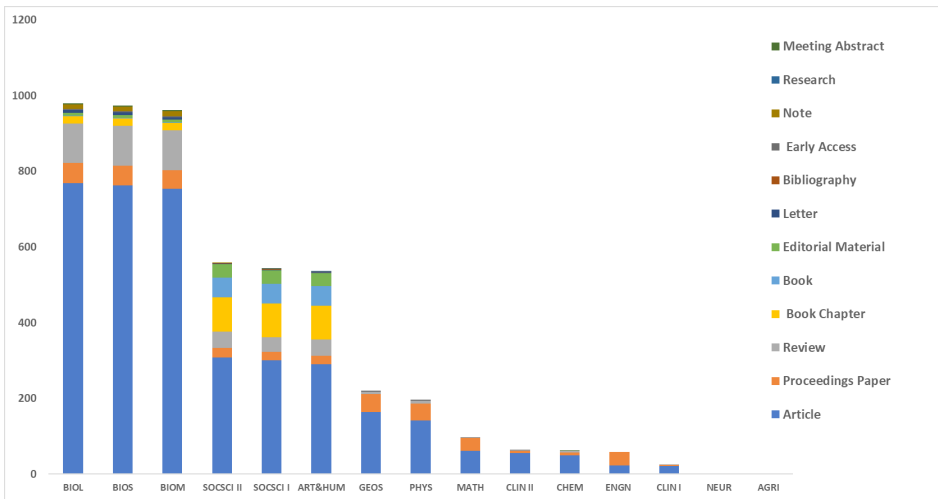


Figure 6. Distribution of the citing papers by document type

Table 3 increases the scope of this analysis by identifying the number of citing papers from articles authored or co-authored by Armenian researchers in relative comparison to the general number of citations. The majority of citations are to the domestic journals in the field of bioscience, biomedicine and biology, followed by

SSH (for more details see Table 3).

Table 3. Number of citing documents (co-)authored by the researchers from Armenia.[5]

Scientific field	General number of Citations	Citations from the documents authored or co-authored by researchers from Armenia
BIOS	924	351
BIOM	912	340
BIOL	930	333
SOCSCI II	464	98
SOCSCI I	465	90
ART&HUM	443	90
PHYS	188	55
GEOS	211	54
MATH	443	49
ENGN	58	41
CLIN II	61	26
CLIN I	24	18
CHEM	61	12
NEUR	1	1
AGRI	0	0

Following this, we have analyzed the share of "diaspora scientists" in the citation count to the domestic journals (see Figure 7). As defined above, diaspora researchers are scientists of Armenian origin who were born and raised in host states or moved to a host state from Armenia later in life. The data suggests that the vast majority of diaspora researchers cite articles in the SSH. This again proves the assertion about the SSH put forward by Sivertsen (2016) about the societal impact and means of communication regarding this discipline, as well as the limited coverage in its individual subfields. Interestingly, the share of other researchers (those not related to the Republic of Armenia or members of the Armenian diaspora) also cite a large number of articles within SSH. The next group of scientific disciplines with a high share of citations from diaspora researchers is Bioscience, Biology and Biomedicine. Meanwhile, it should also be noted that the number and relative share of researchers from the Republic of Armenia is very high in these fields–this is likely because Armenian researchers in these fields tend to publish in WoS-indexed journals, while Armenian researchers in SSH tend to publish predominantly in domestic journals. This is a

[5]Full counting method is used.

common phenomenon in the SSH, which is connected with more heterogeneous publication patterns in the field, as books and domestic/national journals are widely used by the scientists of the field (Archambault et al., 2006; Engels et al., 2012; Sivertsen, 2016).

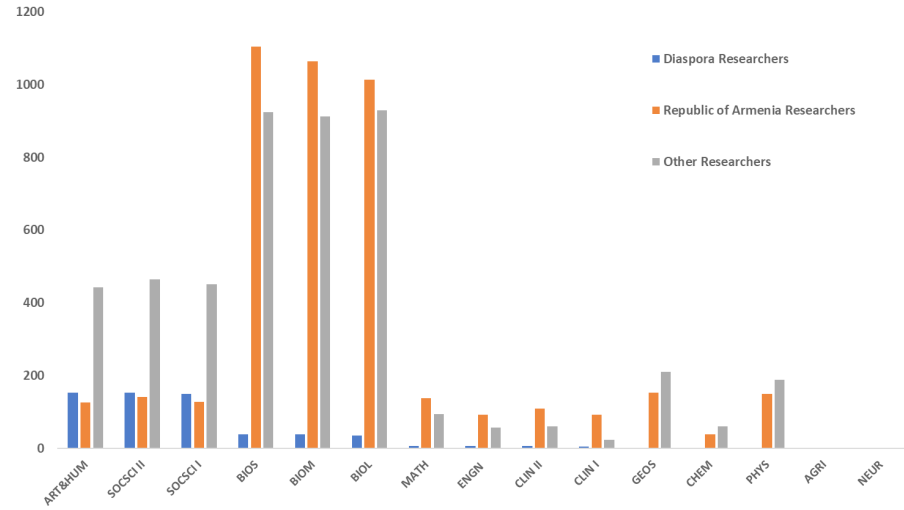


Figure 7. Distribution of Republic of Armenia researchers, diaspora researchers and other/foreign researchers who have cited Armenian domestic journals in WoS-indexed journals.

A significant share of diaspora researchers regarding citations to SSH domestic journals is also explained by the fact that SSH research is often very local in scope with specific research topics covered mainly by Armenian-language journals. For the remaining scientific fields, a relatively small share of researchers from the diaspora was observed.

Finally, to construct an overall picture of the citations to Armenian-language articles, we have also analyzed the citations to those 286 publications; the data reveals that 107 out of 331 citations come from publications with neither Armenian, nor Diaspora researchers, demonstrating that those Armenian-language publications were also used by foreign researchers without a direct national or ancestral connection to Armenia. The share of diaspora researchers remains predominant here, with 119 citations followed by the researchers from Armenia.

5 Conclusion

Despite English being the lingua franca of the scientific world, a wide array of scientific knowledge is still being produced and published in other languages. Additionally, these English-language publications are further limited to journals indexed

in the WoS and/or Scopus databases, which include a very limited number of journals in local or national languages. Meanwhile, these non-English domestic journals struggle to proliferate in a globally oriented, competitive world and take their place as a ubiquitous medium of disseminating scientific knowledge. One possible reason for this is that articles in these journals have a low probability of being cited; this may be due to a researcher's unfamiliarity with or proficiency in the national/domestic language of publication. This lack of visibility may deter the authors from further monitoring the accuracy of the information in those work or their sources. Another concern is the unsubstantiated perception about the low quality of those journals; these concerns seem to be particularly acute for languages that are spoken by a small number of people.

To find out more about the role and possible effect of domestic journals on the pool of general knowledge in circulation in both a local and global context, this article has studied the citations to Armenian domestic journals in the WoS. The Republic of Armenia has a population of only 2.9 million people, while the number of Armenians living abroad—in the Armenian Diaspora—amounts to approximately 10 million. Although not everyone in the Armenian Diaspora speaks or understands Armenian, it is safe to argue that a large number of diasporans may do so. Taking this into consideration, the articles also analyzed the share of "diaspora scientists" in those citation counts.

Having analyzed 122 Armenian journals, of which only six are currently indexed in the international citation databases WoS or Scopus (and were not included in our analysis), we have found that only 47 Armenian domestic journals have at least one citation in the WoS database. Those journals have accumulated 1,697 citations in total, predominantly concentrated in the fields of Biology, Biomedical Research, Bioscience, followed by the Social Sciences and Humanities.

Armenian domestic journals publish articles predominantly in Armenian, but also in Russian and English. Within multilingual domestic journals, the analysis revealed that Russian-language articles have received the majority of citations—followed by English-language and Armenian-language publications. This can be explained by the concept of *balanced multilingualism* offered by Sivertsen. Here, in the Armenian context, Armenian, Russian and English are necessary for different purposes of communication and are used in different contexts to fulfill specific purposes.

The sources who were citing the Armenian journals were analyzed separately in consideration of the countries/nationalities of the publishers of the journals, citing journals' quartiles, citing publication type, etc. Findings revealed that the majority of citations to the Armenian domestic journals came from WoS publications authored and/or co-authored by researchers from Armenia. Armenia possesses a large scien-

tific diaspora with connections around the globe; some of these researchers possess ties with Armenia and also speak and/or understand Armenian language.

The problem of the emigration of researchers to more developed countries has been considerably studied (Burns, 2013; Lewin & Zhong, 2013; Meyer & Brown, 1999; Tung, 2008). Demonstrating that this process of "scientific migration" will continue, Alleyne and Solan (2019) argue that developing countries must shift their focus from retention to seeking to benefit from such migration. The research on scientific emigration has consequently shifted from the brain drain to "brain circulation" and knowledge networks that enable the emigrated individuals to somehow contribute to their respective countries (Bonilla et al., 2022).

This current study has demonstrated that diaspora scientists can somehow contribute to the proliferation of knowledge produced in their homeland, as well as help domestic journals gain visibility by circulating and disseminating the knowledge contained in those publications and pave a way for them to be indexed in international scientific databases.

Our findings demonstrate that 202 out of 1,697 citations to Armenian domestic journals are from diaspora researchers—from which 156 are to journals in SSH. Furthermore, among those cited, 119 citations are to Armenian-language publications. Thus, one way of knowledge networking could be the use of publications in domestic languages with an aim of proliferating their results, which could expand our understanding of knowledge networks.

Funding information

The work was supported by the Science Committee of RA, in the frames of the research project No. 20TTCG-5I013.

Author contributions

Edita Gzoyan (editagzoyan@gmail.com): Conceptualization (Equal), Formal analysis (Equal), Methodology (Equal), Writing – original draft (Equal); Aram Mirzoyan (mirzoyan.aram@gmail.com): Investigation (Equal), Resources (Equal), Writing – review & editing (Equal); Anush Sargsyan (anushsargsyan9@gmail.com): Investigation (Equal), Methodology (Equal); Mariam Yeghikyan (mariamyeghikian@gmail.com): Investigation (Equal), Methodology (Equal); Domenico A. Maisano (domenico.maisano@polito.it): Resources (Equal), Validation (Equal), Writing – review & editing (Equal); Shushanik Sargsyan (shushaniksargsyan8@gmail.com): Data curation (Equal), Funding acquisition (Equal), Supervision (Equal), Writing – review & editing (Equal).

Conflict of interests

No potential conflict of interest was reported by the authors.

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Research Paper

Appendix

Table 2. Armenian domestic journals and their citations from the WoS.

№	Journals	Starting Year	Subject Category	Their Citations in WOS
1	Biological Journal of Armenia	1948	BIOL; BIOS; BIOM	892
2	Historical and Philological Journal	1958	SOCSCI II; SOCSCI I; ART&HUM	243
3	Armenian Journal of Physics	2008	PHYS; GEOS	160
4	Bulletin of Social Sciences	1940	SOCSCI II; SOCSCI I; ART&HUM	72
5	Banber Matenadarani	1941	SOCSCI II; SOCSCI I; ART&HUM	48
6	Mathematical Problems of Computer Science	1963	ENGN; MATH	40
7	Journal of Armenian Studies	2013	SOCSCI II; SOCSCI I; ART&HUM	39
8	Electronic Journal of Natural Sciences	2003	CHEM; BIOL; GEOS; CLIN II; MATH	36
9	Chemical Journal of Armenia	1947	CHEM	23
10	Medical Science of Armenia	1961	CLIN II; CLIN I; BIOS; BIOM	14
11	Bulletin of the Russian-Armenian University.Physico-Mathematical and Natural Science	2005	PHYS; GEOS; BIOS; MATH	12
12	Proceedings of Engineering Academy of Armenia	2004	ENGN	8
13	Etchmiadzin	1944	SOCSCI II; ART&HUM	8
14	International Journal of Armenian Genocide Studies	2014	SOCSCI II; SOCSCI I; ART&HUM	8
15	The Problems of Oriental Studies	1983	SOCSCI II; SOCSCI I	7
16	Proceedings of NAS RA - Mechanics	1966	PHYS	5
17	Reports of NAS RA	1944	PHYS; ENGN	5
18	Proceedings of the YSU: Physical and Mathematical Sciences	2009	PHYS; MATH	5
19	Armenological Issues	2014	SOCSCI II; SOCSCI I	5
20	Mesrop Mashtots University Bulletin	2006	SOCSCI II; SOCSCI I	5
21	Armenian Folia Anglistika	2005	SOCSCI I; ART&HUM	5
22	Medicine, Science and Education	2009	CLIN II; CLIN I; BIOS; BIOM	5
23	Vem	2009	SOCSCI II; SOCSCI I	4
24	Armenian Journal of Political Science	2014	SOCSCI II	4
25	Contemporary Eurasia	2012	SOCSCI II; SOCSCI I	4

№	Journals	Starting Year	Subject Category	Their Citations in WOS
26	Hushardzan	1987	ART&HUM	4
27	Issues in Theoretical and Clinical Medicine	1999	CLIN II; CLIN I	4
28	Main Issues of Pedagogy and Psychology	2013	ART&HUM	4
29	Messenger of Armenian State University of Economics	2004	SOCSCI II	3
30	Journal of Genocide Studies	2013	SOCSCI II; SOCSCI I; ART&HUM	3
31	Bulletin of High Technology	2016	ENGN; SOCSCI II	2
32	Proceedings of NPUA. Information Technologies, Electronics, Radio, Engineering	1998	ENGN	2
33	Proceedings of the YSU, Series Geology and Geography	2009	GEOS	2
34	Banber-Bulletin of Yerevan University. Armenian Studies	2010	SOCSCI II; SOCSCI I; ART&HUM	2
35	Collection of Scientific Articles of YSU SSS	1940	SOCSCI II; SOCSCI I; ART&HUM	2
36	Scientific News of Armenian State Pedagogical University	2003	PHYS; ENGN; BIOL; SOCSCI II; SOCSCI I; ART&HUM; MATH	1
37	Proceedings of the YSU, Chemistry and Biology	2009	CHEM; BIOL; GEOS; CLIN II; BIOS; BIOM	1
38	Proceedings of NAS RA - Earth Sciences	1948	GEOS	1
39	Kantegh	2001	SOCSCI II; SOCSCI I; ART&HUM	1
40	Crisis Management and Technologies	2010	SOCSCI II; SOCSCI I	1
41	History and Politics	2018	SOCSCI II; SOCSCI I	1
42	Akoonq	2011	ART&HUM	1
43	Armenian Journal of Mental Health	2009	CLIN II; NEUR	1
44	Armenian Economic Journal	2019	SOCSCI II	1
45	Grakanagitakan handes	2004	ART&HUM	1
46	Mehrabyan Medical Institute Bulletin	2006	CLIN II; CLIN I	1
47	Russian language in Armenia	1998	ART&HUM	1