

# Information Sciences in Croatia: A View from the Perspective of Bibliometric Analysis of two Leading Journals

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## Introduction

From the very beginnings of publication *Vjesnik bibliotekara Hrvatske* (*Croatian Librarian's Herald*) and *Informatologija* (*Informatology*) took the role of the main channels for the transfer and dissemination of information and knowledge in the field of information sciences<sup>1</sup> in Croatia. The primary driver for the journal originators, editors and authors continues to be the transfer and dissemination of knowledge and information within professional community whose academic and scientific status was not officially recognized until the 1960s and the late 1970s. Due to mentioned reasons along with their pioneering role, the contribution of two journals is even more significant. Therefore, we will follow the process of profiling in the work of two journals based on the course of their publishing of scientific and professional articles. By analyzing the themes of the articles we will also try to unravel the main concerns and interests of local professionals, as well as examine the length of their “common denominator” in the area's subdisciplines. The overall goal is to gain a (better) insight into the degree of development in the field and to examine points of convergence between the theory and practice of Information Sciences.

Field of Information sciences is in the process of constant development, growth and strengthening of its own theoretical foundations. Despite the occasional conflicts, and questioning of the field's maturity, professional expertise and grounding of information professionals is indisputable today. Literature that deals with information institutions and services, such as libraries and archives, museums, documentation facilities and related establishments, predominantly addressed the issues of the profession, organization and institution management, while it only occasionally seeks theoretical explanations of the field's practical activities.

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1 It is commonly accepted in Croatia to use the plural to determine the field that consists of several subdisciplines, such as Library science, Archival Science, Museology, Informatology, Lexicology etc.

Number of published papers in which Information sciences, or some of its disciplines, are examined as scientific branches is much smaller, so the efforts to prove field's scientific grounding is somewhat obscured.

### **The origin and development of Information Sciences in Croatia**

Starting from the so-called Zagreb School of the late 1960's, Croatia's Information sciences included a variety of disciplines that dealt documentation, communication, classification systems, library science, bibliology, archivistics, museology, lexicology and many other disciplines.<sup>2</sup>

In the study of the occurrence and development of Information sciences in Croatia, two key factors stand out:

Dual origin of the field of Information sciences that has evolved from traditional practices of information institutions, particularly archives, libraries and museums as well as influences from other subject areas.

Information science as a new scientific discipline and a professional field formed during the second half of the 20th century in a specific socio-political environment and modeled after international trends in information theory and practice.

The terminology used in the preparation of this paper is based on tradition of so called Zagreb School and established boundaries of scientific areas, fields and branches. More specifically, in the 1980's the University of Zagreb formally established the field of Information Sciences which included a variety of disciplines engaged in "systematic study of the emission processes, collecting, selecting, evaluating, processing, organizing, storing, structuring, retrieval, transmission, distribution, interpretation, use and protection of information, as well as social communication in all its forms."<sup>3</sup>

It is necessary to emphasize here that a relatively small number of theoretical papers on the origins and nature of Croatia's Information Sciences has been published up to date, while the systematic historical and empirical research of the field is almost non-existent.<sup>4</sup> Therefore, this paper will offer an overview of development trends in information sciences based on analysis of papers published in two journals: *Informatologija* and *Vjesnik bibliotekara Hrvatske*.

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2 Maroević, I. Uvod u muzeologiju (Introduction to the Museology). Zagreb: Filozofski fakultet Sveučilišta, Zavod za informacijske studije Odsjeka za informacijske znanosti, 1993. Str. 93. Zagreb: Zagreb University, Department of Information Sciences, 1993. P. 93

3 Pravilnik o znanstvenim i umjetničkim područjima, poljima i granama. (Scientific and Arts areas, fields and disciplines Act), URL: <http://www.nn.hr/clanci/sluzbeno/2005/1500.htm>. (3. 8. 2009.)

4 Valuable contributions to the development of the theory of Information Sciences in Croatia could be find in works by T. Aparac, A. Horvat, I. Maroevic, M. Mikačić, M. Tuđman, T. Šola.

## Institutionalization of Information sciences

The process of social and cognitive institutionalization of Information Sciences in Croatia can be traced at three levels: 1) professional associations, 2) central institutions, and 3) academic institutions which have implemented programs for the education of information professionals. Scientific research and professional activities, as well as publishing and the development of educational programs are encouraged at all three levels. The problem, however, lies in fragmentation and the fact that their efforts were uncoordinated.

Particularly important role in the process of social institutionalization of some subdisciplines of Information sciences have been played by an 'umbrella' institutions: National and University Library, the Croatian State Archives, Museum and Documentation Center as well as the Referral Centre. The core of professionals gathered under the roof of national institutions initiated the founding of professional associations that established connections with international organizations, developed a rich publishing activity that spanned from distributing translations of renowned foreign authors to issuing their own monographs and serials, organizing numerous national and international symposiums, conferences etc.<sup>5</sup>

Bozo Tezak and his **e-t-ak-s-a** concept had a particularly important role in the development of Information Sciences in ex-Yugoslavia and Croatia. B. In explaining his approach Tezak uses the term Informatology to mark the area which includes the theory and practice of emission, transmission, accumulation, selection and absorption of information. Influence of Tezak and his network were crucial for the decision to establish the Referral Center at the University of Zagreb in 1967. The Referral Center was conceived as an institution whose goal was to ensure wide cooperation within the University of Zagreb (the only university in Croatia at the time) and to draw together the universities and scholarly organizations in creating an effective information infrastructure, as well as to encourage participation in international scholarly and professional activities.<sup>6</sup> According to Tezak's ideas, role of the Referral Center was not limited to integrating internal and external university cooperation, but also to integrate Croatia's fragmented and uncoordinated IS community. Important advocate of these ideas was suppose to be a journal called *Informatologia Yugoslavica*, launched in 1969. In the course of its development from "infrastructural institution for science and technology to

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5 First professional association, the Croatian Library Association, was founded in 1940 and the Croatian Museum Society was established in Zagreb only six years later. Archivists have a decade later, in 1954, established the Croatian Archival Association, while the documentalists and communicologists establish their professional associations only during 1990's.

6 Cf. Tezak, B. Referral Center of the University of Zagreb. // *Informatologia Yugoslavica*. 1, 1-4(1969), 68.

independent research organization in the field of information science”, Referral Center is transformed into scientific research unit in 1988 – it becomes the *Institute of Information Science*.

Launch of postgraduate studies in documentation and special librarianship in 1961 at the Faculty of Natural Sciences in Zagreb marks the beginning of formal training and integration of Information Sciences into the existing academic structure. Besides this, starting from the 1976/1977 a new program was offered to educate information professionals pursuing undergraduate studies in librarianship at the University of Zagreb, while the study of socio-humanistic informatics is offered one year later. In 1985 both studies become a part of the Department of Information Sciences (Division of Librarianship, Archivistics, Museology and General Informatology).<sup>7</sup>

Since the 1989 University of Zagreb’s Department of Information Sciences establishes a separate research unit called *Zavod za informacijske studije (Institute of Information Studies)* which aims to organize a continuous and systematic scientific research in the field of Information Sciences and to ensure regular publishing of the works of teachers and employees of the Department. Starting from the academic year 1994/1995 the Department runs postgraduate studies in Information Sciences (sections of Archival Studies, Informatology, Library Science, and Museology).

This created preconditions for a systematic and organized education of information professionals in other university centers in Croatia, especially at the University of Osijek and University of Zadar, which since the year of 1998 and 2003 carried out systematic training for both regular and part-time students. They offered both undergraduate and graduate programs in the field of Information sciences, as well as doctoral programs which started in 2009.

## **Croatian journals in information science**

The appearance and development of Croatia’s professional Information Sciences journals are a direct result of the efforts of professional associations, central national information institutions and academic departments to promote scientific research and professional work, as well as to publish activities in the field. One might even argue that these institutions and associations represent the pillar of the national system of scientific and technical communication in the information sciences.

Most Croatian journals in Information Sciences (Table 1) are directed towards promoting content that contributes to the development of theory and / or practices of individual branches gathered within the common scientific field.

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7 CF. Horvat, A. Povijest Odsjeka (The History of the LIS Department) 2005.

URL:[http://www.ffzg.hr/infoz/web2/index.php?option=com\\_content&task=view&id=3&Itemid=4&PHPSESSID=4bd02ccfed24aac238e0af8f68470d41](http://www.ffzg.hr/infoz/web2/index.php?option=com_content&task=view&id=3&Itemid=4&PHPSESSID=4bd02ccfed24aac238e0af8f68470d41) (01. 06. 2009.)

Journals	Publisher	First Published (Year)
Arhivski vjesnik	Croatian State Archives	1945-
Vjesnik bibliotekara Hrvatske	Croatian Library Association	1950-
Muzeologija	Museum Documentation Center	1953-
<i>Informatologia Yugoslavica</i> (continued working under the name of <i>Informatologia</i> )	Referral Center, Center for the Study of Librarianship, Documentation and Information Science and International Permanent Exhibition of Publications (1969-1988) Institute of Information Science, a joint post-graduate study of Information Science (1989-1991)	1969-1991
Informatologia	Institute of Information Science (1992-1994) Croatian Information-Documentation Referral Agency (1994-1995) Croatian Communication Association (1995 -).	1991-
<i>Bilten informatica museologica</i> (stopped its publications, it continues working under the name of <i>Informatica museologica</i> )	Museum Documentation Center	1970-1973
<i>Informatica museologica</i>	Museum Documentation Center	1973-
Journal of Information and Organizational Sciences	Faculty of Organization and Informatics, University of Zagreb	2002-
Libellarium	Department of Library and Information Science of the University of Zadar	2008-

Table 1. Croatia's scientific and professional journals in the field of Information Sciences

To date, unfortunately, a detailed analysis concerning the process of generation, transmission and use of information by the Croatian information journals has not been conducted. Recent research carried out for the purpose of doctoral thesis<sup>8</sup> examined two journals using the bibliometric method – *Vjesnik bibliotekara Hrvatske* and *Informatologia*. *Vjesnik* is the representative of both the librarianship and related information services, while *Informatologija* was launched in order to cover general and specific problems of the entire scientific field of Information Sciences at home and abroad.

8 Pehar, F. Communication role of journals in the field of information science: bibliometric analysis of the *Vjesnik bibliotekara Hrvatske* and *Informatologia*. Zagreb: University of Zagreb, 2010.

## **Vjesnik bibliotekara Hrvatske (Croatian Librarian's Herald)**

*Vjesnik bibliotekara Hrvatske*, which despite occasional delays in publication of individual issues gets continuously published since 1950, granted the majority of Croatia's librarians their first encounter with professional literature. This happened at a time when international literature was particularly difficult to access and when domestic sources on Library and Information Science were next to non-existent. From its earliest beginnings *Vjesnik* has taken on the role of the main distributor of (new) knowledge and information regarding the field of Library and Information Science, as well as from other related disciplines and activities. In addition to scientific and professional articles the journal has brought news and reports from the works of local and international professional associations.

Over the years *Vjesnik* gradually introduced some innovations in the form and content guidelines. During the last decade a slight shift in programming direction and the journal's concept can be noted because technical papers and other professional reports are increasingly accompanied by the results of scientific research.

## **Informatologia**

The scholarly journal *Informatologia Yugoslavica* (journal changes its name to *Informatologia* in 1991) is closely associated with B. Tezak. As the founder and the journal's first editor, Tezak was credited with all of its characteristics and development trends until 1980.

According to Tezak's idea *Informatologia* was supposed to serve as an "experimental and a working instrument" for researchers from the Referral Center and the PhD students, who would use it to pass on the new cognitive achievements of Information Sciences. It would raise public awareness of information activities in Croatia and the former Yugoslavia, while the papers of foreign authors would give local professionals an opportunity to acquaint themselves with the latest world trends. One of the main motivators behind the launch of *Informatologia* can be found in Tezak's fascination with the idea of creating the Croatian system of scientific information and its inclusion in the worldwide network of scientific information. This system was rooted on strong development and application of computers and computer technology as a basic precondition of development of scientific and educational work. His vision of scientific information system is based on the abovementioned e-t-ak-s-a complex and holistic understanding of Information Sciences.

## The results of the bibliometric analysis

Exploring the characteristics of communication in the field and the role of the two journals in the creation, transfer and use of information, this study applied standard bibliometric indicators by which it explored the formal features of the two journals, the features of scientific productivity and collaboration, as well as content characteristics of the published papers. Citation analysis based on a selected sample of reference items from two journals was used in studying the degree of development of formal features of scientific communication in the field of Information Sciences. Furthermore, the analysis encompassed intellectual and social structures and relationships among authors, institutions, countries and publications. The analysis of the references used in the two journals examines the mutual influences of the two journals who are representatives of different subdisciplines within the same field. It also aims to determine the limits of the field of Information Sciences and the degree of permeation with related disciplines (interdisciplinarity). Based on the results obtained, we tried to determine the profile and characteristics of the used knowledge source (literature), as a collection of the most influential authors.

The study was conducted on a sample of papers published in *Vjesnik* in the period from 1950 to 2005, and *Informatologia* from the year of 1969 to 2005. During the study period *Vjesnik* had a total of 47 volumes, that is 71 issues, while *Informatologia* published 37 volumes and a total of 70 issues. Although *Vjesnik* published its first issue nearly 20 years before *Informatologia*, the overall difference is negligible and it consists of only one additional volume by *Vjesnik*. Reasons for a negligible difference in the number of published volumes and issues were determined by analysis of publication irregularities and delayed issuing of two journals. Despite the fact that during the past decade both journals had problems with irregular publications, this trend is still considerably more prominent in *Vjesnik* than in *Informatologia*.

From a total of 2501 papers published by *Vjesnik* in the period from 1950 until 2005, a sample of 550 scholarly and scientific papers were selected for our investigation. The sample of selected papers from *Informatologia* contained 710 papers selected from a total of 1093.

One quarter of papers from *Vjesnik* and 11.1% of papers from *Informatologia* failed to cite any literature. The largest number of papers included bibliography at the end of the document; however these lists consisted mostly of six to ten (6–10) references. In other words, more than half of the surveyed papers included references consisting of ten or less. On the average, *Vjesnik* authors cite 12.8 references per paper, and *Informatologia* cites 11.5. More than four fifths (94.7%) of *Vjesnik* and *Informatologia* papers are equipped with at least one summary commonly written

in the Croatian language; however, more than two thirds of the papers have two summaries one of which is in a foreign language. However, more than two thirds of the papers have two author abstracts one of which is in a foreign language

Half of the *Informatologia* papers are published in Croatian language, while more than one third are in English. Research papers are published bilingually, in English and original language, from the very beginnings of the journal. The aim of the bilingual publication of the papers is undoubtedly to increase their visibility and to raise exposure of journal's finest articles. More than 90% of papers published in *Vjesnik* are in the Croatian language. The share of foreign authors in *Vjesnik* was 19.9%, while local authors enjoyed 79.4%. During the same period *Informatologia* recorded a significantly higher proportion of foreign authors, that is 41.3%.

Investigation into the characteristics of authors and authorship, publication activities and cooperation in the period from 1950 until 2005 for *Vjesnik* and 1969 until 2005 for *Informatologia* has produced very interesting results. Both journals have recorded growth in the number of authors over time. *Informatologia*, compared with *Vjesnik*, grew slightly faster and its author base almost tripled in the period from the mid-1980's until 2005. *Informatologia*'s editorial policy relieves the stagnation observed during the war years (1990-1995) by implementing new program guidelines, opening itself to new research topics and areas, as well as "recruiting" a number of authors outside the field of Information Sciences. In the same period *Vjesnik* recorded a similar trend of declining numbers of authors, while new authors were attracted primarily by the papers composed at the annual conference of the Croatian Library Association. We find that the above mentioned information is a very useful indicator that speaks of growing interest in topics from the field of information science and it also testifies about the vitality of community that overcomes a crisis with far-reaching consequences.

Bibliometric profile of authors publishing in the two journals was based on the results of analysis concerning publication activity of authors, institutions, countries and cities. Nearly four fifths of authors from both journals published one or two papers at most. The share of authors with one or two published papers is slightly higher in *Vjesnik* than in *Informatologia*. Statistical tests indicate significant differences in the author profile between *Informatologia* and *Vjesnik*. Two-thirds of authors from *Informatologia* are from Croatia and one third of them are from Zagreb. Authors associated with academic institutions (70%) are the most productive, with the proviso that more than half of the papers (54%) come from authors whose academic institutions are outside the field of Information Sciences. It is simply impossible to miss and avoid pointing out a relatively weak representation of academic authors from the field of Information Sciences; *Vjesnik* includes only 13% of them and *Informatologia* a mere 16%. The absence of major contributions of authors affiliated to these types of institutions, who in most similar bibliomet-

ric studies of information science journals are among the most productive group of authors, is certainly disturbing information that requires the special attention of researchers and additional investigation.

Social changes in the environment were reflected in the two journals which, among other things, recorded the steady growth in productivity and numbers of female authors. Specifically, the first publication of the *Vjesnik*'s reference period reported more male authors, while a period of transformation of librarianship into the profession/discipline in which the female authors have a dominant role begins during the 1980's. Two-thirds of *Informatologija* authors are males and the number of female authors has increased significantly in relation to the first decade of publication.

Journal cross-authorship analysis has been conducted in the search for possible intersections within two journals, as well as related communities. The results show that only 28 out of 846 authors have published at least one papers in both journals. No case of cross-authorship has been established for the most productive authors in the *Informatologija* sample, while the most productive authors of the *Vjesnik* published their papers in *Informatologija*. The recorded degree of cross-authorship speaks in favor of a polarization within research groups operating in the field of information sciences whose primary focus are channels operating in a narrower scientific subdiscipline.

The sample of both journals is dominated by single author papers. The subsample of *Vjesnik* holds 85% and *Informatologija*'s share is 71%. However, it is necessary to point out that in the first period of *Vjesnik*'s publications (1950-1968) not one single multi-author paper has been recorded. This data along with the increase of multi-author papers from the mid-1980s (in the sample of both journals) speaks in favor of maturation of information sciences and gradual acceptance of the key features and achievements of modern science and research. During this period the established collaborative coefficient for *Vjesnik* is 0.12. This indicator illustrates a predominantly individual and insular character of research coming from the authors of *Vjesnik*. On the other hand, the authors gathered around *Informatologija* were much more collaborative in the creating and publishing of their works. This is vividly exemplified by the measured collaborative coefficient which amounts to 0.40. The reason for such significant differences among the journals can be explained by a fact that greater numbers of authors coming from academic institutions are joining the *Informatologija*'s subsample. In fact, three quarters of multi-author papers are signed by the authors coming from these institutions. Given the data on the institutions and the countries from which the multi-author works come from, it was found that intramural collaboration among authors coming from the same countries and same institutions was the dominant trend. If we consider that until 1968 *Vjesnik* had no collaborative papers, but how they constitute almost one fifth of the papers in the second reference period as well as a third of *Informatologija*'s works, it is possible to argue that this data speaks in favor of improved levels of scientific research in the field of information sciences.

Content analysis of citing papers from *Vjesnik* and *Informatologia* was conducted with the goal of establishing prevailing research trends in the Information Sciences and identifying the possible common grounds with other scientific disciplines. An analysis showed that more than two thirds of papers from *Vjesnik* belongs to one of the four most frequent topics:

- a. organization, storage and retrieval of information, with special emphasis on cataloging, information surrogates, classification and indexing systems (22.4%),
- b. various kinds of library and information activities and services, with special emphasis on special collections, as well as the activities and services supported by technologies (17.5%)
- c. information services (16.0%), with special emphasis on papers that deal with specific types of information institutions, and
- d. the history and development of information institutions, with special emphasis on studying the history of libraries and other types of information institutions (14.0%).

Results of content analysis suggest an overstated historicity of librarianship as a practical activity and an almost complete historical amnesia of librarianship as a scientific discipline. In addition, if we add a relatively weak representation of authors from institutions outside the information/documentation sector, it can be argued that we are dealing with monodisciplinary journal that attracts a community of practitioners and researchers strongly focused on research problems in the narrower field of Library and Information Science (LIS) and the broader field of Information Sciences.

Only two subject categories of works from the *Informatologia* realized a share higher than 10%. These are papers dealing with different aspects of communication sciences (22.5%), with special emphasis on political and linguistic studies of media and communications, as well as papers that deal with different aspects of information and communication technology (18.7%), especially using ICT in learning and other information systems. Two mentioned categories of works, along with papers that deal with the problems of the information society (6.8%), scientific communication (6.5%) and theoretical/empirical research in the field of Information (and Communication) Sciences (5.9%), account for almost two thirds of works in the observed sub-sample. In the last observed period, *Informatologia* had opened itself up to papers from other fields of social sciences (7.3%), especially in the fields of economics and education, but also to the papers coming from disciplines in the field of technical sciences. The opening to other areas is truly testified by the fact that more than half of works are attributed to authors coming from academic institutions outside the area of Information (and Communication) Sciences. Strong interdisciplinary connections and the opening of the journal to authors from other disciplines is a major challenge for the editors and reviewers

who have the difficult task of opening themselves to the outside influences, while also preserving the disciplinary boundaries of Information Sciences.

The results of reference analysis show another important aspect of this research. The paper started from the assumption that using various citation indicators in a sample of selected references would allow identification of the basic characteristics of scientific communication, as well as socio-cognitive structure and development of Information Sciences in Croatia. The distribution of reference for the years studied indicates that their number is constantly growing. The highest number of references was recorded during the last four observed periods. Examination of the 2512 references led to finding that the authors of the *Vjesnik* use monographs (27.8%) equally frequently as journals (26.8%). A similar trend was observed on a sample of 3435 references from *Informatologia*. Slightly less than half (42.3%) of their references were given to monographs, while the share of journal references was 26.5%.

The average age of references in *Vjesnik* was 23.3 years, half of the references from the observed sequence were 9 years old or less, whereas Price's index (PI), i.e. the number of reference publications that are not older than five years, was 34.6%. Citing half-life indicates that the authors of the mid-1980s began using recent literature faster than their predecessors. Changes in chronological characteristics of *Vjesnik's* references, especially its move towards more frequent use of up to date literature in the last period, are indicators of the transformation and clearer approach of *Vjesnik* to characteristics of other social sciences journals. The average age of references from *Informatologia* was 10.7 years. Price's index was 46.3% and citing hal-life was significantly more stable than the values recorded in *Vjesnik*. Based on the above mentioned information it is possible to conclude that the authors of *Informatologia*, unlike their *Vjesnik* colleagues, used more recent literature and that chronological characteristics show that *Informatologia* is a journal very similar to other social sciences journals.

The largest numbers of cited publications in *Vjesnik* were published in the Croatian language (40.6%), while the share of references in English amount to 36.0%. Other languages take up less than one fourth of the total number of references (23.4%). Analyses of the country origin of the cited publications suggest that the journal, and accordingly, the entire professional community relied on the influence of European (82.9%), specifically the Central European Library and Information Science tradition (55.7%). Most of cited publications were published in Croatia, Great Britain, Germany and the United States. Compared to *Vjesnik*, analysis of languages cited in *Informatologia* showed some significant differences. More than half of the cited publications are published in English, and only one fifth of them are in the Croatian language. The biggest impact of English literature was recorded in the period from 1969 until 1985 when its share stood at 72.5%. If we add that the authors most frequently used literature from the U.S., Croatia, Britain

and Germany, we can conclude that the community of practitioners and scholars gathered around *Informatologia* developed under the twofold influence of both Anglo-Saxon and Central European tradition of information science(s), but were also affected by other scientific disciplines from those geographical areas.

Classification analysis of cited references sought to determine the disciplinary affiliation of references from *Vjesnik* and *informatology*, that is, to measure the degree of subject dispersion and interdisciplinarity in Croatia's Information Sciences as reflected by the two journals. However, one should highlight the methodological limitations of the analysis carried out on the subsample of cited references given to journals. In this way, we found that the authors of papers published in *Vjesnik* rarely use literature from other subject areas. More than three quarters of the references are a so-called disciplinary self-citations directed at journals in the field of Information (and Communication) Sciences, and half of them are directed at library science journals. Based on this information we can say that the narrower field of LIS, represented by *Vjesnik*, is an area with low degree of subject dispersion, and that it relies mainly on the literature from its own field. Although *Informatologia* also used the works from the field of Information (and Communication) Sciences, their share amounts to slightly more than one third of the total number of references. The remaining part of cited references was published in journals of other scientific disciplines. The biggest impact, aside from the journals in Information (and Communication) Sciences, were made by social sciences (23.9%), technical sciences (12.4%) and humanities (8.4%). When these findings are supplemented by the information that part of authors are from institutions outside the area of information sciences, we can say with great certainty that the broader area of Information Sciences (for whom *Informatologia* is the only and the most important representative) includes a high degree of subject dispersion and relies heavily on the literature outside its own areas.

The analysis of frequently cited publications and authors in *Vjesnik* and *Informatology* was conducted with a goal of determining the most influential authors, journals and other types of publications in Information Sciences in Croatia. The list of core information sciences journals was established using Bradford's law of scattering. Although the analysis captures a relatively low absolute number of citations, it is clear that *Vjesnik* provided a certain degree of consensus on the most important literature in which the authors based their research. One, out of total of 188 cited journal titles, received almost one-fifth of citations. It is *Vjesnik*, which along with four other journals represents the first zone, and core of journals in information sciences taking one third of citations. Data on the high level of self-citation testifies to *Vjesnik*'s role and place in the national librarianship as well as the wider information community. Among other types of cited publications, a major role is played by the serials aimed at transferring the official information from the Republic of

Croatia, foreign governments and domestic, as well as international (professional) organizations. A high proportion of official/legal documents and regulations, and manuals required to work in the library, further suggests the primary professional focus of *Vjesnik*. Results of the same analysis conducted on *Informatologia* indicate that there was no consensus on the most important literature of Information Sciences. It was found that the distribution of cited journals according to zones does not follow the predictions of Bradford's law. This happens because of a small number of titles in the second zone, and the excessive dispersion of journals in the third, e.g. the peripheral zone. The largest number of citations are pointing to *Informatologia* (8.0%). The results of citation of other types of publications were compromised by the "insular" nature of citations, that is, four cited publications have received large number of citations from only one study. Therefore, we cannot view it as a consensus, but the decision of the individual author. Such findings call for increased caution in analyzing and interpreting the results of citation analysis. The low threshold of citedness and a relatively modest results in citation analysis make the implementation of consistent and comprehensive data interpretation very difficult. However, presented results are a good starting point for further research and monitoring of the citations in the field of Information Sciences. Without a systematic monitoring and analysis of used literature it is impossible to assess the potential effects of scientific work and create a strategic plan in the development of Information Sciences as a scientific discipline.

The vast majority of the authors received only one citation and even highly cited authors accomplished relatively low absolute values, which further impedes the complete interpretation of the data. The data, however, was still used to generate a list of most frequently cited authors based on the analyzed samples from two reference journals. By comparing the list of the most productive and most cited authors, some interesting overlaps were discovered. From the perspective of two of the analyzed journals, authors whose names are on both of these lists have realized the greatest impact on the development of Information Sciences in Croatia.

## **Conclusion**

In this paper we have tried to give an overview of the most important results of the bibliometric analysis of two Croatian journals in the field of information science. We pointed to the possibility of applying bibliometric methods to explore socio-cognitive structure, investigate the basic knowledge and research topics, as well as to ponder changes within the system of scientific communication in the field of Information Sciences. Furthermore, we managed to produce a bibliometric profile on the process of creation, transfer and use of data in the field of

Information Sciences by following the activities of two very important journals whose work spanned over half a century. This study, unlike most similar studies, is based on the actual collection of selected papers/references and is completely independent of available citation indexes. We believe that this work can be a basis for future studies aimed to create a clear picture of the nature of communication and scientific contributions of Information Sciences in Croatia.

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