

The Role of Academic Libraries in Scientific Production Evaluation – the Experience of University of Zagreb, Croatia

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Abstract

Since internationally visible scientific productivity is a criterion for state evaluation of Croatian academic and scientific institutions and their scientists, Croatian academic libraries have a key role in quantitative evaluation of scientific productivity using methods such as bibliometrics, scientometrics and the like. The aim of this case study is to identify and illustrate the current situation of library services for evaluating scientific production at

the University of Zagreb, Croatia, and to make recommendations for the further development of such services, which could serve as a framework for the systematic implementation of this type of service in all libraries at the University of Zagreb and beyond. More specifically, the purpose of this paper was to identify the existence of the bibliometric services in the libraries of the University of Zagreb (UNIZG), examine the status and involvement of university librarians in the academic advancement procedures and to identify the required competences for bibliometric experts in Croatia. The research was conducted using the content analysis method, the survey method, and the focus group method. The research results show that although UNIZG libraries are integrated into the system of academic promotion and the role of UNIZG libraries is enshrined in Croatian regulations, the bibliometric service is not standardised at the University level. The results also indicate that the service needs to be strengthened in terms of training of professional staff and greater investment in staff capacity and infrastructure. The fact that the study was conducted at a single Croatian university is a possible limitation that could relate to the application of guidelines for further actions and the development of bibliometric services at national level. It would therefore be desirable to conduct future research to identify the situation at other Croatian universities as well. It would also be necessary to determine the open science and open access policies at UNIZG through further research and, in this context, to establish guidelines for possible improvements in the processes of evaluating scientific productivity. The results of this study make an important contribution to the possible future positioning of university libraries and UNIZG librarians in the process of evaluating scientific productivity. In addition, some practical advice is given so that this case study may be a good introductory overview for the wider academic community in relation to this topic.

Keywords: scientific production evaluation; bibliometrics; academic libraries, case study; University of Zagreb; Croatia

1. Introduction

In the 1950s, when the world was recovering from the Second World War, there were many changes in the fields of industry, science and technology. As a result, there was a sudden increase in the amount of scientific information and scientific production. At the same time, the university was strengthened as a scientific research institution, leading to the phenomenon of professionalisation of science. With the rise and modernisation of universities, science

became the focus of higher education and thus also accessible to the public. The number of universities grew rapidly after the 1950s, leading to an expansion of academic, research and university libraries. Since the main function of research and university libraries is to support the teaching and scholarly activities of the parent institution, academic librarians began to focus first on evaluating published scholarly journals for the purpose of building library collections and later, when the imperative to justify professional academic promotion with citation rates became widely accepted in the academic community, on analysing and evaluating the scholarly output of individual scholars. Today, academic libraries play an important role in scholarly assessment. In the 1950s, the concept of “publish or perish” emerged simultaneously, according to which a faculty member’s tenure depends primarily on his or her success in publishing, which has become commonplace in academia (de Rond & Miller, 2005). Since then, the pressure on the academic community to continuously produce scholarly work to ensure its survival in academia has become ever greater. Although there have been many opponents of this principle, pointing out its negative impact on innovation and quality, the academic world seems to have accepted it as an imperative of academic progress. It all started in the United States in the late 1950s, when the first studies on the status of educational institutions were conducted, showing some shortcomings in research production and scholarly publishing (de Rond & Miller, 2005). Since then, the importance of scholarly publishing has been highlighted and donations have been encouraged to promote a scholarly research climate. Although teaching has long been considered the primary responsibility of faculty, research has suddenly become a decisive criterion for tenure and academic promotion, putting pressure on academics to publish frequently in the most prestigious international journals. With the ever-increasing number of published scientific papers and research, it was necessary to find a way to monitor and evaluate the scientific productivity and success of scientists. Citation analysis as a science management tool was used “to assist in the challenge of making a formal legal decision about scientific progress” (Garfield, 1979) and has become established in the procedures for evaluating scientific success.

1.1. Scientific Evaluation and Role of Libraries

Interest in bibliometrics increased in the 1970s due to the need to share knowledge and streamline documentation services (Leksikografski zavod Miroslav

Krleža, n.d). The 1970s are described (Heymann, 2017) as a 'turning point in time', a period of profound economic, social and cultural changes that led to accelerated production and dissemination of scientific information. An important contribution to the identification of relevant articles in the vast volume of the research literature was made by Eugene Garfield – the inventor of the Impact Factor and the Scientific Citation Index (SCI), which enabled a quantitative analysis of the scientific literature (Garfield, 1979). The advent of SCI strongly influenced the development of bibliometrics, and in the 1980s and 1990s bibliometrics became focused on research evaluation (Franssen & Wouters, 2019).

In recent years, the widespread use of citations in the evaluation of scientific productivity has generated controversy and concern among researchers regarding qualitative evaluation. This issue has been addressed by Aksnes et al. (2019), who conclude that citations reflect, with significant limitations, aspects related to scientific impact and relevance, but they have not been proven to reflect other important dimensions related to research quality. Ma (2021) goes a step further by addressing issues of publishing market pressures under which metrics take on a market value, which can lead to citations and metrics becoming a non-linguistic medium for management rather than evidence of research quality and impact.

Following the recent aspiration of the scientific community and information experts to change the way scientific productivity is evaluated, in early 2022 more than 350 organisations from over 40 countries signed the Research Assessment Reform Agreement, which provides a common direction for change in assessment practices for research basing assessment primarily on qualitative judgement (COARA, n.d.). Croatian University of Rijeka is one of the signatories of the Agreement.

The advent of electronic journals in the late 1980s revolutionised access to knowledge and the latest achievements in the world of science. Increased collaboration between scientists on an international level was encouraged, leading to the globalisation of science. This change led to an even greater acceleration of scientific productivity and an increase in the volume of published material. As the dissemination of knowledge changed significantly with the advent and widespread use of the Internet in the 1990s, the idea of Open Science emerged, advocating scientific transparency and dissemination. As a result, the Open Access (OA) movement was launched, whose

primary goal is to make scientific works immediately and widely available to the public and to propagate free access to peer-reviewed scientific papers. Considering the benefits of Open Science, OA journals began to attract attention as it soon became apparent that such journals are more visible and consequently have a greater number of citations. As a result, many information and library specialists have become involved in the bibliometric analysis of OA journals.

Bibliometric indicators, scientific indexing and citations are important elements for assessing the scientific productivity and evaluation of research outputs of the academic population. Therefore, research and academic libraries are taking up the role of research evaluation by providing publication analysis services to University staff. Bibliometric services at academic and research libraries improve support for research, and the services strengthen the partnership between librarians and research institutions. In Croatia, according to the Ordinance on the conditions for selection into scientific professions (Official Gazette 28/2017 (Pravilnik o uvjetima za izbor u znanstvena zvanja, 2017)), bibliometric services are provided by public academic and science libraries in accordance with the available databases and electronic sources. The bibliometric services include:

- issuing of certificates of scientific productivity and citation for the purpose of:
 - promotion to scientific titles,
 - applications for projects, grants, doctoral study programmes, etc.;
- customized analyses of publication portfolios by University scientists;
- customized lists of authors, publication sources etc. created using bibliometric data sources;
- analyses related to publishing activity and metrics.

However, there are three factors that are crucial for a well-established bibliometric service and scientific support: the training of bibliometrics professionals, the legal framework and the operational management of the service provided. Based on these three prerequisites and research findings, this article provides a case study of bibliometric library support practises at the University of Zagreb, Croatia, with the aim of defining the role of academic libraries in the assessment of scientific production.

1.1.1. Literature Overview

Many authors have addressed various aspects of bibliometrics and scholarly assessment. In the following, a brief review of the literature by Croatian authors as well as international research that gives insight into the role of libraries in the evaluation of scientific productions, which is the area of interest of this article.

De Rond and Miller (2005) have examined the emergence of the “publish or perish” concept, which was accepted in academia as an imperative for progress based on the success of scientific publications. They explain when and why it emerged and its impact on innovation, intellectual life, morality, and psychological and emotional state. Heymann (2017) looks at the changes in science that took place during the major economic, social and cultural changes of the 1970s, noting that this period represents a “seminal era” in the history of science. Eugene Garfield has written more extensively about the citation index and its application. In his monograph (1979), he writes about the nature and history of citation indexing and emphasises the advantages and limitations of its use. Aksnes et al. (2019) examined the relationship between citations and various dimensions of research quality and concluded that citation-based indicators alone cannot provide sufficiently nuanced or robust measures of quality. They also point to the importance of review, which they consider to be a fundamental analysis, and to the fact that citation indicators are not particularly relevant to such an assessment. Ma (2021) looks at understanding the nature of citations and metrics in the knowledge production system, which includes universities, funding agencies, publishers, and so on. The paper concludes by addressing issues related to the validity and legitimacy of citations and their implications for the conceptualisation of information and knowledge production.

Åstroem and Hansson (2012) discuss the possible consequences of introducing bibliometrics as an institutionalised practice in academic libraries. They point out that by taking a more active role in scholarly communication and applying bibliometric analysis as an institutional practice, academic libraries can strengthen their position in the context of the university’s organisation and in relation to traditional users, scholars and students, and thus occupy a central position in the development of the university itself within which they operate. Corrall et al. (2013) in their study examined the bibliometric and research activities of 140 libraries in Australia, New Zealand, Ireland and the

United Kingdom. The lack of knowledge, skills and confidence of library staff was highlighted as a major limitation, as well as the need for professional training and continuous development to better understand the research environment. In a follow-up to this research, Kennan et al. (2014) explored the professional and pedagogical implications of current and emerging research support environments for bibliometricians in academic libraries. Mihaljević (2015) provides an overview of new competencies in library professions related to bibliometric services, concluding that the assessment of scientific productivity must involve librarians and information specialists who are formally authorised to carry out these tasks.

Participation in scholarly communication and the role in monitoring the scientific productivity of Croatian academic libraries was discussed by Stojanovski (2013), who highlighted the following tasks of academic libraries: developing collections and services to meet the needs of teachers, researchers and students; promoting open access to scholarly information, developing new services for learning and research, building a digital infrastructure for preservation and access to scholarly information, and bibliometric analysis. In their article, Martek et al. (2014) compare the role of higher education libraries in monitoring scientific productivity in the Netherlands, Slovenia, Spain and Croatia, emphasising that the role of libraries in assessing scientific work has not been systematically identified in Croatia, while foreign practise points to the increasing presence of different types of scientific productivity assessment and the continuous development of information systems on which this assessment is based. According to the decision of the Ministry of Education, Culture, Sports, Science and Technology of the Republic of Croatia from 2013, the evaluation system of scientific institutions should include information on published scientific works. The authors (Martek et al., 2014) emphasise the need to include scientific libraries as participants in scientific communication, following foreign practise, especially since libraries have so far been insufficiently involved (in the legal and practical sense) in the process of creating systematic solutions for the evaluation of scientific work, especially in areas related to the application of modern metrics. Authors Čadovska and Mitrović (2018), in their analysis of the role of libraries in assessing scientific productivity using the example of national and university libraries, point out that the collection of quantitative data for the purpose of assessing scientific productivity and bibliometric analysis is carried out in the libraries of higher-level institutions of the higher education and scientific system. However, it is not possible to clearly identify which libraries provide this type of service, which

points to the need for further research to determine the importance of higher education libraries in assessing scholarly productivity. Tucaković et al. (2019) point out that citation analysis, as a statistical tool for assessing scholarly production, is an integral part of the process of formal decision-making about academic promotion and has become established over time in systems for assessing scholarly success. As a conclusion of her research, Mitrović (2019) states that bibliometric analyses are used to quantitatively assess the quality of scientific productivity, to locate key journals for publication, to identify relevant papers in specific scientific fields and areas, and to identify representative research teams in specific scientific fields. Using bibliometric analysis, it is possible to effectively monitor and evaluate the status of science and higher education institutions, and the assessment of performance can be used in the preparation of reports for international and national assessments. Therefore, the author concludes that bibliometric analyses of published scientific papers and journals have become indispensable for assessing the scientific contribution of the Croatian academic and scientific community.

1.2. Legislative Framework

The legislative framework in the field of science and higher education is based on the work of the Agency for Science and Higher Education, which cooperates with higher-level committees for specific scientific fields and areas. The higher-level committees report to the National Council for Science, Higher Education and Technological Development. The Agency for Science and Higher Education appoints the members of the parent committees from among eminent scientists and members of the academic community. Apart from national regulations, the policies of each faculty of the University are based on a set of statutory regulations that are designed to govern the activities of the faculty. For example, each academic discipline has an Academic Promotion Committee that manages the process of academic promotion at the University. In order to investigate whether there is a legal basis for including libraries in the process of evaluating scientific achievements, the main laws and regulations in the field of librarianship, higher education and science in Croatia were analysed, as mentioned in the Methods section.

Scientists, their scientific titles, academic promotion and the selection procedure for scientific titles are regulated by the Act on Scientific Activity and

Higher Education (hereinafter ZZDVO), Art. 31–40, issued by the Ministry of Science and Education as the highest authority in the Croatian science and education system (Zakon o Znanstvenoj Djelatnosti i Visokom Obrazovanju, 2017). The Act in Art. 32, para. 5 defines the set of rules on the conditions for selection into scientific professions, which "... will prescribe in detail the conditions for selection into scientific professions (type and number of scientific works, evaluation, etc.) ... on the basis of which the commissions will evaluate the scientific activity of scientists." Art. 53. para. 2. and Art. 54. para. 2. also describe the establishment of the University and define its structure, highlighting each faculty library as part of the University. In addition, it also refers to the need to develop a unique library system (Zakon o Znanstvenoj Djelatnosti i Visokom Obrazovanju, 2017). It should be noted that the fundamental law of the Croatian library system is the Law on Libraries and Library Activities, which Zakon o Knjižnicama i Knjižničnoj Djelatnosti 2020, Art. 1 refers to the legal obligation for each constituent unit of the University (each faculty) to establish an academic library. Furthermore, Art. 12 sets the Standard for academic, university and scientific libraries and defines their role and activities. It is interesting to note that the Standard does not mention the role of libraries in the assessment of scientific production. In summary, these are the basic legal acts defining the role and position of university libraries in Croatia. The role of academic libraries in the assessment of academic productivity is presented in more detail in the Rulebook on the Conditions for the Selection of Scientific Professions, adopted by the National Council for Science, Higher Education and Technological Development. The Rulebook prescribes the elections for scientific positions by scientific fields in Art. 2. paragraph 4: "The representation (indexation) of journals in the databases prescribed by this Regulation, the impact factors (IF, Impact Factor, i.e. SJR, SCImago Journal Rank Indicator) of scientific journals, the citations of works and other bibliometric data prescribed by the provisions of this Regulation shall be determined by public university libraries and scientific institutions in accordance with the available databases and corresponding certificates shall be issued by a library to all candidates". As the Regulation does not define criteria and citation indexes by which citations should be displayed, the citations of scientists from all fields of science are displayed in such a way that citations of works represented in the Web of Science database and the Scopus citation database as well as the Google Scholar search engine are displayed, which is in line with the recommendations of the Rectors' Council from 2015 (Pravilnik o Uvjetima Za Izbor u Znanstvena Zvanja, 2017).

The above-mentioned Standard for higher education, university and scientific libraries defines (Standard Za Visokoškolske, Sveučilišne i Znanstvene Knjižnice, 2022) defines the activity of academic, university and scientific libraries whose main task is to provide services to students and scientific staff, and one of the services listed in Art. 11. paragraph 2 are bibliometric services. Thus, from the analysis of the Croatian legal acts, it appears that library services for the assessment of scientific productivity are regulated by law and that bibliometric, metric and similar analyses of scientific productivity are carried out by libraries and professional library staff. Considering that we are talking specifically about the University of Zagreb here, it is important to point out that Art. 48 of the Statute of the University of Zagreb defines the University Library System and the University Library (Statut Sveučilišta u Zagrebu, 2017). Also, in the Strategy for the Quality Assurance System of the University of Zagreb can be found the development of the internal system and quality control, which includes procedures for external evaluation of systems and institutions of national and international character. The implementation of quality control and academic promotion activities is reflected in the adoption of the national legal framework, the establishment of commissions and the adoption of various regulations. The activities are listed in the Strategy, but for this topic it is important to highlight the activities that control the rules and procedures to ensure and improve the quality of higher education. All the above activities should be carried out in all areas of the university, through the adoption of legal acts, the development of criteria and the orientation of the university towards scientific, research and artistic excellence (Sveučilište u Zagrebu, 2014). The University of Zagreb, as the largest university in the Republic of Croatia and a member of the Board of Rectors of the Republic of Croatia, makes clear recommendations for the assessment of scientific productivity, stating that it is important that scientific journals are visible (by indexing in relevant databases and by publishing in open access), while the assessment of scientific impact takes into account all available metric tools used in the field of bibliometrics, scientometrics and webometrics, with the number of citations being one of the metric elements used. In addition, the need for free access to scientific publications and research results is also emphasised (Rektorski zbor Republike Hrvatske, 2015). Finally, it is important to mention that the individual faculties of the University of Zagreb have clearly defined library missions at the institutional level. These regulations regulate in detail the process of evaluating the academic performance of the staff of the parent institution. Such procedures are prescribed by internal acts of individual institutions, such as the Statute of an institution, library regulations, etc.

1.3. The Higher Education System of the Republic of Croatia and Acquisition of Competences

There are both public and private higher education institutions in Croatia. There are currently 117 higher education institutions (Agency for science and higher education, n.d.). However, most Croatian universities are public institutions. All higher education programmes in Croatia were adapted to the Bologna Process in 2005, which means that potential students can choose between two types of higher education studies: university and vocational studies, with vocational studies being offered mainly at polytechnics and colleges at undergraduate and graduate level, while university studies are offered at undergraduate, graduate and postgraduate level. In addition, the European Credit Transfer System (ECTS) is used to record students' workload. The University of Zagreb is the oldest Croatian university and the oldest university in Southeast Europe. The university was founded in 1669 by Emperor and King Leopold I. Habsburg. As a broad-based public Central European university, it provides education and research in all scientific fields (arts, biomedicine, biotechnology, engineering, humanities, natural and social sciences) and offers a wide range of study programmes at all levels, from undergraduate to postgraduate. The University consists of 31 faculties, 3 art academies and the University Centre for Croatian Studies. The University is a place where students acquire knowledge and skills. However, in addition to teaching, it also excels in research, contributing over 50 per cent of the annual research output in Croatia and 80 per cent of the scientific productivity of all Croatian universities.

It is clear from the above documents that bibliometric and other metric analyses fall within the remit of academic libraries. However, the question arises as to how well professional librarians are trained for such tasks and to what extent they provide such services as mentioned above, all three study programmes for the training of professional librarians in the Republic of Croatia were analysed.

According to the old study programme for undergraduate and graduate studies at the Department of Information Science in Zadar, which dates back to 2005 and was revised in 2013, bibliometrics is an elective course at the graduate level (4th and 5th year of studies). In the new programme found on the same website (Aparac-Jelušić, 2005), the course covering bibliometrics and evaluation of scientific production could not be discovered at the undergraduate level (year 1–3), but at the graduate level of the new programme

(Elaborat o Studijskom Programu, 2013), the elective course called Scientific Communication and Evaluation of Scientific Work could be found.

At the undergraduate level of the Department of Information and Communication Sciences, Faculty of Humanities and Social Sciences, University of Zagreb, there was a course called Bibliometrics in the academic year 2020/2021 as part of the single and double degree programme in Librarianship, while an elective course Bibliometrics, Journals and Scholarly Communication was offered in the academic year 2021/2022. From the information on the department's website (Sveučilište u Zagrebu, n.d.), it was not possible to determine when the course became available to students, so Professor Ana Barbarić, the Head of the study programme, was contacted by email. Prof. Barbarić confirmed that course Bibliometrics has been offered as an elective since the 1986/87 academic year. However, the course was not included in the implementation plan in every academic year because it had the status of an elective. The programme of study for all information science students includes two compulsory courses called Marking and Search Systems I and II, in which students deal with various aspects of evaluating scholarly communication, among other things. The aforementioned course is a compulsory course in librarianship. The study programme for Information Science at the Faculty of Philosophy in Osijek, which is published on the Faculty's website, does not contain any information about a course on bibliometrics. Therefore, the head of the Department of Information Science, Professor Kornelija Petr Balog, was contacted by email. According to correspondence with Professor Balog, there has been an elective course called Bibliometrics since 2010. The study programme was revised in 2014 and the course Bibliometrics is still available as an elective.

Continuing professional development through part-time study at the Department of Information Sciences at the University of Zadar also offers a part-time programme called Programme for the Acquisition of Library Skills (Sveučilišta u Zagrebu, 2019), but at that time a course in bibliometrics was not included in the programme.

The Centre for Continuous Professional Development of Librarians (CSSU) in the Republic of Croatia has been operating since 2002 and runs an accredited continuing education programme for librarians and information specialists in the Republic of Croatia. The centre has developed a programme for lifelong learning and continuous professional development of librarians

and information specialists. The courses are aimed at librarians of all types of libraries, library assistants, students of library and information science and information specialists. The programme offers a wide range of training and workshops in the field of information and communication sciences and librarianship. An analysis of the CSSU programme was conducted to determine whether the programme includes courses on bibliometric training and assessment of academic productivity. The analysis shows that the CSSU course programme offers a course Bibliometric Analysis and Assessment of Scientific Productivity of Scientists in the Croatian Scientific Community in Module V. Evaluation, Research and Project Management (Centar za stalno stručno usavršavanje knjižničara, n.d.). Furthermore, in 2019, CSSU published a report on the state of lifelong learning for academic librarians in 2018 (Filipeti, 2019). The report shows that the course on bibliometrics was attended by 112 users, 16 of whom were from university libraries. In addition, a webinar entitled Bibliometric Indicators in the evaluation of Academic Productivity was held in 2018, which was attended by 7.4% of academic librarians. Since the topic of this work was to find out when CSSU started offering training in bibliometrics, the CSSU Centre Manager was contacted by email. The email correspondence revealed that the courses started in 2013: Bibliometric Library Services 1 – Indexing and Citation of Scholarly Works; and Bibliometric Library Services 2 – Metric Indicators of Journals. The courses were held in 2013, 2014, 2015, 2016 and 2018. In addition, the programme included the course Scientific representation and citation: bibliographic and citation databases, held from 2013 to 2015. In 2016, the course was renamed to Evaluation of Scientific Productivity: index and citation analysis of scientific papers and journals and was held in 2016, 2017 and 2019. From 2018 to 2021, the webinar called Bibliometric Indicators in the Evaluation of Scientific Productivity was also held. The webinar was updated in 2022 and renamed Bibliometric Analysis and Assessment of Scientific Productivity of Scientists in the Croatian Scientific Community. The webinar has been available since 2022.

2. Aim and Methods

The aim of this research was to investigate the experiences of university librarians, the legal context on which the legislation for the evaluation of academic performance is based, and finally the training programmes for librarians in Croatia that cover the field of bibliometrics. By identifying the role

of academic libraries at the University of Zagreb in the assessment of academic productivity, the aim is to provide a more comprehensive overview of the current situation at the University of Zagreb (Croatia), to provide guidance on how to implement a more systematic bibliometric service at the University, and to identify the necessary knowledge and skills that librarians should acquire.

Based on the results, suggestions for the improvement of scientific evaluation services at the University of Zagreb will be made.

2.1. Research Methodology

In order to achieve the research objectives, the following methodological approaches were used:

Questionnaire (UNIZG Libraries),

- Focus group (UNIZG library managers),
- Correspondence with the heads of the library science study programmes and the programme director of the Croatian Centre for Continuing Education of Librarians (CSSU), and
- Data analysis and summarisation.

In order to investigate the aforementioned objectives, a qualitative methodology (case study method) was chosen as the research method, as Pickard (2013) argues that the purpose of the case study is to provide a holistic account of the case and in-depth knowledge of the specific through rich descriptions situated in context.

Survey and focus group were used to find out how many UNIZG libraries offer bibliometric services, how the service is organised and what competences librarians should acquire for this type of service.

For the purpose of this research, a 12-question questionnaire was designed and sent to all academic library heads at the University, i.e. a total of 39 e-mail addresses. There were two groups of questions; the first group related to the specification of the bibliometric service and its users, while the second group of questions related to the professional competences of the librarians. The first group of questions is based on the legislative facts from the rules of

the library performing these services for the scientific advancement of scientists which is explained/specified in chapter 1.2. The second group of questions relates to librarians' competences acquired during the study or lifelong learning, as listed in chapter 1.3. To obtain more comprehensive results, the focus group method was used to clarify individual questions and answers (7 library managers were included in such a way that all academic areas were covered). In this way it was possible to examine in more detail the specifics in terms of experience, staff structure and competences/training as well as the form of the bibliometric certificates,¹ the impact on the position of the library within the home institution and the legal framework.

The results obtained from the survey and the focus group interviews should illustrate the service, its organisation at the University, as well as the competences of the librarians. Furthermore, based on the results of the survey, possible irregularities and shortcomings will be easily identifiable. Finally, concluding observations and recommendations will be made based on the overall results.

3. Research Results

The research data were processed using Excel statistical data processing programmes. The analysis led to the following results.

3.1. Questionnaire

To find out what practical experiences the libraries of the University of Zagreb have had with the provision of bibliometric services, an online questionnaire was created and sent to the e-mail addresses of the UNIZG library managers. The questionnaire was sent to 39 managers and consisted of two sets of questions. The first set of questions relates to the organisation and scope of the service and determines the categories of the service and its users, while the second set of questions relates to the professional competences of the bibliometric experts. Out of 39 libraries, 24 managers responded. The questionnaire itself was anonymous and the questions related to the size of the library by number of staff and the ratio between the number of staff and bibliometrics professionals at each library. The academic libraries at the

University of Zagreb differ considerably in terms of the size of the collection, the library space and the number of staff. For this research it was important to find out the number of staff in each library to see how the bibliometric tasks are distributed. The questionnaire shows that more than half of the libraries at the University of Zagreb has up to 5 staff members (54.2%) and one third of the libraries (33.3%) have only one staff member. Of the other responses received, there are only 3 libraries with more than 20 librarians employed.

Most libraries provide bibliometric services (95.8%), while a smaller number of libraries rely on other libraries (especially the National and University Library, NSK) for this type of service. The types of bibliometric services offered by UNIZG libraries are shown in Figure 1.

Of the bibliometric services offered, the research results (Figure 1) show that the most popular and widely used service is the issuing of bibliometric reports for academic promotion, with 75% of certificates issued for this purpose. Certificates for selection to higher positions are requested most frequently (75%), followed by issuing reports for faculty evaluation procedures (faculty accreditation, accreditation of doctoral programmes) (8.3%) and for the purposes of planning or decision-making at the institution level (8.3%). Other bibliometric services are requested less frequently and relate to reports for University or Ministry of Science and Education needs and bibliometric reports for project applications and reports for faculty or university awards.

The bibliometric library services are mainly used by researchers and professors from the parent institutions (95.8%), while some users come from other institutions (4.2%). In 83.3% of the libraries, the service is free of charge but only available to the staff of the respective institution, while in some libraries (16.7%) the bibliometric services are chargeable but only for external users.

Bibliometric services in the libraries of the University of Zagreb are relatively newly introduced, as can be seen from the data on the duration of bibliometric services presented in Figure 2.

The results regarding the question of how many library staff work as bibliometrics professionals are shown in Figure 3.

Fig. 1: Bibliometric services offered at the University of Zagreb libraries.

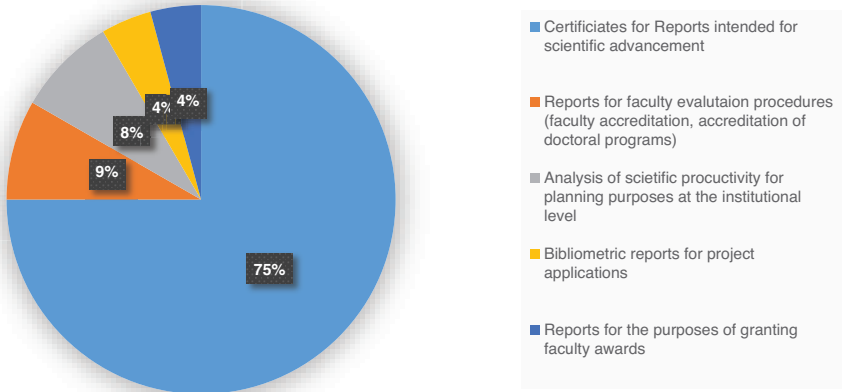
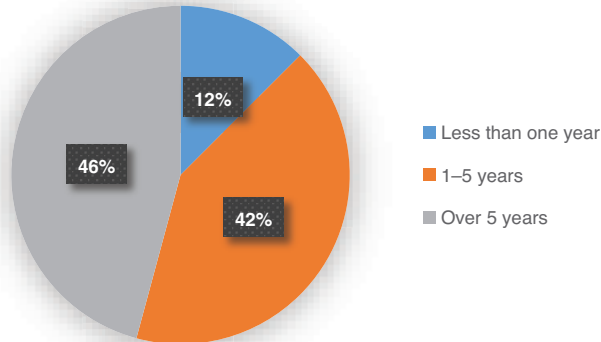


Fig. 2: Time period since UNIZG libraries apply bibliometric services.



As for the distribution of work, according to the data, there are no librarians employed specifically as bibliometricians. Academic librarians do the bibliometric tasks in addition to all other library work. In more than half of the libraries, only one staff member (62.5%) works on these tasks, while in one third of the libraries (33.3%) several librarians are assigned to academic production evaluation.

Fig. 3: Status of bibliometrics professionals in UNIZG libraries.

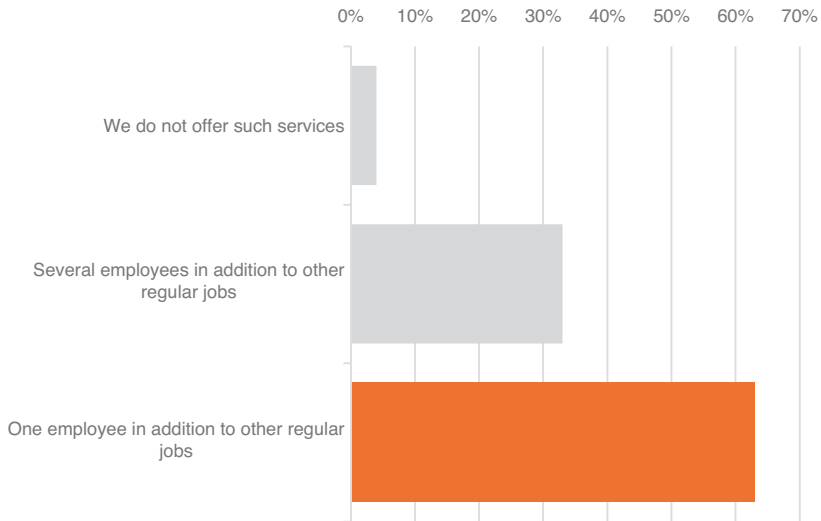
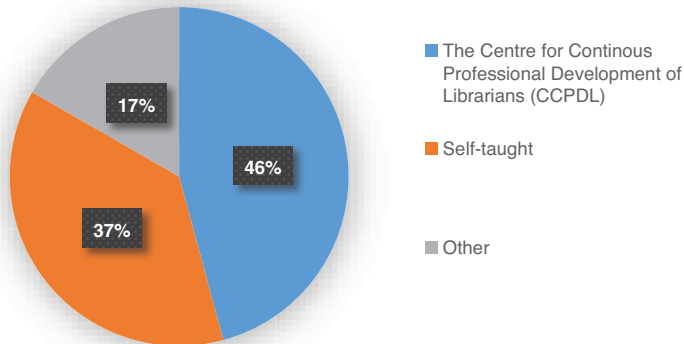


Fig. 4: Methods of professional development of librarians for bibliometric work.



As far as the knowledge required is concerned, the library managers (the respondents) mention various knowledge and skills required to carry out bibliometric tasks, which can be grouped into the following categories

- knowledge of legislation (valid regulations that apply to the specified area)

- knowledge of databases (knowledge of how to work with relevant databases and information sources, knowledge of how to search and make information requests)
- understanding of bibliometric indicators (practical bibliometrics, understanding and interpreting the results obtained and contextualising them);
- analytical skills (metrics, statistics, understanding of indicators).

Figure 4 illustrates the way in which librarians have acquired the expertise required for bibliometric work.

Regarding the required knowledge and skills, a considerable number of librarians (45.8%) working on bibliometric services have completed a special course at the Centre for Continuous Professional Development of Librarians, while as many as 37.5% of them are self-taught. The remaining 16.7% gained their knowledge through a combination of CSSU courses, self-study and consultation with colleagues from other libraries.

The survey also aimed to find out the views of library managers on the need for bibliometric services within the work of each academic library. When asked if bibliometric services should be a regular library service of every library at the University, 83.3% of the library managers answered that they believe that bibliometric services should be an integral part of every library's workflow, while 16.7% of them believe that these services can be provided by another library.

3.2. Focus Group

A focus group interview was conducted to further explore the views of library managers on the issues covered in the questionnaire. The focus group method was organised and conducted as a focus group with a total of 6 participants, in a hybrid format (live and online) at the Library of the Faculty of Humanities and Social Sciences, University of Zagreb on 20 June 2022 from 11:00 to 12:30. The participants of the focus group were selected in such a way that all academic fields were covered, also taking into account the size of the library and the competences of the participants to discuss the given topic. All participants were library managers. The participants were first presented with the results of the questionnaire that had been completed from 26 May

to 7 June 2022. The key findings of the focus group interview are represented through the following categories: experiences, form of certificates and personnel structure, and competences/education.

3.2.1. Experiences

In the first part of the interview, the participants presented their experiences in assessing scientific productivity and gave an overview of other libraries in the same scientific field. The results of the interview show that a few libraries have been offering certificates related to the evaluation of scientific productivity for more than five years (some have been doing it for more than 10, some for more than 20 years). Mostly 1 or a few librarians are responsible for bibliometric services in the libraries, but in addition to other regular tasks. An exception is the assessment of scientific productivity, e.g., when it is carried out for the requirements of science funding, accreditation and the like, when all graduate librarians are engaged in it. The reasons for issuing certificates vary – in a smaller number of libraries they are requested for a variety of purposes, from enrolment in postgraduate study, project applications, elections to higher academic titles, institution-level assessments and so on. Most libraries operate for the purposes of selection for higher academic positions, apart from a smaller number of candidates for whom certificates are issued according to different regulations (selected for teaching positions). The ratio of the number of certificates issued also varies – one library issues more than 700 certificates per year, some more than 100 certificates and most libraries issue an average of 25–50 certificates per year. It was noted that no institution has a uniform database where, among other things, the results of the assessment of scientific productivity are entered (one participant mentioned the publication of the annual Research Output). Respondents also pointed out that Web of Science, for example, does not have up-to-date data on author affiliation at faculty level, which significantly increases the workload. Furthermore, the interview results show that the field of humanities is particularly interesting, where the way of advancement to higher academic titles is quite different from other fields, so that these libraries are less burdened with the work of assessing academic productivity (in one institution, the certificates for selection to higher academic titles are not issued by the library, but by the human resources department). The practise of charging fees for issuing certificates is different. While some librarians believe that they cover the needs

of all scholars within a particular field of science and that no fees should be charged for them, most of them believe that no fees should be charged for staff of the parent institution, while fees should be charged for external users.

When asked about the impact on the position of the library within the parent institution and the legal framework, all focus group participants agree that highlighting libraries in the current regulations as a reference for assessing academic productivity has positively influenced the position of the library within the parent institution. For this very reason, it was concluded that the current changes in the legal framework in education and science must continue to emphasise a prominent role of libraries in the assessment of academic productivity.

3.2.2. Form of Certificates

When asked about the form of certificates, focus group participants pointed out that most libraries issue digitised certificates (in pdf format). However, the form of certificates issued by the libraries varies. Each library has developed its own form of certificate. The interviewees pointed out that the National and University Library in Zagreb has developed and proposed its own form of certificate for each scientific field, which is considered insufficient as it does not meet the needs of libraries in practise. It was concluded that it would be good to design a uniform appearance of the certificate within the same scientific field, which would make it much easier for smaller libraries or those that have problems with acceptance of certificates by the higher authorities.

3.2.3. Personnel Structure and Competences/Education

All focus group interview participants pointed to the perennial problem of staff shortages, which has been exacerbated for years due to the policy of the 'overall coefficient', which does not compensate for vacancies in libraries (e.g., due to staff retirements). The problem is recognised by both libraries with a larger and smaller number of employed librarians. Similarly, due to the shortage of staff, demanding library tasks are often done overtime, which is not recognised or appreciated by the administration of the parent institution. In addition, most of the bibliometrics experts acquired their knowledge

themselves or through a special library course. The interviewees confirmed that library staff are less likely to be trained in bibliometrics as part of formal library training. It was concluded that the skills acquired in this way are not sufficient to perform such responsible and complex tasks and that this requires a well-planned training programme. When discussing the training of academic librarians, the importance of the skills of bibliometric professionals was emphasised. Respondents pointed out that, in addition to the importance of acquiring specific skills and qualifications, the tasks related to bibliometric assessment also entail a great responsibility for the accuracy of the data presented and the objectivity of the assessment itself. All focus group participants agree that bibliometric experts should receive additional training through certified library programmes. Care should also be taken to ensure that these skills are taught in information and library science degree program in the future. It is felt that accreditation of bibliometric training programmes contributes to greater motivation of librarians and credibility of the profession.

4. Conclusion and Recommendations for Future Work

The new role of libraries has changed over time according to the challenges and needs of information and communication technology and modern society. Libraries are following the current trends and developing new services by adapting their business to the new circumstances. However, although new library services depend on the changing needs of modern users, their sustainability and further development depend largely on the legal framework and its legal merits.

The fact is that until 2017, when the Ordinance on the conditions for selection into scientific professions was adopted, academic libraries did not have a framework that could define new services such as bibliometric library services. Therefore, the organisational implementation and management of these types of services at the University of Zagreb depends on both national and university strategic plans and policies. It is important to note that the current Law on Higher Education and Scientific Activity (<https://esavjetovanja.gov.hr/ECon/EconReport?entityId=20457>) points to the need to strengthen the national innovation system by promoting investment in research, development and innovation, strengthening scientific excellence and promoting open science, as well as better linking the academic, research and business sectors.

In this context, what remains to be clarified in future research is the position of academic libraries in the processes of evaluating scientific production in relation to open science and open access policies at the University.

Below are some basic conclusions based on the research results and findings:

- UNIZG libraries are integrated into the system of academic promotion at the University of Zagreb;
- UNIZG libraries play an important role in academic evaluation;
- The role of UNIZG libraries is now enshrined in Croatian regulations as a necessary and indispensable component in the process of scientific and academic promotion;
- Specific competences are required for professionals performing bibliometric analyses (including legal background knowledge, knowledge of the academic environment, analytical skills, etc.);
- The bibliometric service is not standardised and unified at university level (there is no central database for the assessment of scientific publications at the University);
- Librarians are either self-taught or trained in CSSU seminars;
- There are problems with staff shortages.

Based on these results, further recommendations can be made:

- a framework for systematic review of the evaluation of scientific production at the University of Zagreb should be established, which may be further applied at national level (improve the quality and utility of bibliometric reports)
- at both University and national level the service should be unified (in accordance with the scientific areas)
- university library system (non-integrated university) at the University of Zagreb level should be created
- procedures, form and pricing should be standardised, which may further be applied to the national level
- training for bibliometric professionals should significantly be improved (existing formal curricula should be revised in line with modern needs of librarianship and academia) at both institutional and University level, and preferably at national level
- the current changes in the legal framework in the education and science sector should continue to emphasise a prominent role of aca-

demic libraries in the assessment of scientific productivity at national level

- a unique database at the University level, and preferably at national level, should be created, where the results of the evaluation of scientific productivity are visible
- higher status of bibliometric professionals at the university and national level should be advocated
- communication and professional cooperation between libraries and national legal authorities should be established.

These recommendations can serve as guidelines for further action and the development of bibliometric services at a university or national level. For example, identifying the required competences of librarians can provide guidelines for further improving the lifelong education of librarians, as well as recommendations for library degree programmes in Croatia. The recommendations may also be applicable to the international community of academic librarians.

Good infrastructure provides an organised service of high quality, which benefits the academic and scientific community, but also librarianship as a profession, and strengthens the position of academic libraries in the university community.

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Note

¹ Bibliometric certificates are issued by some libraries of the University of Zagreb usually listing the number of published works in journals indexed in online databases, information on the citations the Impact Factor of a given journal etc. The certificates are more often issued for the purpose of academic advancement, application for projects, evaluation of the institution's academic productivity, etc. On the basis of the bibliometric certificates, research evaluation of a scientist's research output is performed by scientific field committees.