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# THE NEW COMPETENCY PROFILE OF ACADEMIC LIBRARIES IN THE FUNCTION OF EVALUATION OF SCIENTIFIC PRODUCTIVITY

## ABSTRACT

The paper starts from the definition of competency and then discusses the competencies that librarians employed in academic libraries must have so that the library could provide their mission. The requirements of the scientific community as a dynamic category go towards the achievement of the knowledge society, and therefore they change and improve methods of evaluating its productivity. Measurement and evaluation of the overall scientific creativity is an extremely demanding job that must be made by competent professionals. The paper informs on qualitative and quantitative: bibliometrics, sociometrics, altmetrics and other methods that can be used for evaluation of scientific production. It presents and explains the new competency profile which the scientific community requires from the academic library as a service user and special attention is paid to the possible role and place of the library in the evaluation of scientific productivity. This paper is designed to provide information on the new competencies that the library must have if it is involved in the provision of various metric services. In this regard, possibilities of the academic library as a partner in measuring and increasing scientific productivity are discussed. It is explained how academic libraries can adapt to their new role. Furthermore, it is attempted to answer the question in which direction education of librarians should move in order to realize this partnership.

**Keywords:** Bibliometrics, librarian competencies, academic libraries, evaluation of scientific productivity

## 1. Introduction

The aim of this paper is to determine the types and levels of new competencies libraries and librarians are required to have to perform their tasks according to the requirements set by users, the most demanding segment of which is the scientific community. These requirements pertain to providing the highest quality library service and can be met

by increasing the level of librarians' knowledge. The 21st century library departs from the traditional understanding of its mission. The reasons for this are the galloping changes in technology, science, economy and other areas of social and cultural life. The scientific community requires libraries to monitor and accept these changes whereby they become and continue to be learning organizations. Academic libraries must take on a new role of an information,

communication and education centre. One of the latest roles libraries need to acquire is participating in the evaluation of scientific productivity.

## 2. Defining competencies

In general, a competency profile (Shipmann et al., 2000) includes integrating all levels of formal, non-formal and informal education. Formal education is acquired in the school system and results in the graduation as a 'framework' for a particular vocation. Non-formal education is acquired by organized learning outside the regular school system through seminars, courses, etc., and it may or may not result in a degree or certificate. Informal education is acquired by self-education and represents an upgrade of educational level for a particular profession. Competency profile involves defining the educational procedures through which an adequate level of competency can be achieved as well as defining the methods and procedures for its evaluation. In theory, competencies are commonly defined as a combination of knowledge, skills and attitudes. They are affected by different skills, personalities, social background, qualities of understanding, motivation, beliefs and the system of ethical values and interests. They are the result and the outcome of learning, as well as practical skills, i.e. work activities related mainly to performing in the work environment. Competencies can be continuously improved by training which means they are dynamic (Barbarić, 2009).

The theoretical basis for defining the competencies of lifelong learning and key competencies has been excellently presented by an OECD's document from 2003 entitled "Defining and selecting key competencies."<sup>1</sup> According to the document each organizational structure has a defined set of requirements for each particular workplace, including the competencies required by a particular workplace and a requirement for lifelong learning and training.

Competencies must integrate the continuous mixture of acquired education, workplace requirements and a person's ability to change and develop. It is absolutely necessary to define instruments for evaluating specific workplace competencies. According to Ball, the definitions of competencies have become increasingly popular in library and information science, and have been used to describe the necessary

qualifications of libraries and librarians as well as a tool for assessing the value of libraries and librarians (Ball, 2004). Griffiths and King (1985: 45) have defined competencies as "a set of knowledge, skills and attitudes related to the effective conduct and work performance of library and information science professionals". This is the oldest and most commonly used definition in the librarian profession.

## 3. The international framework for competencies of libraries and librarians

Library and librarian competencies are generally defined by professional library associations as a set of requirements for professional, generic and personal competencies of individual experts. Library associations in the United States, Canada, UK, and Australia are involved in the process of evaluating library science studies, whereas in most European countries library associations are not involved in this process. The International Federation of Library Associations and Institutions (IFLA)<sup>2</sup> brings together all library associations and promotes library and information science profession through its professional bodies and working groups. The IFLA is the leading international organization that represents the interests of librarians and library users. Through its regular work and activities, the IFLA stresses the importance of continuous identification of the necessary competencies of librarians, as well as life-long learning, and professional development through a variety of projects and programs. The Association has founded the Section for Continuing Professional Development and Workplace Learning drawing attention to the fact that a systematic education of librarians is a precondition for development. In 2012 the IFLA adopted the Guidelines for Professional Library/Information Educational Programs setting down elements to be included in formal library and information educational programs, as well as the requirement for systematic assessment of educational needs. The generally accepted frameworks for defining the competencies in the librarianship are:

- Core competencies of the American Library Association (ALA)
- Professional Knowledge and Skill Base - successor of the British Association CILIP (Chartered

Institute of Library and Information Professionals)

- Competencies for Special Librarians of the 21<sup>st</sup> Century of the American Special Libraries Associations (SLA).

ALA's<sup>3</sup> core competencies define a professional or competency profile of the American library profession. They are defined as the basic knowledge to be possessed by all persons graduating from an ALA-accredited master's program in library and information studies. In addition to possessing the core competencies a librarian of the 21<sup>st</sup> century is required to provide high quality services that meet the needs of users, carefully analyze information sources and services, effectively use the tools and techniques to research users and their needs for information, treat the users as collaborators and partners in information retrieval, effectively create reference services, develop cooperative relations within the profession, stay abreast of the latest developments in the profession, actively participate in projects and self-educate, conduct library services marketing, and consistently and systematically evaluate library services effectiveness.

CILIP's<sup>4</sup> Professional Knowledge and Skills Base represents a competency profile of library and information professionals. Their professional expertise includes a set of basic interconnected elements and activities as illustrated in the diagram. Generic skills are clearly separated from field-specific competencies. The knowledge base is complemented by general and transferable skills including computer and information literacy, interpersonal skills, management skills especially those related to human resources and finance management, marketing and research skills.

SLA's<sup>5</sup> competencies of librarianship comprise only competencies and skills required for special librarianship. They are divided into three categories: professional, personal and core competencies. Professional competencies include managing information organizations, managing information resources, managing information services and applying information tools and technologies. Personal competencies represent a set of attitudes, skills and values that enable practitioners to work effectively and contribute positively to their own organizations, clients and profession. Core competencies anchor the professional and personal competencies. Information professionals contribute to the knowledge

base of the profession by sharing best practices and experiences, and continue to learn about information products, services and management practices throughout the life of their career. Information professionals are committed to professional excellence and ethics, and to the values and principles of the profession. Two core competencies are essential for every information professional: sharing knowledge through association networks, and by conducting and sharing research, as well as adhering to the ethics of the profession. These two core competencies are paramount to the value and viability of the profession.

The Canadian Association of Research Libraries (CARL) was commissioned to develop a study entitled *Core Competencies for 21<sup>st</sup> Century CARL Librarian*<sup>6</sup> in which core competencies of Canadian librarians were defined.

The European Association for Library and Information Education and Research (EUCLID)<sup>7</sup> the European Bureau of Library Information and Documentation Associations (EBLIDA)<sup>8</sup> and the Danish Royal School of Library and Information Science, which adopted the European library and information science curriculum, have dealt with Library studies and attempted to harmonize librarians education in Europe. European experts are aware that the adoption of a single program of studies for all European countries is hardly to be expected.

Based on the above mentioned documents and sources it can be concluded that there is no international consensus on education and competencies required in the library and information profession.

#### **4. The framework for defining competencies of library and librarians in Croatia**

In Croatia the training of librarians is based on legislative and regulatory framework. Competency profiles are defined using ALA, CILIP and the SLA frameworks. For Croatia, the Bologna process meant focusing on profession and establishing the librarian studies on professional competencies as their basis (Horvat, 2005).

The Croatian Library Association (HKD)<sup>9</sup> is an alliance of library associations in Croatia. In addition to the main goals such as promoting library profession, organizing conferences, proposing regulations,

magazine publishing, etc., the alliance supports and promotes the professional integrity of librarians which implies continuous care about their education and development. The Croatian Library Association is a member of IFLA, and many Croatian librarians are involved in the work of IFLA's professional bodies. Libraries Act and Regulations on the conditions and methods for acquiring a title of library professional define the conditions that have to be met by a person working in a library. Within academic education librarians and information specialists are educated at several Croatian universities (Zagreb, Osijek and Zadar) and after a year of working in a library, they are required to pass a state exam. Librarians can choose to continue their formal education at universities, i.e. pursue a higher academic title. To further their formal education, they can attend postgraduate studies, and it is possible to obtain a higher professional title. By passing the state exams a librarian become a certified/licensed senior librarians and library advisor.

The librarians continue their education by participating in seminars and conferences organized by different organizations and professional associations and by publishing their papers and giving presentations in Croatia and abroad. Professional development is not an obligation, but it is implied, initiated and rewarded, since it enables advancement in the profession, as a result of continuous professional development.

Continuous support in the process of acquiring the highest competencies in librarianship in the form of training is offered in the framework of the national program by the Centre for continuous professional development of librarians (CSSU) in located in Zagreb<sup>10</sup>. The program is based on the needs identified through practice and new user requirements. Professional development programs organized by the CSSU in Croatia support the continuous professional development in the context of lifelong learning. Training programs are designed to increase the level of competencies of librarians in particular areas in keeping with contemporary needs of libraries and librarians.

Both international and Croatian librarian community has discussed librarian competency profile; however, they have not provided a single definition for all types of libraries. One of the major projects that had been dealing with competencies of libraries and librarians in the framework of lifelong learning was a project "Lifelong learning of librarians:

learning outcomes and flexibility" (CUK), which was financed by the National Foundation for Science, Higher Education and Technological Development of the Republic of Croatia. According to Maštrović, this project has contributed immensely to the defining and development of the competencies. Within the framework of this project, the initial national competency profile of library professionals has been developed (Maštrović et al., 2009). Based on the legislation and reference documents on competencies and learning outcomes a draft strategy on librarian lifelong learning has been adopted. The strategy represents a recommendation with regard to the direction of lifelong education of librarians in Croatia. Lifelong learning in the field of librarianship in the Republic of Croatia should primarily integrate formal, non-formal and informal education of librarians into a single flexible system based on the competencies, evaluation and recognition of previously acquired knowledge (Maštrović et al., 2009). The goal of the project was to define the competencies of librarians in lifelong education. They are mostly defined as generic and/or professional competencies, and personal competencies. Generic or general competencies represent a set of knowledge, skills and responsibilities with a wide application in various areas – they allow flexible adaptation to the requirements of a variety of professions: general, personal and linguistic culture, communication skills, computer and information literacy, the ability to transfer knowledge and skills, willingness for continuous learning and adherence to ethics in handling the resources and interacting with customers. Field-specific (academic) competencies, i.e. competencies that are specific to a particular discipline or profession, are at the core of the study program and are included in each educational cycle. The main requirements are information literacy, adherence to professional ethics, organisation of library resources in accordance with the objectives and user needs, followed by quality management of materials and collections, organization of information about the resources, identification and selection of materials, processing of library materials, the capacity to evaluate library materials, quality storage and preservation of library materials, and provision of information services. Professional competencies also include monitoring, understanding, adherence to laws and standards. Personal competencies of librarians include the ability to effectively communicate with customers and colleagues, organization and planning skills, under-

standing and application of research methods, creativity, innovation, teamwork, the ability to create work conducive and accessible environment, openness, friendliness, etc. Some competencies are both generic and professional, while some required by modern circumstances and special user requests have not been covered or defined, such as an appropriate pedagogical and psychological knowledge, in particular leadership and management skills. Some of the competencies required of a manager or a librarian with higher professional titles include organization or cooperation in the organization of cultural and promotional activities, education of users, collaboration with publishers, publishing skills, computerization of library management and evaluation of scientific productivity. The most recent and quite important contribution to the study of library profession has been made by Diana Mahala, the author of "Librarian competencies: Reflections on the development of the profession". The book gives a historical overview of the development of the library profession and librarian competencies, making a significant contribution to the understanding and the defining of the competencies librarians are required to have (Mahala, 2015).

### 5. The evaluation of the scientific productivity

Research institutions provide a platform for research, recruit, educate, and promote research by scientists and researchers. Research results in discoveries and inventions, which are generally published in scientific books and journals, or in the conference proceedings. Textbooks published by institutions and those published by some other major Croatian and internationally recognized publisher are differently evaluated. According to Macan and Petrak, journals play a key role in the implementation of science policy "...because an evaluation of a journal can influence the decisions on the financial support of scientific projects, the ranking of academic and scientific institution and the advancement of individuals in the scientific and academic system" (Macan, Petrak, 2015: 37).

### 5.1 Qualitative evaluation

Qualitative evaluation of scientific contributions of individual scientists or a group of researchers coming from a particular institution, university or country is extremely complex. In Croatia it is performed by appropriate evaluation committees for various purposes, mostly for professional advancement according to legislative and regulatory requirements, or statues whose requirements and criteria are created by the National Council for Science, Higher Education and Technological Development as a professional body within the Ministry of Science, Education and Sports (MZOS). Although the criteria for advancement are defined, committees are generally faced with a subjective assessment and the requirement for impartiality and objectivity. Committees are often required to include the paper in a particular category given that paper categories have not been defined by the regulations. The first step in the qualitative assessment of the contribution of the published paper is its evaluation through review. Reviewers are always prominent scientists, respected and trusted experts in the field. Be they domestic or international, it is impossible to completely avoid subjectivity. Objectivity is accomplished by having a larger number of reviewers, double-blind reviews, reducing the length of the review process, and adopting the Code of Ethics for authors and reviewers. The quality of papers is raised by introducing a completely open access and increasing the visibility of papers by indexing in the relevant databases. The qualitative evaluation of scientific papers must take into consideration the differences in the rules of scientific communication in various fields of science and time needed for research and publication of the results especially between the natural and social sciences.

The Croatian Agency for Science and Higher Education (AZVO)<sup>11</sup> has set the main criteria for evaluation of the quality of work conducted by scientific organizations:

- quality of scientific research,
- productivity (quantity) of scientific research,
- impact and importance of scientific research,
- efficiency of scientific organization.

Moreover, research quality is established through assessments of international and domestic projects, forms of financing and the outcomes of scientific re-

search. Socio-economic significance is determined using indicators of knowledge transfer and development of new technologies. Effectiveness is assessed in terms of the level of contribution to the development of the scientific community and society in general. In recent years, the most important and widely accepted indicator of the level of scientific contribution of an author or an institution in a particular field is the indexing and citation in relevant databases. Although citation is measure of the quality of scientific work, it is considered a numeric indicator.

## 5.2 Quantitative evaluation

Quantitative evaluation of the scientific contribution is conducted by means of appropriate disciplines of librarian and information science. According to Moore, the most frequently mentioned disciplines whose areas are not strictly separated and are intertwined are: bibliometrics, scientometrics, cybermetrics, infometrics (Moore, 2005) and more recently altmetrics or webometrics. Bibliometrics dates back to mid 20<sup>th</sup> century. It deals with the quantitative study of bibliographic records, authorship, scientific production and citation. Similarly to that, a new discipline called "naukometrija" developed in Eastern Europe which had scientometric research as its basis. Scientometrics is the study on analyzing science. It uses bibliometric methods for measuring the total number of an author's papers, gives information on the types of papers, the number of co-authors, affiliation with institutions and countries, and examines the data on the sources used by an author in order to define the role of science and technology in the national economy. Infometrics is a more recent term that comes from Germany. It is the study on measuring information and includes the theory of information retrieval. It is broader concept because it includes bibliometrics, scientometrics and webometrics. It is used in the library management, science policy and the evaluation of scientific productivity. Webometrics or cybermetrics is an emerging discipline (Moore, 2005), which studies quantitative aspects of the design and use of information sources on the Internet, by using bibliometric and infometric methods. It measures the number of hyperlinks on the Internet, a description of the network structure and the way users access the content. Altmetrics is the latest so-

cial network metrics that analyzes and measures the impact of scientific productivity through social networks and applications such as Facebook, Twitter, blogs, or online organization of bibliographic references software (Briski, 2014: 193).

Evaluation of scientific production worldwide and in Croatia is based on available quantitative data on scientific publications and their impact within the science system, because one can obtain the results very quickly and cost effectively using modern methods of digital technology. This paper will present the oldest and most common metric discipline used for the evaluation of scientific productivity by libraries and librarians.

### 5.2.1 Bibliometrics

According to Jokic, the term bibliometrics (Eng. bibliometrics, German Bibliometrie) comes from the Greek word "biblion" which means book and the word "metrein" which means measurement (Jokic, 2005). It was mentioned for the first time by Alan Pritchard (1969) in his article entitled "Statistical Bibliography or Bibliometrics?". He defined bibliometrics as the application of mathematical and statistical methods to books and other communication media in order to quantify and analyze the various forms of written communication. Bibliometrics is a multidisciplinary science. "It lends statistical methods and carries out its own analysis, using surveys and tests, and computer science to process the data using spreadsheets, statistical applications and databases. All of these tools are used to analyze the work of scientists and researchers in the various branches of knowledge" (Carrizo-Sainer, 2000). According to Pehar, bibliometrics can be descriptive and evaluative (Pehar, 2010). Descriptive researches are related to studying the number of publications in a certain area by allowing comparison between forms of research in different countries, periods or sub-disciplines, and evaluative researches are related to the study of literature that is used by researchers within a specific scientific field.

Over time, a variety of bibliometrics methods and techniques have developed. According to Okubo, the Organization for Economic Cooperation and Development (OECD) initiated a document entitled "Bibliometric Indicators and Analysis of Research Systems" (Okubo, 1997), which presents the essen-

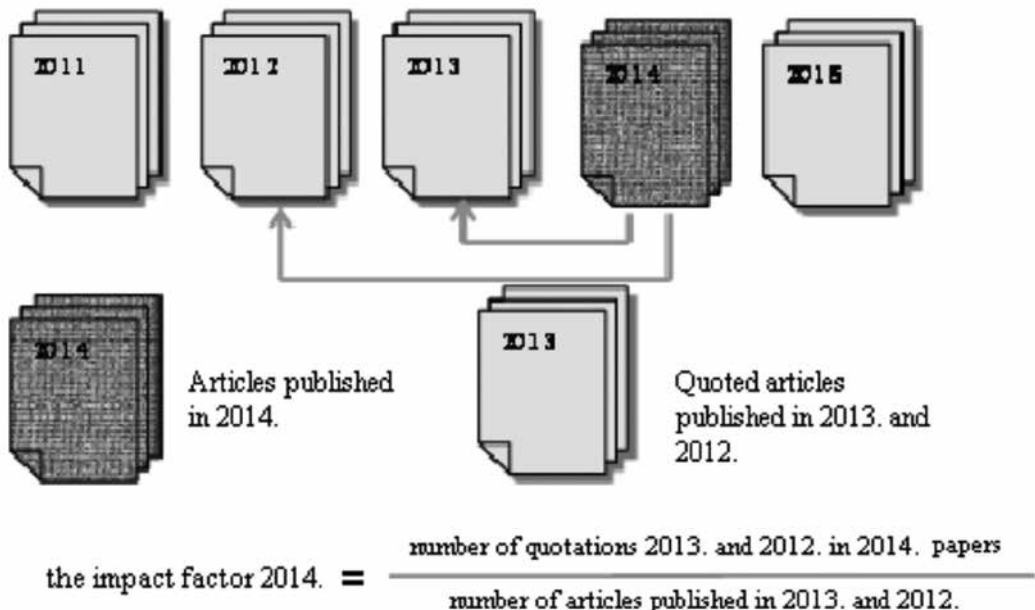
tial elements of bibliometrics, the most important indicators and methods of evaluation of scientific production. According to the document, bibliometric analyses include counting papers according to the state, institution and author; counting citations with an aim to measure the impact of published papers by a particular scientific community, and their authors aimed at of measuring the production and impact of individuals; counting quotation where two or more authors are quoted together in one article. All of these techniques have to be combined in order to have a more detailed and effective metric. Results of scientific paper are mostly evaluated using bibliometric indicators of publication activity, citation impact, scientific cooperation, etc. The most important bibliography tool is the analysis of citations recorded in databases. Bibliographic databases collect and process, i.e., index bibliographic records of a published document: an article published in a journal, a presentation at a conference or congress, an official publication, a thesis, etc. Quotation databases add data on the citation to the bibliographic records, based on the assumption that the number of citations shows the size of the impact of the results of the published scientific studies.

A necessary condition for measurement is the existence of database of an appropriate scope and quality from which one can get the exact number of citations of scientific papers. Today there are different citation indexes: the commercial and non-commercial, international and national, multidisciplinary as well as those developed for a single discipline.

For the Croatian scientific production the most important and generally accepted bibliographic and citation databases are Thomson Reuters's "Web of Science Core Collection" (WoSCC) and Elsevier's "Scopus". Internet database search engine "Google Scholar" is unjustly neglected although their conceptual and software solutions for the metrics slowly take precedence in terms of usefulness for the scientific community.

The most important bibliometrics indicator according to Jokic (Jokic, 2005: 87) is known as the impact factor. The impact factor shows the level of impact of individual articles published in a given journal. The impact factor, according to Macan (Macan, 2014), allows the determination of the importance of magazine journal by ranking it according to the number of articles published and their citation. It is calculated (Figure 1) as the ratio of the number of citations which papers published over the last two years have received and the number of papers pub-

Figure 1 Calculation of Impact Factor



Source: Author



lished in the last two years (Garfield, 1996). It represents expected average of citations of articles published in the relevant journal. According to Briski, the impact factor should help with "... determining the quality of a journal, rather than the quality of a scientific article" (Briski, 2014: 191). Impact factor is published in the Thomson Reuters database Journal Citation Reports (JCR), based on data on citations from journals which are continuously processed by citation database Web of Science Core Collection (WoSCC).

In recent years, two new executive bibliometrics indicators have emerged: SCImago Journal Rank (SJR) and Source Normalized Impact per Paper (SNIP). They are calculated from the data on paper citations in Scopus database. Data from Scopus, as well as calculations of bibliometric indicators such as SCImago Journal Rank (SJR), Source Normalized Impact per Paper (SNIP), H-index and others are published by the group SCImago free of charge and are public<sup>12</sup>.

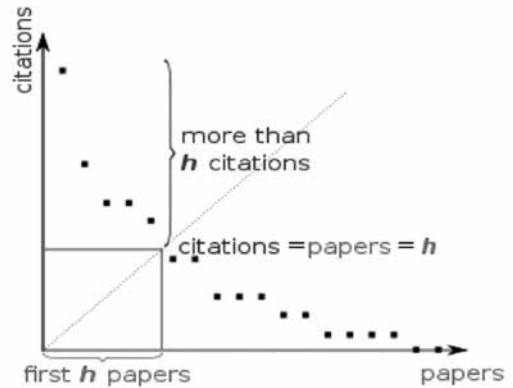
SCImago Journal Rank (SJR) is what the impact factor is in the Scopus database. According to Macan, SJR indicator is calculated on the basis of quotations that published research papers receive, just like the popular impact factor. The difference between the two is that in the case of impact factor all quotations are considered equally important, whereas for the calculation of SJR more importance is given to the citations coming from a journal that has a higher SJR factor (Macan, 2008: 262).

Source Normalized Impact per Paper (SNIP)<sup>13</sup> is also calculated on the basis of quotation data available in Scopus database, where one can find SNIP values of individual journals. SNIP is calculated as the ratio of the number of citations of an average paper published in a journal and citation potential of the field covered by that journal. This indicator is important because it takes into consideration the nature of the research fields of a journal.

Hirsh index or H-index (named after physicist J. E. Hirsch) is a relatively new indicator for the evaluation of scientific work and journals that connects the productivity and influence of scientists (Mitrović, 2013: 133). It is defined as a number that indicates the number of papers a scientist has published that were cited at least "n" times. The value of the indicator (Figure 2) depends on the number of publications and the number of citations of each of these publications, regardless of the impact factor of the

journal in which they were published. The calculation takes into account only those papers that were cited at least once. H-index is an indication of the constancy of acceptance of papers published in a journal, papers of a scientist, or an institution in a scientific community (Macan, 2013).

Figure 2 Hirsh index or H-index



Source: Macan (2013), Available at: <http://fulir.irb.hr/549/> (Accessed on: September 18, 2015)

It is included in the citation database Scopus, and is focused primarily on the evaluation of scientists. H-index of journals included in the Scopus database is available on the portal SciImago Journal & Country Rank for one or more years. It is calculated in the same manner as for individual scientists. Google Scholar has started to publish a "Google Scholar Metric"; i.e. tools (h5-index, h5-average) which support scientific productivity metrics, and more recently various comparative analyses of citations in these databases have been published. H5-index is used for articles published during the last 5 years, and h5-average for publications represents an average number of citations of articles that make up its the h5-index<sup>14</sup>. H-index of journals depends on the length of publishing a journal and the impact of articles published in it. It is not a good indicator for new magazines.

These indicators are widely used, but there are many others that reflect different aspects relevant to the evaluation of scientific productivity.

Lately, the evaluation of scientific productivity is primarily based on the quantitative bibliometric in-

dicators. These powerful tools can only be used by a competent analyst who knows the pros and cons of bibliometrics, taking into account certain limitations of quantitative analysis. The following text will highlight the factors that must be taken into account when using metric indicators. These factors are the result of the author's empirical analyses conducted in the period from 2013 to the present, i.e. the writing of this paper on evaluation procedures of scientific productivity in academic libraries as well as discussions of people involved in the process of scientific production and its evaluation.

- The indicator values depend on the scope of the data included in the appropriate databases from which they were calculated, and the data used for calculation of the impact of a journal are neither transparent nor publicly available. Impact factor and h-index have different values for the same journals or scientists if they are calculated using Web of Science and Scopus databases. There may also be errors in entering data in the citation indexes. Therefore, it is necessary to enter the source, i.e. the database from which the indicator was calculated.
- The evaluation of publications using impact factor of a journal in which they were published is not a true indication of their citation, or influence, because any a paper can receive be more or fewer quotations than a given magazine average.
- The connection between the cited paper and observed paper does not have to objectively exist because often there are, so called, negative quotes in which the authors mistakenly quote paper, which cannot be excluded from the count.
- There is evidence in scientific circles of the existence of editorial policies and informal groups that manipulate the citation practice. There are many self-citations and co-citations that can affect the overall increase in the number of citations, so the recommendation is to exclude self-citations from the calculation.

In the last few years, scientists have been drawing the attention to the shortcomings of evaluation of scientific productivity using bibliometrics. The success of bibliometric evaluation depends on the national strategic policies, legislative regulations defining the relevant databases and bibliometric indicators, and their expected value for the different fields of science. "Most scientists dealing with the evaluation of scientific work tend to use both

a reasonable interpretation of bibliometric indicators and peer review as an optimal solution" (Jokic, 2005: 14).

In 2013, the San Francisco Declaration on Research Assessment (DORA)<sup>15</sup> was published as a response to the shortcomings of bibliometric evaluation and a call to put less emphasis on the importance of bibliometric analysis. It invited university institutions and individual scientists to reduce their reliance on journal metrics in deciding on the scientific and teaching advancement of individuals, and the criteria for the funding of science. DORA invited members of the scientific community to reformulate their definition of quality research. The most important criterion for evaluating a scientific paper should be the quality and content of the paper, not the place, or the journal in which the article was published. In this way, the evaluation of the reviewed paper quality becomes a topic of primary concern. DORA has called on everyone involved to find new impact indicators based on the characteristics and capabilities of online publications which has led to the gradual introduction of altmetrics (Bladek, 2013: 194).

### **6. The new academic libraries competency profile**

Competency profile of academic libraries can be defined as a set of necessary knowledge, business skills and abilities required to perform tasks and business processes in the library as part of the institution to which they belong. Thoroughly defined competencies are the basis for further elaboration and changing of librarian competency profile which remains open to change and subject to constant innovation in accordance with the requirements of the community, users and library profession. Neither in Croatia, nor anywhere else is there an exhaustive definition of competencies for university librarians, but there are numerous studies and experiential knowledge of what their role should be.

The traditional library role (Stojanovski, 2010) is to collect, organize, classify, store, provide access to the material and make it available to users. This requires the following traditional knowledge base: the knowledge of the laws, ordinances, standards and other regulations; the knowledge of material processing (cataloguing, classification, subject

analysis, indexing); computer literacy; the knowledge and skills related to the acquisition, gathering, organizing, management and use of the collections; the use, organization, research, and evaluation of information sources; the application and development of bibliographic records; the knowledge of technology for the protection and storage of materials; the knowledge of foreign languages.

More recent requirements pertain to the following knowledge and skills base such as drafting regulations and manuals; organization and team management; marketing and promotional activities; strategic and operational planning; periodic reporting; the knowledge of the theory of science and the application of research methods; the understanding of intellectual property and copyrights, and application of the quality system.

Most recent requirements include teaching and scientific research participation; knowledge, skills required for applying and managing a project, establishing and maintaining institutional repositories; active involvement in the work of an institution through governing bodies; digitalization of materials; building and management of digital collections; metadata creation; creating and maintaining Web sites.

The new competency profile for academic libraries must include the knowledge of bibliometrics, scientometrics and altmetrics as well as the knowledge of scientific communication. A prerequisite for the acquisition of these competencies is the possession of appropriate skills and abilities for continuous acquisition of new knowledge. The so-called soft/life skills such as emotional intelligence, stress management, self-awareness, intellectual curiosity, innovation, and creativity have come into focus relatively recently.

The establishment of a new academic library competency profile, according to Macan, will respond to the needs of scientific and educational communities and users by establishing new library services (Macan, 2013) which may include:

- collecting data on scientific publications according to the affiliation to parent institutions for the purpose of multi-year funding of science,
- continuously monitoring of publishing activities by the parent institution, tracking publications of researchers and teachers at the home institution as well as the authors affiliated with the institution,

- establishment of institutional repositories which will keep all publications of the institutions at one place,
- issuing the certificates on indexing and citation in databases,
- issuing the certificates on metric indicators on journals (IF, SJR, SNIP, h-index),
- on-demand bibliometric analyses,
- analysis of scientific productivity of an institution,
- relevant training and advisory services.

Today academic libraries predominantly take part in the evaluation of scientific productivity of the institutions, or the re-accreditation of the institutions; issue indexation and citation certificates, and perform bibliometric and citation analysis. Sometimes they also issue certificates on metric indicators of a journal. What is the real contribution of academic libraries in the evaluation of scientific production and which services related to the new requirements of scientists they provide depends on the willingness of individual libraries and librarians to further their education, as well as the requirements of the parent institution. Libraries have started to assume the role of publishers, and some have been participated in the publishing of the home institution journal. Recently, many librarians have been actively involved in setting up, organizing and running institutional repositories through DABAR project.

The academic library must recognize the necessity of mastering the skills required for tracking scientific publications, searching databases, and the interpretation of the received data. Any academic library dedicated to meeting the needs of its customers can respond to the new requirements of the scientific community by raising the level of required competencies through continuous education and lifelong learning of its employees.

## **7. Conclusion**

The best way to assess the scientific production is qualitative assessment in the form of a review. Bibliometrics provides information about the national scientific production, the production of a particular scientific institution, the ranking of scientific institutions and thus allows their comparison (within the relevant field of science) with the highest pro-

duction, the types of publications in which scientists publish, the most valued scientific journals, and the most cited scientists. Furthermore, it indicates the level of cooperation between scientists and institutions. In many countries, including Croatia, science and research policy is aimed at increasing the visibility of national science on the international level by indexing in the relevant databases, with an emphasis on the evaluation of papers published in journals indexed in a specific secondary database (WOS, Scopus) as opposed to those published in the less-known or non-indexed publications. Therefore, authors are pressured to publish papers in journals that are included in those databases, and the editorial boards are trying to index their journals in databases that have been highlighted as the most important by the national institutions and agencies for science. It should be noted that the generally accepted and most important criterion for evaluating the scientific contribution of an individual author is a relevant number of independently cited papers. In Croatia, the criteria for evaluation have been increasingly focused on qualitative criteria taking into consideration the impact factor, the individual contribution factor, being published by internationally recognized scientific books publisher, taking into account patents and projects. An increasingly frequent topic of discussion are the new opportunities provided by altmetrics that are freely accessible on the Internet, i.e. counting downloads or visits, and number of shares on social networks (Facebook, Twitter), the number of citations, bookmarks, comments on social networks and public reviews.

In a higher education institution, bibliometrics was mainly used for making decisions during the acquisition and organization of library holdings. The impact factor was initially conceived so that libraries could rank magazines to which they would subscribe. Recently bibliometrics has become important to scientists, teachers, and parent institution management and therefore must be important to libraries too. It is most commonly used to assess the scientific contribution of a researcher or a university teacher for the purpose of their appointing to the relevant posts, making professional advancement decisions, and in competitions for project funding. Furthermore, it is used in the process of calculating the institution productivity for the purposes of multi-annual institutional funding, re-accreditation of the scientific institution and for other similar purposes.

The role of academic libraries has been changing so as to meet the new requirements of customers. Libraries have adopted new technologies; they cooperate with the scientists themselves; provide assistance with the decision where and how to publish a paper. Library and Information Science is a unique scientific discipline that provides the librarians with competencies for understanding scientific publications. Librarians have the knowledge and skills needed to search different databases; they have the experience of working with bibliographic metadata, and through information management they have become participants in the scientific communication.

Although there is no systematic inclusion of libraries in the process of evaluation of a scientific paper, some academic libraries have been proactive, offering their customers new services on their own initiative. They are included in all stages of the creation, distribution and use of knowledge; they cooperate with scientists and teachers in the parent institution. They knowingly take on great responsibility given the presented disadvantages of quantitative indicators which should not be the sole factor in the evaluation of scientific production. It can be concluded that Croatian academic libraries have the staff that should be ready to adopt new competencies required for the evaluation of scientific production, but also that acquiring new competencies of an academic librarian is a process that not only takes a whole working life, but a lifetime. Thus, lifelong learning to acquire new competencies implies continuous development necessary for a successful transition to a knowledge-based society.

Learning about the complexity of this issue leads to the conclusion that there is a need to rethink the strategies and legal frameworks for defining scientific policies and build a national system of scientific information. It is possible to establish a national centre for bibliometric research by involving experts in the field of library and information science, and by appropriate certification of librarians who would become experts with formal authority for the evaluation of scientific productivity.

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## **NOVI KOMPETENCIJSKI PROFIL VISOKOŠKOLSKIH KNJIŽNICA U FUNKCIJI EVALUACIJE ZNANSTVENE PRODUKTIVNOSTI**

### **SAŽETAK**

U radu se polazi od definicije kompetencije te kompetencija knjižničara zaposlenih u visokoškolskim knjižnicama. Zahtjevi znanstvene zajednice su dinamička kategorija, idu u smjeru postizanja društva znanja pa se prema tome mijenjaju i usavršavaju metode za vrednovanje njezine učinkovitosti. Mjerenje i ocjenjivanje ukupnoga znanstvenoga stvaralaštva izuzetno je zahtjevan posao, koji moraju odraditi kompetentni stručnjaci. Rad informira o kvalitativnim i kvantitativnim: bibliometrijskim, sciometrijskim, altmetrijskim i drugim metodama koje se mogu koristiti za evaluaciju znanstvene produkcije. U radu se predstavlja i obrazlaže novi kompetencijski profil koji znanstvena zajednica, kao korisnik usluga, traži od visokoškolske knjižnice, a posebna se pozornost posvećuje mogućoj ulozi i mjestu knjižnice u evaluaciji znanstvene produktivnosti. Rad je oblikovan s ciljem pružanja obavijesti o novim kompetencijama koje knjižnica mora imati ukoliko se uključi u pružanje različitih metričkih usluga. U tom smislu navode se mogućnosti visokoškolske knjižnice kao partnera u mjerenju i povećanju znanstvene produktivnosti. Obrazlaže se prilagodba visokoškolske knjižnice novoj ulozi i odgovara na pitanje u kojemu se smjeru treba kretati obrazovanje knjižničara kako bi se ostvarilo ovo partnerstvo.

**Ključne riječi:** bibliometrija, kompetencije knjižničara, visokoškolske knjižnice, vrednovanje znanstvene produktivnosti