

COBISS.SR and E-CRIS.SR as Support for the eScience System

UDC 655.411:004.42COBISS (497.11)
DOI 10.18485/infotheca.2023.23.2.3

ABSTRACT: The paper presents the role of the COBISS.SR and E-CRIS.SR systems in constructing the Register of Researchers and the Register of Scientific Research Work in the Republic of Serbia - eScience. The eScience system, as a national aggregator of metadata on the results of scientific research work in Serbia, firmly relies on the library system COBISS.SR in terms of the direct transmission of data on papers that are part of the scientific production of domestic researchers. The selection of records from the COBISS.SR system is based on a set of records containing the document typology and personal identifier, that is, the researcher's code from the E-CRIS.SR database. The University Library "Svetozar Marković", as the parent library of academic and scientific libraries, together with the National Library of Serbia, successfully performs the task of providing support for the transparent presentation of the results of scientific research work in Serbia, thereby fulfilling its obligations at a high level, which was also recognized by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia.

KEYWORDS: COBISS.SR, E-CRIS.SR, eScience, harvesting, identifiers, typology of documents

PAPER SUBMITTED: 30 December 2023

PAPER ACCEPTED: 30 January 2024

Aleksandra Trtovac
aleksandra@unilib.rs
ORCID: 0000-0002-0478-9980

Mile Stijepović
stijepovic@unilib.rs
ORCID: 0000-0002-7645-5664

*University Library
"Svetozar Marković"
Belgrade, Serbia*

1 Introduction

The need for the existence of a unified system of scientific information was perceived in the mid-80s of the 20th century in the former Yugoslavia. The Scientific and Technological Information System of Yugoslavia (SNTIJ) project was launched in 1987. Already in 1988, a feasibility study of SNTIJ was published in which, among other things, the institutional structure of the system was prescribed. The project envisaged that the system would consist of libraries - special, higher education, university and national, INDOK and information units (services, centers), referral centers, specialized centers of scientific and technological information, specialized systems of scientific and technical information, archives and museums, Yugoslav bibliographic agency (Yugoslav Bibliographic Institute), and computer services - hosts. The same project defined the introduction of shared cataloging in the libraries of Yugoslavia within the framework of a centralized computer network (SNTIJ 1988, 12–15).

One of the central supporters of this project and scientific research work was the University Library "Svetozar Marković" as a library, information-documentation, and referral center of the University of Belgrade. From its foundation until today, for almost a whole century, the Library has been carrying out its basic activity continuously, trying to provide the best possible support and assistance to the work of academic libraries and their librarians on the one hand, and on the other hand, to offer its users, in the first place researchers, university professors and students, assistance in their scientific research work through adequate services. The development of new technologies and the application of technological innovations have also found their place in the library world, and the Library tries to keep up with them, while its employees improve their skills and develop new knowledge and skills in their daily work and work on projects in order to respond to new challenges and meet the needs of contemporary users.

As the University Library "Svetozar Marković" has been one of the leaders in the development of the shared cataloging system since 1987 in the former Yugoslavia,¹ that activity spilled over into the development of the CO-

1. The shared cataloging system was established at the level of the entire former Yugoslavia in 1987. The bearer of the development of organizational solutions and software was the Computer Center of the University of Maribor (today the Institute of Information Sciences - IZUM). In 1991, IZUM promoted the COBISS system. Due to social and political changes, COBISS continued to develop as a Slovenian

BISS.SR system, in cooperation with the National Library of Serbia (NBS)² and the Library of Matica Srpska (BMS)³. In cooperation with the NBS, in 2001, the University Library implemented the projects "Establishment of the Center of the Virtual Library of Serbia (VBS)" and "Building a cooperative network of higher education libraries in Serbia", which were financed by the Open Society Fund and the European Commission within the TEMPUS program (Филипи-Матутиновић 2001). After the implementation of the projects, the VBS center was established with its headquarters in the National Library of Serbia (Grujić, Čano-Tomić, and Ljubišić 2016, 5) with a common host server, and in 2003 the shared cataloging system in Serbia started to operate, based on the COBISS platform (Cooperative online library systems and services)⁴ (Filipi-Matutinović 2010, 95), which has been developed from the late eighties of the 20th century by the Computer Center of the University of Maribor (today the Institute of Information Sciences - IZUM)⁵ (Popović-Bošković and Filipi-Matutinović 2001). The shared catalog was established by connecting the databases with the electronic catalog of the BMS (which was the most comprehensive in Serbia in terms of the number of records), the Yugoslav Bibliographic Information Institute (YU-BIN), the University Library "Svetozar Marković" and the National Library of Serbia. Also, cooperation was achieved with the newly formed countries on the territory of the former Yugoslavia and the COBISS.Net network was established, which meant connecting the national databases of the five countries of the former Yugoslavia that were part of the system at the beginning (Slovenia, Serbia, Bosnia and Herzegovina, Macedonia and Montenegro). From that moment, the University Library provides continuous assistance and support to all scientific research libraries that are part of the system and their librarians, in terms of creating records and maintaining their quality.

In 2018, within the COBISS.SR system, the CONOR.SR⁶ authority file became active which, after more than a decade since the initiation of the normative control project proposal in the COBISS.SR system, enabled the normative control of personal names (Савић 2017, 103). The project was imple-

library and information system, while affiliated libraries in Serbia continued to work with the same software locally without further improvement until 2003.

2. [National Library of Serbia](#)

3. [Matica Srpska Library](#)

4. [COBISS.SR](#)

5. [Institut of Information Sciences \(IZUM\)](#)

6. [CONOR.SR](#)—Authority file of personal and corporate names

mented by the National Library of Serbia, the University Library "Svetozar Marković" and the Matica Srpska Library. As the CONOR.SR database is an integral part of the COBISS system (Тртовац and Дакић 2020, 76), it represents a significant resource for the eScience⁷ system in the sense that the normative records for researchers contain the necessary personal identifiers that are also used in the eScience system.

The University Library "Svetozar Marković", in addition to its core activity and providing services to students and the scientific and research community, also performs the role of an educational center. Over the years, the Library, following its legal obligations, has undertaken the organization and implementation of various forms of professional training for librarians employed in all higher education institutions. Back in 2003, within the framework of its Statute, the Library prescribed in Article 10 the obligation to organize professional development of personnel for the performance of library activities (УБСМ 2003). In the past two decades, various trainings have been organized for employees in academic and special libraries (in the form of lectures, workshops, seminars, etc.), covering all the most important segments of library work (Дакић, Тртовац, and Андоновски 2020, 32–33). Given all of the above, the University Library "Svetozar Marković", together with the National Library of Serbia and the Matica Srpska Library, is a key actor in the process of unifying data on scientific and research work in the COBISS system for the eScience system, providing technical support and assistance to scientific and research organizations and researchers individually. Thus, it has the opportunity to support the implementation of a new system for monitoring and evaluating the results of scientific work in Serbia - eScience.

2 COBISS and SICRIS (E-CRIS) – a model of the optimal scientific information system

If we consider the development of the scientific information system in the countries of the former Yugoslavia, we can state that the COBISS system is used as a preferred library-information system in Slovenia, Serbia, Bosnia and Herzegovina (Republic of Srpska and the Federation of Bosnia and Herzegovina), Montenegro and North Macedonia. Croatia remained outside this system and developed its own resources and platforms for the presentation, evaluation and promotion of the results of scientific research work.

7. Register of Researchers and the Register of Scientific Research Work in the Republic of Serbia - eScience

2.1 Slovenia

At the beginning of the 1990s, when mutual cataloging gained momentum and more libraries were included in the common system, the political situation in the former Yugoslavia changed. Consequently, due to socio-political circumstances, shared cataloging and further construction of a common system were interrupted. Libraries in Serbia began to work separately, each in its own local base until 2003. The COBISS system continued to be developed individually in the Republic of Slovenia as a generally accepted national integrated library and information system. As part of that development, in addition to the improvement of modules and segments for basic library operations - cataloging, procurement, and lending - SICRIS⁸ (Slovenian Current Research Information System) was launched in the second half of 1999 as a national information system that initially contained databases on researchers, research organizations and research projects.

After more than 20 years of successful application, "today, this system contains data on scientific research organizations, departments, research projects and programs, researchers, as well as research equipment. Data on the papers of Slovenian researchers is contained in the library and information system COBISS.SI⁹, that is, its bibliographic database COBIB.SI¹⁰, with which SICRIS is connected, thus enabling immediate insight into the researchers' bibliographies.

The researcher database contains the most basic data (name, surname, unique code of the researcher, area of scientific research work, etc.). Additional data (education, language skills, employment, etc.) are available only for researchers who have permitted the publishing of their personal data. This database contains data on all researchers who participated in the projects of the Research Agency of the Republic of Slovenia (ARRS¹¹) from 1998 until today that were registered by Slovenian scientific research organizations. The organization database contains data on scientific research institutions that participated in projects that were, at least partially, financed by the Slovenian Ministry of Science from 1995 to the present day. Complete data are available only for those institutions that responded to the call from 1999 (when SICRIS was launched) and submitted all the requested data. In addition to the institutions that participate in the projects,

8. SICRIS

9. COBISS.SI

10. COBIB.SI

11. Research Agency of the Republic of Slovenia - ARRS

the database also includes institutions that do not participate in ARRS projects but have informed the Statistical Office of the Republic of Slovenia that they are engaged in scientific research work and that they want to be represented in the SICRIS system. Apart from these two databases (on researchers and organizations), the database on projects financed by ARRS, that is, the Slovenian ministry that was in charge of science from 1998 to the present, is particularly interesting. Other projects in which Slovenian researchers participate are also presented if the researchers and institutions themselves wish to present them through SICRIS. An important prerequisite for the development of this system is the cooperation of the Institute of Information Sciences from Maribor with the Agency for Research Activities of the Republic of Slovenia.

It is safe to say that the key moment happened in 1997 when Slovenia introduced the COBISS system as a mandatory system for displaying bibliographic data and creating researcher bibliographies. This led Slovenian researchers to take more interest in their publications and to publish them more actively. The introduction of COBISS clarified the approach to cataloging and evaluating scientific papers in Slovenian academic circles. This led to the fact that the importance of a specific scientist became more concrete because, based on the review of published scientific papers in COBISS, a comprehensive and reliable assessment of the value of the scientist's work was obtained. IZUM and ARRS are responsible for entering and updating data in the system. Slovenian legislation stipulates that each library in a scientific research organization has at least one librarian who is engaged exclusively in managing the bibliographies of researchers employed in the specific institution and their scientific production.

2.2 Bosnia and Herzegovina

After the signing of the Agreement on the establishment of the COBISS.Net network at the end of February 2003, which foresees the free flow of bibliographic records created in the autonomous library and information systems of Bosnia and Herzegovina (BiH), Montenegro, North Macedonia, Slovenia, and Serbia, two important dates for the implementation of the COBISS system within Bosnia and Herzegovina can be highlighted. The first is March 9, 2005, when the umbrella Agreement on the implementation of the COBISS system in BiH was signed between IZUM and the National and University Library in Sarajevo. The second is February 6, 2006, when the National and University Library of the Republic of Srpska from Banja

Luka was included in the COBISS.BH system. In this way, both entities of Bosnia and Herzegovina (Federation and Republika Srpska) started using the COBISS system.

The test version of the system on research activity in Bosnia and Herzegovina, E-CRIS.BH, was launched in March 2006. The institution in charge of entering and updating already entered data is the National and University Library of Bosnia and Herzegovina.

In the Republic of Srpska, there was no database of researchers and research organizations containing data on researchers, institutions, published papers, current and completed projects, or their results. Such a situation greatly hampered the work of the Ministry of Science and Technology, which, for this reason, decided to accept the offered web application and launch E-CRIS.RS, an information system on research activity in the Republic of Srpska in order to improve cooperation and promotion both at the national and the international level. The management of the E-CRIS.RS system and the function of the national E-CRIS center was taken over by the Ministry of Science and Technology in December 2010.

The conditions for research institutions or researchers remain the same as in previous cases, and all those involved in research and development activities in the Republic of Srpska should be included. The National E-CRIS Center takes care of the organization and coordination of data collection, checks the conditions for enrollment (registration), and monitors the quality of data sent to it by research organizations and researchers (Стијеновић, Кринуловић, and Поповић 2017, 182–183).

2.3 Montenegro

The common cataloging system COBISS.CG, which included the Central National Library 'ĐurđeCrnojević' and the Podgorica University Library, was established in December 2001. In the experimental period from 2006 to 2008, the work of entering data into E-CRIS.CG was performed by the University Library in Podgorica. Since 2009, the management of the E-CRIS.CG system has been taken over by the Ministry of Education and Science (MPIN), and at the same time, the methodology of data collection and updating has been changed. Letters have been sent to scientific research institutions and researchers, requiring them to register in the E-CRIS.CG system if they participate in research projects financed by public funds. All those involved in research and development activities in Montenegro should be registered in the E-CRIS.CG system, and thus contribute to the promotion and cooperation at the national and international levels. A research

organization can be a university or an organizational unit of a university (faculty, institute...), but also any other legal entity in the public or private sector with a registered research or development activity and at least one employed researcher. A researcher is a natural person who has at least a university education (university degree), performs research or development activities, and undertakes to maintain their bibliography in the COBISS.CG system (Stijepović, Krinulović, and Popović 2017, 180–181).

2.4 North Macedonia

At the end of 2003, the implementation of the COBISS.MK system began in North Macedonia. As in other countries participating in the COBISS.Net project, an information system on research activity called E-CRIS.MK was launched there. The task of running this system was entrusted to the National and University Library "St. Kliment Ohridski", which also performs the function of the national E-CRIS center. From March 2012, the methodology of data collection and updating was changed. Researchers who were already registered in the ECRIS.MK system were invited to submit an e-mail address to which they were sent a username and code for authorized access to the system so that they could complete their data. Researchers who were not yet registered in the system but met the requirements for enrollment (higher education, engagement in scientific research, and the obligation to maintain a bibliography in the COBISS.MK system) should fill out form EV-03/2008, send it to the address of the national E-CRIS center and when the responsible person determines that the researcher meets the requirements for registration in the system, the data becomes public, and the researcher is informed about it and can update his data with the help of a username and password. The same methodology was applied in research organizations (181–182).

2.5 Croatia

As the libraries in Croatia do not utilize a unique software that supports the library-information system, data on scientific research work and researchers in this country are most comprehensively kept in the Science Information System of the Republic of Croatia - CroRIS and the Croatian Scientific Bibliography - CROSBIB. CroRIS is the central place for the scientific research work of Croatian researchers because it contains reliable data about researchers, institutions, projects, research, patents, equipment, and its use¹². CROSBIB contains comprehensive bibliographic data on the scien-

12. CroRIS

tific and professional work of over 46,000 individuals working in science and higher education with more than 815,000 publications and 9,100 projects¹³. These two systems have been developed and maintained by the Computing Center of the University of Zagreb (Srce¹⁴).

The need to enable open access to scientific information and the presentation of the results of scientific research led to the creation and establishment of Dabar¹⁵ (Digital Academic Archives and Repositories) in Croatia in 2014, which is also maintained and managed by the computing center of the University of Zagreb (Srce). Dabar includes interoperable institutional and thematic repositories. Since 2015, doctoral dissertations, final and graduate theses, contributions since 2016, and papers published in magazines and anthologies, as well as chapters in monographs since 2017, have been deposited there (Macan, n.d.). Dabar is a metadata aggregator for 172 repositories, it contains over 250 thousand results of scientific research, more than half of which are in open access¹⁶.

The development of the system in Serbia will be outlined and explained in detail in the following chapters.

3 E-CRIS.SR and researchers' bibliographies

Based on the efficient model established in Slovenia, which involves communication, exchange of research data, and the creation of bibliographies using the COBISS.SI and SICRIS systems, at the end of 2005, at the initiative of the University Library "Svetozar Marković", in cooperation with the Institute of Information Sciences from Maribor (IZUM) the web application E-CRIS.SR¹⁷ was launched with the aim of establishing an information system on research activity in Serbia. Sixteen files with data on teachers and faculty associates of the University of Belgrade, prepared by the University Library, were initially converted into the system. The E-CRIS.SR system contains four interconnected databases on research activities in Serbia. These are databases about researchers, projects, organizations, and departments (Стијеповић 2016).

The web application E-CRIS.SR (Figure 1) belongs to the category of information systems known as CRIS (Current Research Information Sys-

13. Information provided on 1.2.2024, source: <https://www.croris.hr/>

14. **SRCE** - Computing Center of the University of Zagreb

15. **DABAR** - Digital Academic Archives and Repositories

16. Information provided on 1.2.2024, source: <https://dabar.srce.hr/repozitoriji>

17. **E-CRIS.SR**

tems), which have been developed in Europe for decades. A significant step in the development of CRIS systems is their transfer to the Internet, which additionally motivates researchers, that is, contributors to make their data transparent, thus making them more visible to the wider research population. In addition to moving to the Internet, an important step in the popularization of the CRIS system is the generally accepted recommendation CERIF¹⁸ (Common European Research Information Format), which standardizes data by prescribing the structure of data on research projects, along with recommendations related to research organizations, departments, and researchers.



Figure 1. E-CRIS.SR web application

Recognizing the recommendations of CERIF, IZUM developed the web application E-CRIS and offered it free of charge to users of COBISS applications in the COBISS.Net network with the aim of establishing records of researchers and institutions, which is a prerequisite for keeping bibliographies of researchers (scientific workers) and institutions. At the beginning of February 2023, a new version of the E-CRIS software, V2.0, was installed, which brought many improvements compared to the previous version. Researchers can register themselves in the E-CRIS system by entering their data. After verification by the administrator from the national E-CRIS center, their data becomes publicly available.

Researchers who are already registered in the E-CRIS system can update some of their biographical data themselves, provided that their email address is entered in their profile. If the e-mail address is not entered in the E-CRIS

18. **CERIF** - Common European Research Information Format

presentation or is not valid, the researcher is obliged to enter a valid e-mail address through the national E-CRIS center. The procedure is similar for the registration of research organizations, but it is necessary to specify the e-mail address of the contact person who will take care of the organization's E-CRIS presentation.

The National E-CRIS Center, located in the University Library in Belgrade, is responsible for organizing and coordinating the collection of data in the system by researchers and research organizations, as well as for checking its quality. A new possibility is the addition of a fifth database on research equipment that is standardized according to the appropriate classification, but for now this database is not being filled.

An important moment for replenishing the database of researchers in the E-CRIS system occurred in March 2023, when data on all active researchers registered by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia who did not have an E-CRIS code were submitted. Thanks to that data, in July 2023 codes were assigned to almost 13,000 new researchers.

At the end of October 2023, the following data are represented in the databases of the E-CRIS system:

- 25,879 researchers,
- 3,477 projects (2,697 international),
- 325 organizations,
- 1,166 departments.

In the following period, the national E-CRIS center, in cooperation with research organizations, will pay special attention to the entry of data on research projects that are not currently in the records of the E-CRIS system. Additionally, they will focus on entering data on research equipment. Researchers' bibliographies are printed from the COBIB.SR bibliographic database of the COBISS.SR system using the Personal Bibliography segment, and the prerequisite for this is that the data on the researcher's E-CRIS code has been entered into the CONOR.SR normative database of personal names.

It is important to note that the data in the COBIB.SR and CONOR.SR databases are entered by trained librarians in libraries and specialized information centers who are full members of the COBISS.SR system. In essence, the researcher can choose which library or specialized information center will take care of their personal bibliography, and there they obtain information about what data they need to submit in order for the bibliography to

be complete. Registered researchers are required to enter typology information (document/paper types for maintaining bibliographies in the COBISS¹⁹ system) in the bibliographic records to ensure the bibliography is sorted accordingly. The researcher's typology and code are necessary data that determine the papers from the COBIB.SR database that are transferred to the papers in the Results segment of the eScience portal. During 2022, 21,486 bibliographies were downloaded from the COBISS.SR system.

4 COBISS.SR as a data source for the eScience portal

Although the COBISS.SR and E-CRIS systems have all the good features and functionalities of the COBISS.SI and SICRIS systems, they have failed to become the preferred scientific information system in Serbia. Although it is based on transparency and the possibility of including evaluation and review of citations of scientific works, the COBISS system has not been implemented in many research and academic libraries in Serbia. The reason for this lies in the fact that for many libraries this system is expensive because the competent ministries do not finance its implementation and maintenance, but also in the fact that in addition to the COBISS.SR system, other systems were developed in Serbia - primarily BISIS²⁰, which now has a long tradition of use not only in public libraries but also in academic ones.

Additionally, many Serbian academic and research libraries are not included in COBISS or BISIS, and many of them also work in their local systems (e.g. libraries of the Faculty of Electrical Engineering and Faculty of Mathematics of the University of Belgrade, libraries of most institutes of the Serbian Academy of Sciences and Arts, etc.). Additionally, the compulsory recommendation of the Ministry of Education and Science is that every scientific research organization has its own institutional repository, so it was decided when establishing and developing the architecture of the eScience system, that this system would be an aggregator for metadata coming from institutional repositories, the repository of doctoral dissertations NaRDuS²¹, the database Ours in WoS²² and ORCID²³ researcher profiles. In its initial version and implementation, the eScience system did not foresee the transfer

19. More about document type in the chapter 6

20. [BISIS](#)

21. [National Repository of Dissertations in Serbia – NaRDuS](#)

22. [KoBSON, Ours in WoS](#)

23. [Open Researcher and Contributor](#)

of metadata from the COBISS.SR system. Subsequently, with the intervention of the library community, particularly the representatives of the University Library "Svetozar Marković" and in cooperation with high-ranking representatives of the Ministry of Science, Technological Development and Innovation²⁴, a series of meetings were held with the National Library of Serbia and IZUM, where the issue of transferring records from the COBISS.SR system to the eScience system was discussed.

Despite all the previously mentioned problems related to its implementation, the COBISS.SR system is the most comprehensive library and information system used by libraries in the Republic of Serbia. After twenty years of existence of the system of mutual cataloging and the Virtual Library of Serbia, 262 libraries (of which 109 are academic and institutional²⁵) are actively working in this system today, and have created close to 4 million records in the mutual catalog COBIB.SR²⁶. Analysis of the database by including the criteria that the records contain the code of the researcher from the E-CRIS.SR system (E-CRIS ID) and the code for the typology of the document entered in the bibliographic data format COMARC/B in field 001\$t results in 294,670 records²⁷. All those records are potential candidates for the database of scientific results displayed on the eScience portal.

Testing of the transmission of the given set of records (query as=* and td=*²⁸) via the OAI-PMH protocol was performed in May 2022 from the local database of the University Library "Svetozar Marković". Since the testing was successful, the authorities responsible for the development of the eScience system - Computing Center of the University of Belgrade (RCUB)²⁹ decided that the format for data transmission should be COMARC.XML as the richest in metadata because it simultaneously includes bibliographic and authority data, as well as all entered identifiers that are the base for connecting the profiles of researchers and the results of their scientific research work in the eScience system. The final initial transfer of all records containing the necessary data (researcher code and document typology) from the mutual catalog COBIB.SR was completed on April 24, 2023. To that end, IZUM de-

24. Republic of Serbia, Ministry of Science, Technological Development and Innovation

25. Information provided on 20.12.2023.

26. COBIB.SR

27. Information provided on 25.12.2023.

28. The query involves finding all records that contain the researcher's code and document type, regardless of the type of publication

29. Belgrade University Computer Centre

veloped a special application that allows the harvesting of record sets via the OAI-PMH protocol from the mutual catalog level. At that moment, there were over 250,000 potential results for transfer to the eScience system.

By additional filtering, supplementing the criteria for records, and checking for duplicates in the current state of the eScience system, as well as by rejecting certain types of publications (final papers, master's and doctoral theses³⁰), about 90,000 records from the COBISS.SR system were transferred to eScience (Косановић 2023). Following the initial transfer, records were regularly harvested into the eScience system once a week, specifically, every Thursday. Each new transfer implies the creation of new records, as well as the addition of existing records with researcher codes and/or document typology. For example, in 2023, libraries created a total of about 15,000 records that were candidates for results displayed in the eScience system, of which about 1,400 records in December 2023 only.

Considering that highly educated librarians with many years of experience work in academic and institute libraries within the COBISS system, and that they receive additional education through basic and advanced courses for working with the system³¹, those responsible for the development of the eScience system have decided that records from the COBISS system should be directly imported into the eScience system without further verification or confirmation. This approach mirrors that of other systems, such as institutional repositories of scientific research organizations, Ours in WoS, and NaRDuS, where librarians used to monitor the inputted metadata before its transfer to the eScience system.

5 Identifiers in the COBISS and eScience systems

Three types of personal identifiers (PID) are used in the COBISS system for stable and unique determination of authorship and linking of bibliographic records with their relevant authority records. The authority database of personal names CONOR.SR has its own identifier CONOR ID, which each record created for each individual person receives. Within the COMARC/A³² format itself, the entry of the identifier ORCID ID in field 017\$a\$2 and E-CRIS.SR ID in field 200\$r is provided. In this way, the

30. Doctoral dissertations are transferred to the eScience system from the National Repository of Dissertations in Serbia - NaRDuS

31. [Portal education, courses, presentations](#)

32. [COMARC/A –Authority data format in the COBISS system](#)

connection of the COBIB database with the researcher's bibliographies and the uniqueness and unequivocal authorship of a specific publication or work that is an integral part of a specific publication are achieved. The following figure (2) shows the entry of the identifier in the COMARC/A format.

```
CONOR ID=12546151 PN V01 25.09.2012 CONSR::COBIB_LZUM Updated: 21.04.2023 CONSR::UBSM_ALEKSANDRAJ C3
000 a00101 b2012092520230421 cCONSR::COBIB_LZUM dCONSR::UBSM_ALEKSANDRAJ eC FO g0000049008 tC3
001 ac -- corrected or revised record br -- authority record ca -- personal name
010 a000000109202203
0177 a0000-0003-3234-4118 2xoid -- ORCID
100 ba -- established crsp -- Serbian gcb -- Cyrilic - Serbian
101 asrp -- Serbian
102 asrb -- Serbia
106 ad -- may be used as subject access point
120 ba -- differentiated personal name ab -- male
152 aPRIAK -- Pravnik i pomoćnik za izradbu abecednih kataloga
18011 f1960
200 1 7cb -- Cyrilic - Serbian aJerome Ba Aleksandar f1960- f01886
200 1 7ba -- Latin aJeroku Ba Aleksandar f1960- f01886
340 aСрпски територијални историјски књижевности, од академика на српској књижевности 20. века и редовни професор Филозофског факултета Универзитета у Београду.
400 1 7ba -- Latin Фроп -- Serbian aJerome Ba Aleksandar M. f1960-
```

Figure 2. Identifiers in the COMARC/A format

Connecting the profile of researchers with the results of their scientific research work in the eScience system is done through personal identifiers. The identifiers provided for researchers in the mentioned system are IBI³³, ORCID ID³⁴, E-CRIS.SR ID³⁵, APVNT ID³⁶. Using the identifier E-CRIS.SR ID, researchers' profiles are automatically connected with their results that are harvested from the COBISS system, and via ORCID ID, they are automatically connected with results that come to eScience from institutional repositories, database Ours in WoS, and the author's ORCID profile. Figure 3 shows the researcher's profile in the eScience system with the associated identifiers.

The use of identifiers allows the researcher's works to be unambiguously linked to the corresponding profile, thus avoiding potential errors. This is especially important for authors who have non-specific names and surnames, and who often deal with the same field of research or are employed in the same institution. We will cite the example where in the list of researchers on the eScience portal, 22 people with the same first and last name appear – Jelena Petrović. Without the use of identifiers, it would be impossible to precisely classify their published research results, especially among female researchers who deal with similar fields of research. Also, eScience records

33. Identification number of the researcher in the Register of Researchers of the Republic of Serbia

34. [Open Researcher and Contributor ID](#)

35. [E-CRIS.SR ID](#)

36. [Identifier in the Database of researchers of Vojvodina](#)

The screenshot shows a user profile for Aleksandar Jerkov. The profile is divided into several tabs: Profile, Details, Publications, Secondary authorships, Indicators, and Statistics. The 'Profile summary' section is active, displaying the following information:

| | | | |
|--|---|----------|---------------------|
| Status | AKTIVAN | ORCID ID | 0000-0003-3234-4118 |
| IBI (Researcher Identification Number) | AH566 | | |
| Main Affiliation | Univerzitet u Beogradu, Filozofski fakultet | | |
| eCris ID | 01886 | | |

Figure 3. Identifiers in the eScience system

the profiles of two authors whose names are identical – Lidija Radulović, and both of whom are employed at the Faculty of Philosophy of the University of Belgrade. In such cases, personal identifiers are the only reliable way to link author results. Identifiers make it possible to gather all papers under one profile, regardless of the form of the author’s name, which is especially important for authors who have changed their name or surname during their professional work.

Bearing in mind all these circumstances, the recommendations of the editorial team of the University Library "Svetozar Marković" to the librarians of higher education and institute libraries was to regularly enter the aforementioned personal identifiers even before the eScience system was established. With the introduction of the eScience system, the reasons for entering personal identifiers have only been further confirmed.

6 Harvesting, classifying and connecting records from the COBISS.SR system to the eScience system

As previously emphasized, records containing a personal identifier in the form of an E-CRIS.SR ID, as well as the typology of the document entered in the field provided for this - 001\$t, are included in the corpus of records that are transferred from the COBISS.SR system to the eScience system through a regular harvest.

The identifier enables the direct and automatic connection of the researcher’s profile in eScience with the specific paper that comes from the COBISS.SR system in eScience. The typology of the document is mandatory data in eScience records as well. The typology assigned to documents

in the COBISS system is detailed in Appendix F6 of the COMARC/B manual (IZUM 1991–2023, F6) and provides a clear and very detailed overview of document types from scientific articles, through scientific monographs, textbooks, collections of papers from various types of scientific conferences, patents, technical solutions to performed works and events (more in the paper (Андоновски, Ђурђулов, and Кринуловић 2023)). The typology of documents in the eScience system is not so elaborate and includes a narrow number of types (shown in Figure 4) with which different types of documents are compared in the transfer of records as they are managed in the COBISS system.

| | |
|----------------------------|-------------------|
| Article | Technical reports |
| Conference Paper | |
| Book parts | Arch works |
| Monograph | Reviews |
| Other | Patent |
| Text book | |
| Doctoral theses | Report works |
| Editorial works | Dataset |
| Contribution to periodical | |
| Encyclopedia entries | Public policies |

Figure 4. Document type in the eScience system

The typology of documents in the eScience system is based on international guidelines for repositories (OpenAIRE typology³⁷), and in the last iteration, which was carried out in November 2023, it was supplemented with document types for textbooks and patents. Document types for technical solutions and various types of short scientific articles (case studies, case reports, final report, etc.) are still missing.

If we analyze the typology for a scientific article, we will find that there are three types of documents in the COBISS system:


- 1.01 – original scientific article
- 1.02 – review scientific article
- 1.03 – other scientific articles.

The last mentioned type of document refers to the results of a completed original research work or a work that is still in progress, which enables a more precise typology of all potential results of scientific research work, while in the eScience system there is only one type of document - Scientific article and it refers to all the mentioned types from the COBISS system (typologies 1.01, 1.02, 1.03).

During the transfer of records from the COBISS.SR system to eScience, a check for duplicates is performed, and records from the COBISS.SR system that are duplicates of already existing records in eScience are automatically rejected. The procedure for identifying duplicates involves checking the title, DOI (digital object identifier), ISBN numbers, and ISSN numbers in the article records. Records from the COBISS.SR system that are identified as duplicates according to the records in the eScience system are assigned a stable URI from the COBIB.RS database as metadata. The following example clearly illustrates that the record was migrated from the repository and was also assigned a URI from the COBIB.RS database (see Figure 5).

In this way, it is possible that there is only one record for each result in the eScience system, and that all online sources in which the work is located, which communicate with the eScience system, are marked by a separate URI, i.e. URL.

37. [OpenAIRE Guidelines for Literature Repositories v3: Publication Type \(M\)](#)







| | |
|------------------|---|
| Title: | Oslabađanje stiha u pevanju modernog čoveka. Tendencije i okolnosti razvoja slobodnog stiha u Americi i Srbiji |
| Authors: | Adamović, Bojana   |
| Issue Date: | 2016 |
| Publication: | Savremena proučavanja jezika i književnosti |
| Publisher: | Kragujevac: Filološko-umetnički fakultet |
| Type: | Book parts |
| ISBN: | 978-86-85991-87-5  |
| VBS COBISS: | https://plus.cobiss.net/cobiss/sr/sr/bib/515350702 |
| URI: | https://enauka.gov.rs/handle/123456789/599851 https://plus.cobiss.net/cobiss/sr/sr/bib/515350702#izum.si http://dirikum.org.rs/550/ |
| URL: | http://www.filum.kg.ac.rs/dokumenta/izdavastvo/zbornici/2016_VII_skup_mladih_filologa_2015_knjiga2.pdf http://dirikum.org.rs/550/1/2016%20Oslaba%20stih%C4%9Fanje%20stih%C4%9Fanje%20Mladi%20filolozi%20kg.pdf https://plus.cobiss.net/cobiss/sr/sr/bib/515350702#izum.si |
| Metadata source: | Migracija |
| Updated by: | Костић, Лариса <i>[Institut za književnost i umetnost]</i> |
| M-category: |  |

Figure 5. An example of a record found in different systems

7 Instead of a conclusion - the importance of COBISS.SR for the sustainability of the eScience system

Historically speaking, the COBISS.SR system was created before all other systems that today form the framework for eScience and from which data is transferred - Ours in WoS, institutional repositories, NaRDuS, and ORCID profiles of researchers. If we look at the twenty years of existence and efficient functioning of the Virtual Library of Serbia, the system of shared cataloging and the introduction of the regional system for the transfer and exchange of bibliographic data COBISS.Net, it is clear that the COBISS system in Serbia has been established and confirmed, and has demonstrated stability and sustainability. As such, it is an inseparable part of the eScience system because it enables the transfer and aggregation of metadata of the entire scientific production of the Republic of Serbia in the form of records for monographs, serial publications, and analytical records from journals and proceedings.

What the COBISS.SR system lacks to some extent are records of the papers of domestic researchers published in leading international scientific journals. The way to overcome that problem is a sub-application that enables

the direct transfer of records from Ours in WoS to the the COBISS.SR system based on the SRU protocol (Милновић 2023). It is planned that the authorities in the National Library of Serbia and the Center for Shared Cataloging will work on this solution together with colleagues from IZUM. Another shortcoming lies in the fact that all scientific libraries in Serbia are not members of this system, but this is not a weakness of the COBISS.SR system itself, but of the library and information system of Serbia, which in fact has no uniqueness in the entire territory of the country. Nevertheless, the development and implementation of solutions that IZUM has already tested and implemented in Slovenia and the fact that behind the development of this system stands a reliable institution with a sufficient number of highly skilled personnel provides an excellent basis for the further support of the State of Serbia to the COBISS.SR system and all its applications.

The sustainability of the COBISS.SR system is closely related to the sustainability of the eScience system because over 850 licensed catalogers, of which about 300 are in over 100 academic libraries, enrich this system with new metadata every day, a large part of which finds its place in eScience as the largest aggregator of metadata about scientific research work in Serbia. Therefore, it is no coincidence that the Ministry of Science, Technological Development and Innovation, after analyzing the work of the COBISS.SR system, unequivocally decided to include records from this system subsequently in the corpus of results that are an integral part of the eScience system. Within the COBISS.SR system, the University Library "Svetozar Marković", together with the National Library of Serbia and the Matica Srpska Library, will continue to advocate for high precision of metadata and improvement of the quality of records that reflect the scientific work of our researchers.

References

- Filipi-Matutinović, Stela. 2010. "Virtuelna biblioteka Srbije." Препузето 11.12.2023, https://www.casopiskultura.rs/wp-content/uploads/2021/publikacije/129_7.pdf, *Kultura*, no. 129, 91–105.
- Grujić, Angelina, Emina Čano-Tomić, and Ljubica Ljubišić. 2016. "Projekat Virtuelna biblioteka Srbije – osvrt i pogled u budućnost." Препузето 11. 12. 2023, http://doi.fil.bg.ac.rs/pdf/eb_ser/melissa/2016-2/melissa-2016-15-2-ch22.pdf, *Melissa* 15 (2): 303–317.

- IZUM. 1991–2023. *COMARC/B. Format za bibliografske podatke: priručnik za korisnike, Dodatak F6 – Tipologija dokumenata – definicije i preporuke*. Preuzeto 25. 12. 2023, https://edu.cobiss.net/sr/EntryFormDesktopDefault.aspx?tabid=38&type=manual&manual=1_Comarc_B_svn. Maribor: IZUM.
- Macan, Bojan. n.d. “Archiving of publications in DABAR – current state and future plans.” *Dani e-infrastrukture 2017* (5 April 2017) Zagreb, Hrvatska. Preuzeto 1.2.2024, https://fulir.irb.hr/3457/1/Bojan_Macan-Pohranjivanj_publikacija_u_DABAR-DEI2017.pdf.
- Popović-Bošković, Gordana, and Stela Filipi-Matutinović. 2001. “Virtuelna biblioteka Srbije (VBS) – računarsko povezivanje biblioteka u Srbiji.” *Infoteka 2* (1-2): 57–79.
- SNTIJ. 1988. *Sistem naučnih i tehnoloških informacija Jugoslavije: studija izvodljivosti*. Beograd: Savez inženjera i tehničara Jugoslavije.
- Андоновски, Јелена, Јелена Ђурђулов, and Оја Кринуловић. 2023. “Поддршка Универзитетске библиотеке еНауци: интегрисање и оптимизација информационих ресурса за научни напредак.” У припреми, *Инфотека 23* (2).
- Дакић, Наташа, Александра Трговац, and Јелена Андоновски. 2020. “Промена улоге библиотекара: од каталогизатора до едукатора.” , преузето 11.12.2023, https://infoteka.bg.ac.rs/ojs/index.php/Infoteka/article/view/2020.20.1_2.2_sr, *Инфотека 20* (1-2): 29–48.
- Косановић, Биљана. 2023. “еНаука – CRIS у Србији.” У припреми, *Инфотека 23* (2).
- Милновић, Василије. 2023. “Евалуација и фертилитет: еНаука као залог развоја науке и демократског друштва.” У припреми, *Инфотека 23* (2).
- Савић, Ана. 2017. “Нормативна контрола у Србији.” Preuzeto 9. 12. 2023, <http://infoteka.bg.ac.rs/pdf/Srp/2017/infoteka-2017-17-1-5.pdf>, *Инфотека 17* (1): 9–112.
- Стијеповић, Миле. 2016. “Информациони систем о истраживачкој делатности у Србији: 10 година примене веб апликације E-CRIS.SR.” Preuzeto 5.2.2024, <https://zbus.rs/visokoskolske-biblioteke/2016-2/broj-dva-2016/>, *Високошколске библиотеке 13* (2).

- Стијеповић, Миле, Оја Кринуловић, and Александра Поповић. 2017. “Евиденција истраживачке делатности у земљама региона.” Преузето 5.2.2024, <https://doisrpska.nub.rs/index.php/VIBSR/article/view/3623/3459>, *Библиотекарство Српске*, no. 6, 175–188.
- Тртовац, Александра, and Наташа Дакић. 2020. “База CONOR.SR у систему COBISS.SR.” Преузето 25. 12. 2023, https://infoteka.bg.ac.rs/ojs/index.php/Infoteka/article/view/2020.20.1_2.5_sr, *Инфотека* 20 (1-2).
- УБСМ. 2003. *Универзитетска библиотека „Светозар Марковић“*,. *Статут*. Преузето 9. 12. 2023, <http://ubsm.bg.ac.rs/latinica/strana/70/statut>.
- Филипи-Матутиновић, Стела. 2001. “Пројекат Темпус.” *Инфотека* 2 (1-2): 81–90.