On Necessity of the Azerbaijan Citation Index (AzCI)

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***Abstract*— The paper is dedicated to science citation index development problems in Azerbaijan. Existing international evaluation systems in this field are analyzed. It has been demonstrated that, within the framework of electronic-science project carried out in the country, formation of national scientific information resources and science citation index carries vast importance. Solution of the problem will provide decision making capabilities in evaluation of researchers, research institutions and academic journals, their recognition to world scientific society, as well as science management.**

Keywords*— *e-science; evaluation of research activity; national science information resources; scientific citations; impact factor; science citation index

I. MOTIVATION

In modern environment, transfer to information society has set important objectives and functions for scientific activities, as well as other fields. Electronic-science projects carried out within the framework of scientific reforms conducted in the country play an important role [1]. The objective of the project is creation and development of scientific activity in accordance with modern requirements by widely using capabilities of Information Communication Technologies (ICT), improvement of management of science, formation of national science information space. Thus, as a result, it will be possible to achieve close relation of scientific organizations, collectives and researchers, increasing the effectiveness of scientific management and research works, development of all fields of science of modern world standards level and integration to world scientific environment.

One of the main directions of the project is research of evaluation problems of scientific activity and its practical realization.

For fifty years, bibliometric indicators and citations are used for analysis of scientific knowledge, evaluation of activity of academic journals, research organizations and researchers, and preparation of ratings. This information is informed based on special citation databases. Currently, there are a large number of such scientific databases and search systems. "Science Citation Index" (SCI) [2, 3] of Thomson Reuters company (former Institute for Scientific Information - ISI) – and Elsevier Scopus [4] are most popular products of world based on volume of their resources.

Currently, non-inclusion of scientific publications of the republic in these databases does not allow to fully evaluating the real situation. For this reason, development of such a national project is a very important and actual problem for our country.

II. PROBLEM STATEMENT

Justification of development of national scientific information resources and science citation index in order to evaluate scientific activity in Azerbaijan has been presented in the paper.

III. SOLUTION OF THE PROBLEM

Thomson Reuters stores bibliographic database of influential scientific journals of the world provides information on past and current condition of the journal to the subscribers [2, 3]. Today, Web of Science stores a list of nearly 12000 international and regional magazines and books on different fields of science – nature, social and art sciences.

Scientific journal bases do not contain the list of all scientific publications. Such approach cannot be carried out from practical point of view, and generally is not important. A very few number of journals publishes the large volume of important scientific results.

In mid 1930s, S.C. Bradford demonstrated that, literature core of each scientific field consists of less than a 1000 journals [5, 6]. A little portion of these 1000 journals is completely relevant to that particular scientific field; and relevance level of their majority is very low. Literature which is weakly relevant to a particular scientific field is relatively more relevant to other fields. Thus, the core of scientific literature is formed of special journals completely or partially relevant to subject surrounded by different fields. Bradford noted that, the main core of the journals is formed of literature relevant to all fields of science and important articles are published in very few journals fully relevant to selected scientific field.

As result of analysis of approximately 8005 journals registered in JCR 2010 (Journal Citation Reports) database, it was discovered that 50% of 300 of these journals contain citations and 30% of them contain articles published in them. 3000 of these journals contain 80% of all publications and almost 90% of them are cited articles. This core is not static and changes depending on scientific field. Main objective here is to renew the list of journals registered in Web of Science. Evaluation and selection of journals, their inclusion in and deletion from database at Thomson Reuters is carried out every two weeks. Each year, Thomson Reuters editor staff reviews approximately 2000 journals and 10-12% of these journals are included in database for

evaluations. Besides, existing products in Thomson Reuters are continually reviewed. Correspondence of journals to high standards and provision of relevance of articles to the journal are kept under control. Journal selection process is applied to all journals included in Web of Science covered in Science Citation Index Expanded, Social Sciences Citation Index, or Arts & Humanities Citation Index. Several special theories have been provided for evaluation social sciences and arts & humanities.

Several factors are taken into account of listing the journals from quantity and quality point of view. Main publication standards, their editorial board, international diversity of authors and all citation data related to journal are considered as these factors. None of the indicators can be ignored, but editor can determine the strength and weakness of the journal by creating interrelations with data.

Editors conducting journal evaluation at Thomson Reuters have higher education is their fields. Because, these editors are selected as experts of their fields and each newly published journal is virtually reviewed by them.

Periodicity of publishes is the main criteria in evaluation process. It is considered as one of the first conditions. After journal's registration, in order to enter Thomson Reuters database, it must be published with certain (periodic) frequency. Periodically published journal contains healthy and reliable articles. Weekly or monthly lateness of the journal from determined publishing date is not acceptable. For determination of time interval between publishing, 3 consecutive issues of the magazines from the day of first publication must be sent to the base.

Periodicity of publishing is an important condition for electronic journals (e-journals). If an e-journal is periodically published, these issues must be posted online on a timely basis. But, if e-journal articles are published with different frequency, a different approach is used in order to evaluate the periodicity.

Thomson Reuters also determines whether the journal is registered at other international evaluation centers. This optimizes obtaining of other article sources. These databases store information about the journal – name of the journal and abstracts, all references and information about the address of the author.

English is currently considered as the universal language of science. For this reason, Thomson Reuters summarizes journals with completely English language texts or at least with bibliographic information in English. In majority of articles contained in Web of Science, bibliographic information is in English and the full text is written in another language. It is clear that, full text of journals deemed important for international scientific society must be in English. This especially concerns natural sciences. Besides, references of all journals must be written in Roman (Latin) alphabet.

As noted above, main core of scientific literature forms the basis of all scientific directions. But, this core is not static. Editors of Thomson Reuters check the conformity of the subject of evaluated journal to subject of journals existing in the database. Excessiveness of the basis assists the editors in determining the subjects of active fields of science.

The editors of Thomson Reuters search International Diversity among authors cooperating with each other (co-authors) and journal editions with editorial board of Consultation Union. This is especially important for international journals. Currently, researcher is relevant to global contexts and international diversity demonstrates proximity of the journal to international scientific society.

Global spread of Web of Science is virtually broadening along all regions of the world. Increasing of number of regional users demonstrates the importance of regional science. Despite the difference of citation analysis of selection criteria of regional journals, they are similar to criteria for international journals. For example, importance of a regional journal is determined based on the subject relevant to it.

Majority of local (regional) journals cover not international, but local scientific problems. Thus, international diversity is weaker in local journals.

All selected local journals must be published on a timely basis, possess bibliographic information in English (title of the article, summary, key words) and pass the review. References must be written in Roman (Latin) alphabet.

Thomson Reuters evaluation is considered unique, because Thomson Reuters editors possess a very rich database. Explanation and understanding of these data cannot be very easy. In order to evaluate impact-factor, use citations is important solely depending on the subject of the journal. For example, a small science field such as crystallography does not create a large number of articles and correspondingly citations, like large scientific fields such as biotechnology and genetics. Besides, in some fields, especially in arts and humanity sciences, a sufficient period must pass for obtaining necessary citation. But, in life sciences these citation are obtained faster and reach their highest point in 2 or 3 years. These facts must be taken into account for correct use of citation data.

Citation analysis was carried out on at least 2 levels. Here, citations made by the journal to itself and general citations defined with impact-factors are searched. Also, citation list of cooperation of authors useful to evaluation of new journals are checked.

Besides, some journals are not considered during evaluation. Such types of journals obtain transition to a new level in evaluation by making certain changes in publications and translation to English.

For this reason, Thomson Reuters stores citations obtained from 9300 journals. Naturally, citations of journals included in the base are more preferential to the citations of those not included in the database and will be used in evaluation.

Here also self-citation level is considered. Self-citation level is measured by correlation of self-citations of journal to citations used from all other journals (self-citations included). For example, number of self-citations of journal

X is equal to 2000, and number of citations from other journals is equal to 15000. In this case self-citation level of this journal is equal to 2/15 or 13.3%. It is not unusual or groundless for a leading journal in any field to have a high level of self-citation. This is explained by high quality, unique and new subjects of articles published in this journal. Indeed, authors refer to previous works that are directly related to their current works independently from the published journal. But, among general citations, superiority of self-citations is observed in many journals. In these cases, self-citation distorts the real position of the journal.

80% of journals in JCR Science Edition List have a self-citation level not higher than 20%. This demonstrates that self-citation is a normal case for most journals. This serious deviation from normal level is considered by Thomson Reuters as an attempt to artificially increase the impact factors of boundless citations. If self-citation is discovered to be irrelevant, then journal is not given an impact factor and journal is extracted from Web of Science.

Starting from 1990s, based on information base of bibliographic analysis of science, database of Journal Citation Reports (JCR), which is produced by Thomson Scientific Company, obtained experimental importance by establishment of Essential Science Indicators (ESI). General indicators of Journal Citation Index journal on countries, organizations, scientific researchers and journals is annually updated in database. Currently there is a serious competitor of Thomson on citation base – "Scopus" product of Elsevier Company has entered the market [4].

Scopus is an abstract database indexing 19500 scientific-technical and medical journals from 5000 international publishing houses. Daily updated Scopus database includes the first issues of journals printed in leading publishing houses. This base provides the search of scientific publications and covers citations from all journals. It also includes materials of scientific conferences and scientific works only in electronic form.

Scopus search system simultaneously provides Research Performance Measurement (RPM) service. Thus, this service which is a method of control of research effectiveness, allows evaluating authors, scientific directions and journals.

Scopus forms the hyperlink to the full text of papers and allows obtaining those texts from direct source of a payment basis.

Scopus classification system consists of 24 subject areas. Generally, it consists of Physical sciences (32%), Health sciences (31%), life sciences (20%), and social sciences (17%).

Scopus stores papers published in different languages (provided there is an English language version of papers). Geographically it covers following world regions – Europe, Middle East and Africa (52%), Northern America (36%), Asia-Pacific Ocean (9%) and Southern America (3%).

Content Selection Advice Board (CSAB) makes a decision in order to index a new publication is Scopus database. This border includes 20 scientists and 10 librarians that work in different scientific fields and come from different regions of the world. Any researcher can register newly published journal by filling the form provided in Scopus Info web site.

Main evaluation criteria of Scopus Expert Committee are as following:

- Publications must be titled in English and the abstracts of all articles must be in English. Full text can be printed in any language;
- Periodic publications must be published at least once in a year.
- Number of copies must be high
- Journal must have web site in English.

A citation lists is indexed in Scopus jointly with scientific resources published from 1996 until today. Unlike web of knowledge database, Scopus does not use impact factor concept, but gives importance to Hirsch index.

Individual registration number (Author ID) is created for authors that published more than one article on Scopus. This profile reflects several versions of author's names, list of workplaces, number of publications, distributions of publication activity over a certain scientific field, citations to main co-authors, and number of general citations made to all publications of the author, overall number of used literature, Hirsch index of the author etc.

By analogy to author profile, organization, employees of which published with more than one article creates a Scopus affiliation identifier profile. This profile contains information such as address of the organization, number of author-employees and their works, list of publications and their thematic distribution.

It is possible to conducted wide analysis of scientific level of publication (journal) using Journal Analyzer tool of Scopus.

As significant requirement are set for journals in order to be evaluated in international bases, sometimes-important scientific results are reflecting in local, i.e. regional publications. Here, followings are considered as main requirements:

- Bibliographic data of the journal in English. Naturally, it takes a lengthy period of time for a journal fully published in native language to transfer to a full English language publication (it can be reflected in staff readiness, as well as financial problems).
- Periodic frequency equality of journal. It is known that this requirement is not always met for regional scientific publications. This is related to incompletion of certain condition for publications.
- International diversity of authors. It is clear that, scientific activity of a researcher in local scientific society only creates condition for him/her to become co-authors with employees of his/her workplace. I.e. cooperation of scientists with foreign (in other countries) researchers is not rather high.

As regional journals do not fully meet abovementioned requirements, it does not allow them to register in international databases and thus, be evaluated.

Wide coverage of international citation database sets forth the issue of creation of raison d'être –"national" indexes on inter-country or geographical region. In several countries, projects for creation and development of such databases are commanding attention. Recently, Scientific Electronic Library has started to create a special national database within the framework of "development of analysis system based on Russia citation index data" in Russia. The database was titled as "Russian Science Citation Index" [7].

The main reason for creation of a local index is non-representation of Russian publications in ISI database. Based on information obtained from "Journal citation report" in 2003, only 109 (10%) out of 1100 journals on Russian Higher Attestation Commission list were registered [8].

Although the total number of journals published by Japanese scientific society equals 1600 (except humanitarian sciences), JCR has only registered 162.

The condition in China is graver. Only 70 journals out of 4200 (1.7%) have been registered in JCR.

Only Applied and Computational Mathematics of the Azerbaijan journals was registered in Thomson's database and gained 0.857 impact factor in 2010.

ISI registration of any journal also sets important financial issues, for example formerly popular Russian "Scientific-technical information" journal published abroad, has suspended its ISI-registration as of 1994 and based on obtained statistics number of Russian publication in "Science Citation Index" has decreased 5 times in comparison with 1980s. Hence, we come to a conclusion that, if a journal cannot continue its publication in a foreign language, then the process of coordination of its national version to ISI conditions (regularity of publications, presentation of bibliographic data, summary in English etc) must be carried out.

It is possible for each regional journal meeting these conditions to register and be evaluated in ISI database. This means delivery of scientific problems researched in the country to the international scientific society. From this point of view, creation of national citation index is important. As a result, we bring the most citation academic journals forward and obtain chance to pass ISI registration. For example, China has increased the number of ISI registrations from 31 to 70 thanks to its national citation data.

Demonstrated problems are not only met in Azerbaijan, but also other non-English countries. For this reason, researches were carried out and continued to create national citation indexes in these countries. These citations indexes include countries such as China, Japan, India, South Korea, Turkey, and Russia [7, 9-13].

IV. Result

Important scientific-practical results have been obtained because development of national citation indexes in the world and the researches are continued. This experience justifies intensive conduction of researches in this direction in the republic. We must note that, such online system to be created will provide evaluation of scientific activity, management support of science, operative spreading of scientific results and recognition in international scientific environment.

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