

## The Modern Situation of Using Bibliometric Methods in Library-Information Activity in the Republic of Azerbaijan

UDC: 379.85

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### Abstract

Bibliometrics, which is a scientific method used in evaluating the scientific activities of specialists conducting research in various fields of science in higher educational institutions of the Republic, is a scientific discipline that deals with the study of documents based on the development regularities and structure of the researched fields, and the analysis of the quantitative indicators of information sources. In our country, bibliometrics reflects the analysis of bibliographic data of publications as a whole. In modern times, the multitude of different definitions of bibliometrics has led to the development and application of mathematical models and methods for all aspects of communication.

In the article, scientific-theoretical and empirical analyzes were made in this aspect, and a scientific interpretation of bibliometrics was given by referring to the works of local and foreign authors. In modern times, bibliometric indicators are widely used in information activities and usually form the basis of decision-making in various situations: in the process of assembling the funds of scientific libraries and in its development; during the evaluation of the results of scientific activities of academic institutions, etc. Bibliometrics is a scientific discipline that deals with the study of documents based on the analysis of quantitative indicators of primary and secondary information sources with the help of methods designed to obtain information about the development regularities and structure, effectiveness of the studied areas. Bibliometrics reflects the analysis of bibliographic data of publications as a whole. The application of modern methods in the objective evaluation of the creativity of scientists and specialists is of special importance for science. In modern times, the library and information institutions operating in the Republic are going through a difficult process of defining their roles and responsibilities in the scientific communication system. The level of integration of libraries into the academic environment is increasing.

**Keywords:** library, bibliometrics, bibliometric analysis, bibliometric research

## Сучасний стан використання бібліометричних методів в бібліотечно-інформаційній діяльності в Азербайджанській республіці

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### Анотація

Бібліометрія – науковий метод оцінки наукової діяльності фахівців, які проводять дослідження в різних галузях науки у вищих навчальних закладах республіки – наукова дисципліна, яка займається вивченням документів на основі закономірностей розвитку та структури досліджуваних полів, аналізу кількісних показників джерел інформації. У нашій країні бібліометрія відображає аналіз бібліографічних даних видань у цілому. У наш час безліч різних визначень бібліометрії призвело до розробки та застосування математичних моделей та методів для всіх аспектів комунікації.

У статті здійснено науково-теоретичний та емпіричний аналіз цього аспекту та дано наукову інтерпретацію бібліометрії з посиланням на праці вітчизняних та зарубіжних авторів. У сучасний час бібліометричні показники широко використовуються в інформаційній діяльності і, як правило, лягають в основу прийняття рішень у різних ситуаціях: у процесі комплектування фондів наукових бібліотек і при його розвитку; під час оцінювання результатів наукової діяльності академічних установ тощо. Бібліометрія – наукова дисципліна, яка займається вивченням документів на основі аналізу кількісних показників первинних і вторинних джерел інформації за допомогою методів, призначених для отримання інформації про закономірності та структуру розвитку, результативність досліджуваних напрямків. Бібліометрія відображає аналіз бібліографічних даних видань у цілому. Особливе значення для науки має застосування сучасних методів об'єктивної оцінки творчості вчених і спеціалістів. У сучасний час бібліотечно-інформаційні установи, що діють у республіці, переживають складний процес визначення своїх ролей та відповідальності в системі наукової комунікації. Підвищується рівень інтегрованості бібліотек в академічне середовище.

**Ключові слова:** бібліотека, бібліометрія, бібліометричний аналіз, бібліометричні дослідження

Стаття надійшла / Article arrived: 09.03.2023

Схвалено до друку / Accepted: 28.04.2023

### Introduction.

According to the "State Program for the Development of the Library Information Field in the Republic of Azerbaijan (2008-2013)" approved by the order of the President of the Republic of Azerbaijan Ilham Aliyev in 2015, it is stated in the Azerbaijan Library Encyclopedia prepared by the Ministry of Culture and Tourism and the National Library that "Bibliometrics is a science that arose as a result of the application of mathematical and statistical methods to bibliography, and was born from the combination of the terms "biblio" (book) and "meter" (measurement). Bibliometrics is the statistical analysis of books, articles, and other publications, and is a scientific direction that measures the activity of a researcher, a collection of articles, a research direction or an institute. (Azerbaijan Library Encyclopedia, 2015).

### The purpose of the research.

Today, scientific institutions need to be based on specific research for effective functioning. In the future, it is important to carry out the analysis of the accumulated achievements, the prediction of the main directions, trends and development prospects, and the evaluation of the scientific potential. In this regard, the study of methods and methods of bibliometrics in scientific research reflects the main essence of the article.

### Main part.

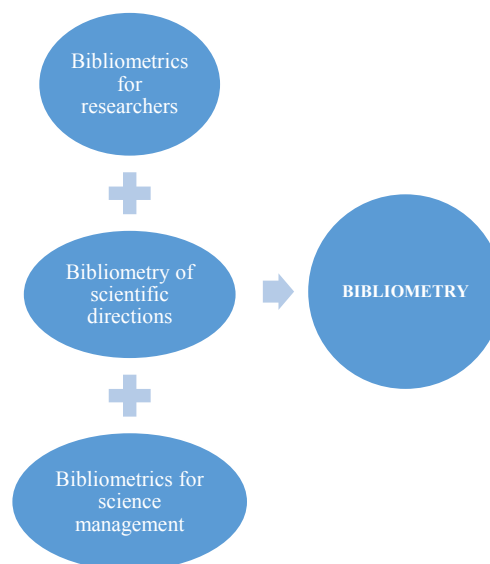
The modern activity, working conditions and conditions of the library social institute determine the scientifically based, measured and effective state policy, which is an extremely urgent problem in the field of library work. The solution of these and other such issues should be based on the effective use and development of the potential gathered in the scientific-theoretical field, which is aimed at studying the development of the development laws of library work and requires the activation of librarian studies. All this determines the current trends of expanding the methodological base of national librarian studies through the application of quantitative methods, especially the bibliometric method. So, it should be noted that until the last period, their characteristics were studied with the help of quantitative analysis, as a rule, only separate aspects and aspects of library activity were studied.

Regarding the Azerbaijani model of bibliography, we can note that in our field, bibliometric methods are currently used more in the development of information culture, in experimental library work: in the discovery of the main component of the library fund, in the study of the effectiveness of the library-information service, in the assessment of the obsolescence of the literature on librarianship, in the library-bibliographic press. It is more widely applied in determining the importance of information, in identifying priority directions in professional library-bibliography publications. Despite its non-bibliographic genetics, bibliometric methods occupy a special place in the structure of bibliography. With the help of bibliometric methods, the intensity and

character of the research work is determined according to the quantity, dispersion and concentration. It is not difficult to distinguish continuous elements in the variety of basic methods of bibliometrics. They include, first of all: the analysis of primary and secondary sources of information and the analysis of references. Researches in the field of bibliometrics are necessary not only in library activities, but also for the determination of scientific policy as a whole.

Bibliometric analysis is based on two main elements: scientific publications as the main indicator of research output and citations from publications as the main means of evaluating scientific activity. The first bibliometric studies, called statistical bibliography, were applied to the study of the development of science, and later to the management of library collections. For example, F.J., who is considered the first researcher of bibliometrics. Kol and N. ILLS studied the research conducted in the field of anatomy in European countries based on the literature published in 1543-1860. (Cole, & Eales, 1917).

**Bibliometrics can be classified as follows.**



**Scheme 1.**

- Bibliometrics (methodology) for researchers is the field of bibliometric methodological research. It is applied for the purpose of determining the "topical" topics of the given direction in obtaining scientific information from the results of research conducted in this field and determining the ways of obtaining this information.

- Bibliometrics of scientific directions (scientific information) - extension of information science with metric tools. This direction of bibliometrics includes the study of the structure and dynamics of science, the mapping and visualization of the state of science, the detection of new trends, research areas, the study of the dynamics of the development of scientific directions, as well as the optimization of information search and statistical research in information search.

• Bibliometrics for science management (scientific policy) is a direction of research evaluation. Currently, the most important direction of bibliometrics is the measurement of scientific activity at the regional, national and organizational levels. It consists of directions such as creating methods for measuring the results and performance of the research and conducting comparative studies for the evaluation of the research (Glanzel, 2003).

**Levels of bibliometric researches.**

The levels of bibliometric research vary from the micro (individual – author) to the macro (country) level, with various meso levels in between, such as institutes, journals or scientific disciplines. Depending on the level of bibliometric analysis, the activity of a different person or organization is evaluated based on the author and his address mentioned in the article (Penkova, & Tyutyunnik, 2002). For example, the joint article published in the journal Astrophysics by the authors A working at Baku State University and B working at Oxford University,

authors A and B in the direction of astrophysics at the micro level, Baku State University and Oxford at the meso level, scientific universities of the most research areas, and at the macro level analysis for Azerbaijan and Great Britain is being Since joint publications authorize the designation of scientific cooperation, the above example formally proves the cooperation of authors A and B, Baku State University and Oxford University, Azerbaijan and the United Kingdom in the field of astrophysics (Sokolov, 2008).

**Methods of evaluation of authors working on scientific research in higher educational institutions of the Republic.**

One way to evaluate scientific research is to examine the individual contributions of scientists or groups of scientists. The fact that the authors of the work are not from the same organization, but from different organizations makes it necessary to investigate this issue. Various methods of evaluating authors individually have been proposed, of which two are more commonly used.

<b>Publications</b>	Number of publications in peer-reviewed journals
<b>Journal impact factor</b>	A factor determining the impact of a journal in terms of how ofte its articles are cited and is calculated as the average number of citations received per paper published in that journal during the two preceding years.
<b>H-index</b>	The H-index or Hirsch index measures the productivity and impact of a researcher and is calculated as the published number papers (h) each of which has been cited in other papers at least h times. Note that self-citations should be excluded
<b>Citation impact</b>	Number of citations of articles and can be given for each article and as a total sum of citations (often per year).
<b>ISI or Web of Science</b>	A publication service provided by Thomson Reuters collecting bibliographic information from journals worldwide
<b>Scopus</b>	A publication service provided by Elsevier collecting bibliographic information from journals worldwide

Scheme 2.

Co-authored articles published in the above-mentioned international databases are counted for each scientist as a whole article (absolute authorship) or as a part depending on the number of co-authors (partial authorship). For example, if the number of authors of

a publication is n, then the value of each author is 1/n. Another method is to attribute the article only to the first author (counting the first author). This type of evaluation is used in various formats of ISI reference databases (not publications database).

Table 1 shows a small set of four articles and their authors as examples.

In this case, the results of the authors' evaluation methods are as follows (Braun, Glänzel, & Schuber, 1991):

Attribution of the first author:  $a_1=a_3 = a_4=a_5=1; a_2 = 0;$   
 Absolute authors:  $a_3 = a_4 =3; a_2 = 2; a_1 = a_5 =1;$   
 Fractional counting:  $a_4 =1/3+1/2+1/2=4/3;$   
 $a_3 =1/3+1/3+1/2=7/6;$   
 $a_2=1/3+1/3=2/3; a_5 =1/2; a_1 =1/3;$

Table 1.

Articles	Authors		
Article 1	$a_1$	$a_2$	$a_3$
Article 2	$a_4$	$a_2$	$a_3$
Article 3	$a_3$	$a_4$	
Article 4	$a_5$	$a_4$	

Thus, if we build the rating table of scientists based on the results obtained in the given sample, we will get different sequences for different methods (Table 2).

Table 2.

Assessment methods					
First author counting		Definitely the author counting		Fractional counting	
1.	$a_1$	1.	$a_4$	1.	$a_4$
1.	$a_3$	1.	$a_3$	2.	$a_3$
1.	$a_4$	2.	$a_2$	3.	$a_2$
1.	$a_5$	3.	$a_1$	4.	$a_5$
2.	$a_2$	3.	$a_5$	5.	$a_1$

In general, like the high development dynamics of modern science, library science also leads to the importance of wider application of methods of bibliometrics, which allow obtaining results that can act as a basis for more comprehensive study with traditional, complete, interesting analysis in the future. One of the most important characteristics of information is its volume, which allows it to be quantified. Without measurement, it is known that it is impossible to understand and learn science. The analysis of the flow of documents in science allows making judgments and opinions about the state and development prospects of individual fields and areas of science (Ismayilova, 2016). It was determined that the advantage of the variety of documents in this or that field of science depends on the intensity of its development. In addition, the emergence and development of any new scientific direction is properly accompanied by the intensive creation of articles in periodicals and serial publications. The great, special weight of this type of publications in the flow of documents is determined by the importance of prompt informationalization of readers interested in a scientific problem, as well as the understanding of its various aspects and the intensive collection of empirical materials. In the 20th century, the bibliometric analysis method related to the quantitative study of document-information flow began to be widely used (Kobelev, 2001). In the 1960s and 1970s, bibliometrics received the status of an independent scientific direction.

The rapid growth and change in the form of society's information resources has created a demand for acquiring new knowledge through other qualitative means. Within the framework of bibliometric studies, new ways and methods of document-information flow analysis, as well as new directions of their use, have been developed. The intensive development of science and the rapid quantitative growth of all types of publications have led to the importance of the organization and complex comprehensiveness of the system of statistical analysis of document-information flows in libraries. Bibliometrics, as a qualitatively new form of the development of analytical-synthetic processing of literature, directs the

attention of library science theorists and practitioners to a more rational selection of effective information, its assessment methodology and effective ways of research. There is a great demand for bibliometric information in the library information activity as well as in the scientific environment (Galyavieva, 2015). The function of libraries as a supplier of raw data or as a carrier of information is completed when conducting a bibliometric analysis of highly qualified processing of information. Bibliometrics is the ideal tool for developing and providing innovative services of libraries. Bibliometrics not only presents new opportunities to libraries, but also poses new challenges to them (Pronin, 2010).

#### Common conclusions.

Libraries are considered as a full-fledged partner of the scientific research circle. One of the developing directions in the activities of libraries is evaluative bibliometrics, which realizes their strategic role in the process of research management and evaluation. Bibliometrics is a developing part of library and information science research: currently, not only digital library technologies, but also the creation and management of library collections with the application of bibliometrics are very relevant in libraries. The rapid increase in interest in bibliometrics in libraries, especially in academic libraries, is due to the increasing use of bibliometric methods by universities, states, research leaders, information specialists, librarians and researchers for the purpose of research evaluation. The growing volume of scientific information in libraries makes the implementation of bibliometric research more urgent. Their implementation requires special knowledge, competent use of new technologies and information resources.

The combination of bibliometric methods with modern technical tools and information resources makes it possible to expand the possibilities of research conducted in libraries, to structure document arrays and to guide their increasing flow. Prospects for the application of bibliometric methods are related to the development of new information technologies and the implementation of information support of science. Bibliometric methods have evolved over time and continue to evolve (Redkina, 2003). All these methods for more detailed and effective

measurement – counting of scientific works for countries, institutions or authors, counting of references to measure the impact of publications in the scientific community, determination of the frequency of the same references, i.e. the frequency of several referring articles referring to the same source, etc. are combined with each other. Also note that:

- First of all, it is necessary to create a national register of specialists working in the field of librarianship and bibliography.

- It is necessary to create a database of periodicals in the field.

- At the national level, necessary measures should be taken to determine the rating of individual scientists and specialists, including scientific communities.

All this can accelerate the strengthening of the scientific arsenal of National librarianship and bibliographic science and its integration into world science.

## REFERENCES

- Azerbaijan Library Encyclopedia. (2015). *Ministry of Culture and Tourism of the Republic of Azerbaijan, National Library named after M.F. Akhundzade*. Baku: "Zardabi-Nashr".
- Ismayilova, N. (2016, April 15). Bibliometry: Modern State, Problems and Development Prospects. *Proceedings of the Republican Scientific-practical Conference "Problems of the formation of e-libraries"* (pp. 34-36). Baku.
- Galyavieva, M. S. (2015). Bibliometrics in the library in the assessments of librarians (based on foreign studies). *Bulletin of the Kazan State University of Culture and Arts*, 1. Retrieved from <http://cyberleninka.ru/article/n/bibliometriya-v-biblioteke-v-otsenkahbibliotekarey-po-materialam-zarubezhnyh-issledovaniy>
- Kobelev, A. N. (2001). Cognitive Structure of Modern Ukrainian Library Science: Results of Bibliometric Analysis of Monographs. *Scientific and tech. libraries*, 3, 119-130.
- Penkova, O. V., & Tyutyunnik, V. M. (2002). *Science of science, scientometrics and their derivatives: Methods for quantitative assessment of scientific activity*. (Monograph). T.: Publishing House MINZ.
- Pronin, A. A. (2010). *About Bibliometrics*. Retrieved from [http://hist.igni.urfu.ru/dais/pdf/11/21%20%D0%9F%D1%80%D0%BE%D0%BD%D0%B8%D0%BD\\_v.pdf](http://hist.igni.urfu.ru/dais/pdf/11/21%20%D0%9F%D1%80%D0%BE%D0%BD%D0%B8%D0%BD_v.pdf)
- Redkina, N. S. (2003). Bibliometry: history and modernity. *Young in Library Science*, 2, 76-86.
- Sokolov, A. V. (2008). Determinism and Deontology in the Document Communication System. *Bulletin of the Chelyabinsk State Academy of Culture and Arts*, 4, 6-34.
- Braun, T., Glänzel, W., & Schuber, A. (1991). The Bibliometric Assessment of UK Scientific Performance: Some Comments on Martin's Reply. *Scientometrics*, 20(2), 359-362.
- Glänzel, W. (2003). *Bibliometrics as a Research Field: a Course on Theory and Application of Bibliometric Indicators*. Retrieved from <http://nsdl.niscair.res.in/jspui/handle/123456789/968>.
- Cole, F. J., & Eales, N. B. (1917). The History of Comparative Anatomy. Part I: a Statistical Analysis of the Literature. *Science Progress*, 11(43), 578-596.