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University Library at a New Stage of Social Communications Development. Conference Proceedings, 2025, No. 10
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Scientometric and Bibliometric Activities as Important Areas of Activities in University Libraries (On the methodology of studying and assessing scientific activity in Azerbaijan)

Objective. The study aims to transfer the existing experience of scientific libraries in evaluating scientific information into the modern digital environment, to study new "evaluation standards", and to integrate them into international practice. **Methods.** A synthesis of traditional methods of servicing library and information activities with modern technologies and a comparison of innovative approaches with traditions are used in the article. **Results.** Libraries, whether traditional, digital, or hybrid, constitute a valuable information heritage of human society. Their sustainability and ability to preserve their position in the modern information age depend largely on the correct assessment of their socio-philosophical significance. The adoption of modern methods and technologies that meet current demands enhances the attractiveness of scientific libraries. This article studies, for the first time, the methodology used in Azerbaijan to determine the National H-index and evaluates its degree of compliance with international standards. A scientific-theoretical analysis of the work carried out in 2023–2025 is conducted, and recommendations are made for the first time to enhance the role of scientific libraries in the evaluation of scientific activity. Since 2023, scientometric methods have been applied in Azerbaijan to study the rankings of scientific and higher educational institutions, as well as researchers, and to determine the National H-index. The scientific validity of this methodology and its compliance with international standards is being examined for the first time. The globalization of scientific information determines a number of international norms. These include the assessment of scientific information, the calculation of ratings, and the determination of the national Hirsch index, all of which are based on uniform standards. Experience shows that university libraries' participation in these processes, their monitoring of scientific information circulation, and the organization of educational activities demonstrate positive efficiency. **Conclusions.** The growth of scientific information arrays and the need for their evaluation for management purposes is increasing every day. Scientific libraries attempt to manage this process not only through traditional methods but also by applying new digital opportunities and modern methodologies, introducing innovative evaluation tools. Gradually, consolidated international standards have been formed, and it has become important to align national projects with these standards. Expanding the participation of academic libraries in determining the National H-index is proposed. The problem involves not only processing, preserving, and providing access to scientific information but also learning to apply scientometric methods in its evaluation. It is recommended to explore broader possibilities by applying traditional bibliometric methods to the digital space.

Keywords: scientometric research; National H-index; scientometric methods; scientific libraries; evaluation of scientific information; bibliometric methods

Introduction

According to the results of 2024, an analytical table reflecting the development of science in Azerbaijan was published. This table indicated that Azerbaijan's H-index was 224 on Google Scholar, 180 on Scopus, and 160 on Web of Science. Although each of these figures could be subjected to long and detailed analyses, the most important fact is that the average value is five times higher than previously expected. (Kazimi & Guliyeva, 2023). These indicators are a source

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of pride and reflect the overall picture of scientific development in Azerbaijan. Nevertheless, detailed data analysis is necessary to identify the specific outlook by scientific fields.

In 2018, a table prepared by the Islamic Citation Center of the Organization of Islamic Cooperation (Shiraz, Iran), covering the scientific development dynamics of 1997–2017, presented a surprising general picture of science in Azerbaijan. In that table, Azerbaijan's average H-index was 27, ranking 145th in the world in citation rate.

Academics in Azerbaijan understood that these figures did not reflect the true overall academic landscape of the country. Until scientific journals published in Azerbaijan were integrated into the digital space and our researchers' scientific works indexed in reputable journals, it was impossible to establish an objective picture.

As a result, the first steps in "digital engineering" were taken, and projects were implemented to determine the National H-index. This national ranking system has become an independent platform that evaluates the scientific productivity of researchers, groups, and institutions in Azerbaijan. It is based on data from internationally recognized scientific databases such as Scopus, Web of Science, and Google Scholar.

Methods

A synthesis of traditional methods of servicing library and information activities with modern technologies and a comparison of innovative approaches with traditions are used in the article.

Results and Discussion

The National Hirsch Index (NHR, n.d.a) used in Azerbaijan indicates its methodology on the website's interface. A study of this methodology reveals that, when assessed against three international databases, a rough picture of scientific activity emerges. However, there are no tools for assessing internal academic activity in the country.

The management of the aforementioned information service is either unaware of the activities of CoARA (the Coalition for the Assessment of Research Progress) or is specifically focused on studying the dynamics of scientific development in the natural and applied sciences. Of course, the success of initial steps, the dynamics of statistical indicators, and the study of quality indicators are important. However, it is also essential to improve the applied methodology and apply a differentiated approach to scientific fields.

The methodology for determining the "National Hirsch Index" used in Azerbaijan, as well as the methods used in Turkey and Russia, and their mutual comparison also show that they are insufficient for determining academic activity within a country, and the launch of new instruments is necessary. Developing such a methodology and bringing it up to international standards could be important.

Since early 2023, the National H-index has been officially announced. It serves as an important scientific information service with significant functions. The "Azerbaijan National H-index Ranking" is an independent international rating system that evaluates the scientific productivity of Azerbaijani researchers, groups, and institutions, based on a consolidated H-index drawn from the three most authoritative indexing databases worldwide.

Using information obtained from Scopus, Web of Science, and Google Scholar, the National H-index rating reflects the overall H-index of Azerbaijani research institutions. Based on this data, a ranking is formed, and institutions are placed accordingly. Through this methodology, Azerbaijani universities and research institutions are integrated into the global scientific

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information space and evaluated according to internationally recognized standards. The first evaluation list was published in February 2023, and currently, data for the second quarter of 2025 is being released. The increasing dynamics of scientific activity within two years are clearly visible in these lists.

Today, the H-index is used to measure the value of scientific knowledge. It is a statistical metric applied primarily to researchers, journals, and academic articles. This calculation model has not changed since its inception and is still regarded as the most authoritative measure. Although some countries use alternative methods, the H-index remains the primary indicator. Nevertheless, there is also growing practice in applying other indicators alongside the H-index, and new approaches in "digital engineering" are being encouraged.

For individual researchers, the H-index is calculated; subsequently, departmental and laboratory indices are determined by aggregating individual results. These are then consolidated into the H-index of scientific research institutes and universities. At the final stage, the aggregated H-index of all institutions determines the scientific potential of the Republic. This constitutes the initial evaluation. In later stages, science development maps are drawn, and more advanced scientometric analyses are conducted. Previously, such assessments were performed annually, but now in Azerbaijan, they are conducted twice per year. We support the idea of transforming this into a continuous monitoring process institutionalized by specialized organizations.

It should be noted that not all scientific and educational institutions in Azerbaijan are yet included in the "Azerbaijan National H-index Ranking 2023". With the inclusion of all institutions, the national academic performance indicators are expected to increase significantly. Additionally, scientific and educational institutions will likely place greater emphasis on professional recruitment, apply differential evaluation to researchers, and expand academic collaborations.

Currently, 96 scientific and educational institutions are included in the ranking, of which 40 are higher education institutions and the remainder are research institutes. Seventy-three institutions are ranked by their scientific indicators, while 11 institutions only appear in the ranking list. For national scientific prestige to increase, all institutions must be included. Since this method of evaluation is relatively new, we will likely observe a dynamic growth of indicators in the coming years (Chernova, et al., 2022). For this purpose, the scientific community of Azerbaijan should be trained in the methodology of scientometric assessment, the creation of researcher profiles, and the proper placement of scientific outputs in relevant platforms. Such training, familiarization with evaluation methodologies, and broader participation in scientific information platforms could significantly raise the National H-index.

The Role of Scientific Libraries in the Evaluation of Scientific Development

In the globalized world, the circulation, mass, evaluation, and impact of scientific information require increasing attention year by year. For a long time, academic institutions devoted only occasional attention to this issue, often only once annually, without establishing institutionalized organizations for this work. (Kunanets, Filippova, Dobrovolska, & Kazimi, 2020). Scientific libraries have always played a supporting role in these processes, and they continue to do so today. However, as institutionalized entities, scientific libraries have the potential to devote significantly more time to scientometric and bibliometric activities, and the prospects in this direction are broad.

The role of scientific libraries as providers of scientific information, their contribution to measuring scientific productivity, their function in raising the information literacy of researchers, their promotion of academic collaboration and networking, and their role in preserving and disseminating national scientific heritage should all be studied in the modern paradigm.

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Criteria that can be established for evaluation by scientific libraries include: the degree of digitization of national archival materials, usage statistics and assessment, quality evaluation of information services, monitoring and dissemination of bibliometric indicators, expansion of training and educational activities, participation in international collaborations in the field of evaluation, and preservation and promotion of national scientific heritage.

Scientific libraries reflect the development of science in the country — their collections, activities, and ability to disseminate information create an objective picture of the academic environment. Although the National H-index is not yet widely applied, it remains a theoretically valid metric, and scientific libraries play a crucial role in its formation and growing popularity in the country.

By participating year-round in these processes, scientific libraries help determine the dynamics of scientific development in multiple directions. Their work in data collection and processing, citation analysis, creation of national databases of scientific resources, integration with international systems, and preparation of analytical reports allows meaningful and purposeful monitoring of H-index movements and forecasts.

The mechanisms proposed for scientific libraries' participation in the calculation of the National H-index include: collecting sources, monitoring citations, preparing bibliometric analyses and reports, and promoting the visibility of local scientific outputs in international databases. Thus, libraries act as "strategic operators of information", and without their involvement, the preparation of the National H-index would either be impossible or fail to reflect an objective reality.

The National H-Index in Azerbaijan: Nature and Methodology

At present, the "National H-index" reflects not only the real picture of academic activity in Azerbaijan but also plays an important role in determining the country's position in global academic processes, as well as in assessing the dynamics of development. There is no more accurate method currently available to reflect reality.

In the ranking, institutions in the top ten are referred to as the "leaders of scientific potential", with the Azerbaijan National Academy of Sciences (ANAS) at the forefront, logically so. Among higher education institutions, Baku State University (BSU) ranks first. Its figures are highly reputable and competitive compared to many European universities.

Institutions ranked 21–30 are categorized as having "high scientific potential". These are institutions with strong academic performance and clear development dynamics in the ranking. Some universities achieve high indicators by attracting foreign experts, while others, despite strong internal performance, remain underrepresented in prestigious platforms and thus excluded from evaluations. Still, some universities improve their rankings significantly by consolidating their potential during the year.

The third group, termed "ranking members", includes a wide range of scientific and educational institutions, both large and small. For some smaller research institutes, participation in the ranking itself is already a significant achievement.

There are also discussions regarding potential artificial interventions. It should be emphasized that the first two databases — Scopus and Web of Science — are closed systems, making external manipulation impossible. The third, Google Scholar, operates as an open system and could theoretically be manipulated. However, monitoring can easily reveal artificial figures or fraudulent practices, so the credibility of the data remains reliable.

For Azerbaijan, the H-index values were as follows:

- Scopus: 166 in 2023, 180 in 2024

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- Web of Science: 145 in 2023, 160 in 2024
- Google Scholar: 186 in 2023, 224 in 2024

These figures demonstrate not only dynamic development but also stand as prestigious numbers in themselves. In the "Top-1000 Researchers" list, Faiq Ahmadov (Physics Institute of ANAS) and Mais Suleymanov (Baku State University) lead with a very high number of publications and citations (NHR, n.d.b).

Table 1

Azerbaijan's H-index and Publications by Scientific Fields (SCImago database)

	Scientific Field	**H-index**	**Number of Articles**
1	Physics & Astronomy	117	370
2	Social Sciences	63	197
3	Biochemistry, Genetics, Molecular Biology	62	111
4	Mathematics	61	92
5	Computer Science	50	84
6	Chemistry	47	55
7	Earth Sciences	45	71
8	Arts & Humanities	30	18

The compilation of the "Azerbaijan National H-index Ranking" serves as a powerful motivation for researchers and fosters a healthy competitive academic environment (SCImago Journal & Country Rank, n.d.).

In global practice, H-index requirements vary between natural sciences and social sciences. Evaluations should therefore group institutions by natural sciences, social sciences, and specialized scientific institutes. (H. Lypak, T. Lypak, & Kunanets, 2024). The latest ranking list also included the Azerbaijan Medical University and other medical institutions, suggesting that in the future, medical and healthcare fields will likely be evaluated separately. Similarly, social sciences and humanities should be assessed independently, with the application of domestic evaluation tools. In this regard, Turkey's Sobiad experience could be examined. Furthermore, applied and fine arts must also be evaluated as separate categories.

Conclusions

Since its launch in 2023, the Azerbaijan National H-index has allowed for a general overview of scientific development in the country. It revealed the presence of a healthy academic environment and strong development dynamics.

The creation of academic profiles for Azerbaijani researchers, information search within scientific platforms, monitoring of statistical data, and planning of information literacy initiatives have been outlined as necessary steps.

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In order to ensure systematic management of these processes and maintain consistency in scientific activity, the responsibilities of scientific libraries must be defined (Artemenko, Seniura, & Lozytskyy, 2023). University and researcher rankings should not remain one-time campaigns but should instead become continuous processes throughout the year. In this context, the analytical functions of scientific libraries are vital. They should lead in preparing annual and quarterly reports, collaborating with databases, and organizing training with specialists.

It is regrettable that the libraries of Azerbaijani universities, the Central Scientific Library of the National Academy of Sciences, and research centers do not cooperate with the Coalition for the Advancement of Research Assessment (CoARA) and do not participate in international discussions on this topic. Naturally, this situation affects the quality of assessment methodology.

The globalization of scientific information processes will continue to grow more complex, requiring the application of increasingly sophisticated algorithms. This, in turn, demands the continuous improvement of the professional skills of scientific library specialists.

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Наукометрична та бібліометрична діяльність як важливі напрямки роботи університетських бібліотек (про методологію вивчення та оцінювання наукової діяльності в Азербайджані)

Мета. Дослідження має на меті перенести існуючий досвід наукових бібліотек з оцінки наукової інформації в сучасне цифрове середовище, вивчити нові стандарти оцінки та інтегрувати їх у міжнародну практику. **Методика.** У статті використовується синтез традиційних методів обслуговування бібліотечної та інформаційної діяльності зі сучасними технологіями та порівняння інноваційних підходів із традиціями. **Результати.** Бібліотеки, традиційні, цифрові чи гібридні, становлять цінну інформаційну спадщину людського суспільства. Їхні стійкість та здатність зберегти свої позиції в сучасну інформаційну епоху значною мірою залежать від правильної оцінки їхнього соціально-філософського значення. Застосування сучасних методів і технологій, що відповідають сучасним вимогам, підвищує привабливість наукових бібліотек. У цій статті вперше досліджується методологія, що використовується в Азербайджані для визначення національного H-індексу, та оцінюється її відповідність міжнародним стандартам. Проводиться науково-теоретичний аналіз роботи, виконаної в 2023–2025 роках, та вперше надаються рекомендації щодо підвищення ролі наукових бібліотек в оцінці наукової діяльності. З 2023 року в Азербайджані застосовуються наукометричні методи для вивчення рейтингів наукових і вищих навчальних закладів та дослідників, а також для визначення національного індексу Гірша. Вперше вивчається наукова обґрунтованість цієї методології та її відповідність міжнародним стандартам. Глобалізація наукової інформації визначає низку міжнародних норм. До них належать оцінка наукової інформації, розрахунок рейтингів та визначення національного індексу Гірша, які базуються на єдиних стандартах. Досвід показує, що участь університетських бібліотек у цих процесах, моніторинг ними обігу наукової інформації та організація освітніх заходів демонструють позитивну ефективність. **Висновки.** Збільшення обсягів наукової інформації та необхідність їхньої оцінки для потреб управління щодня зростають. Наукові бібліотеки намагаються управляти цим процесом не тільки за допомогою традиційних методів, а й застосовуючи нові цифрові можливості та сучасні методології, впроваджуючи інноваційні інструменти оцінки. Поступово сформувалися консолідовані міжнародні стандарти, і стало важливим привести національні проєкти у відповідність до цих стандартів. Пропонується розширити участь академічних бібліотек у визначенні Національного H-індексу. Проблема полягає не тільки в обробці, збереженні та наданні доступу до наукової інформації, а й у набутті навичок застосування наукометричних методів у її оцінці. Рекомендується досліджувати ширші можливості шляхом застосування традиційних бібліометричних методів у цифровому просторі.

Ключові слова: наукометричні дослідження; Національний H-індекс; наукометричні методи; наукові бібліотеки; оцінка наукової інформації; бібліометричні методи

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