

Introduction

Thanks to the Institute of Information Science (IZUM), Slovenia is one of the few countries that connect all types of libraries into one unified library information system. It is also probably the only country with the national current research information system (SICRIS) directly connected to the national library information system (COBISS.SI). Slovenia also has one of the best managed and transparent systems for maintaining researchers' bibliographies within the framework of the library information system and it is the only country with the national researcher's bibliography directly connected with the databases Web of Science and Scopus. COBISS.SI is an indispensable information platform for evaluating the research performance of Slovene researchers within the framework of the Slovenian Research Agency (SRA) and for habilitation procedures in higher education.

COBISS and SICRIS

COBISS (Cooperative Online Bibliographic Information System and Services) represents an organizational model of joining libraries into a uniform library information system with shared cataloguing with the COBIB shared bibliographic database, with local databases of participating libraries, and with other special databases and functions. COBISS has been developed and maintained by Institute of information science (IZUM), an institution established by the Government of the Republic of Slovenia as an information infrastructural service for Slovenian science, culture and education. This year we celebrate the 30th anniversary of the COBISS system. Almost all libraries in Slovenia use the COBISS system.

SICRIS (Slovenian Current Research Information System) is the current research information system in Slovenia. This is a tool for managing Slovenian research activities. It covers research organizations, research groups, researchers, research projects and research programs. The SICRIS information system is developed and maintained by IZUM and Slovenian Research Agency (SRA). SICRIS is linked to the COBISS system and its shared bibliographic database, which allows everyone to have a direct insight into personal bibliographies of researchers.

While the COBISS.SI and SICRIS systems are used in Slovenia, IZUM also develops and maintains the COBISS and E-CRIS systems in other countries: Serbia, Montenegro, Macedonia, Albania and Bosna and Hercegovina.

Researcher's Bibliographies

Researcher's Bibliographies is one of the COBISS web applications, which is used to evaluate the bibliographic indicators of research performance in the SICRIS system. Researcher's Bibliographies can be prepared for researchers and experts who are registered with the Slovenian Research Agency as researchers and have a researcher's code, provided that their bibliographic units are included in the COBIB shared database and researcher's code in the CONOR authority database. An individual bibliographic unit from COBIB database will be appropriately placed on the bibliography report if the record contains the basic bibliographic data (author, title, publication year, publisher, etc.) as well as the type according to the typology of documents/works named "Typology of Documents/works for Bibliography Management in COBISS" and the researcher's code.

Data is entered to the shared COBIB bibliographic database and to the CONOR authority database by qualified librarians in libraries and in specialized information centers that are full members of the COBISS system. As a rule, researchers can choose which library or specialized centers will manage their personal bibliography. Records for bibliographic units are usually entered and edited by the library at the institution where the researcher is employed. If the institution does not have a library, researchers can choose a library that specializes in their field of research. Six central Specialized

Information Centers, each responsible for its scientific discipline (natural sciences, technical sciences, medicine, biotechnical, social sciences, humanities), monitor and supervise that the bibliographic units classification complies with the valid typology of documents/works within the COBISS system.

Evaluation of the Researcher's Bibliography

Evaluation of the researcher's bibliography is represented as a sum of values assigned to every bibliographic entity. There are two major groups of evaluation in the SICRIS system. One is based on the evaluation of bibliographic indicators of research performance according to the Slovenian Research Agency's methodology for researchers, organizations, groups, projects and programs, and the other is based on the evaluation of habilitations for the three main universities in Slovenia. In this presentation the implementation of the SRA methodology will be presented more in detail.

In the researcher bibliography all the bibliographic units are divided into 4 large groups:

- Articles and other component parts
- Monographs and other completed works
- Performed works (events)
- Secondary authorship (editors, mentors, etc.)

The first three groups depend on the type according to the typology of documents/works. The first group *Articles and other component parts* consists of articles, conference contributions, abstracts, book chapters, etc. Let's review how the article is displayed in the researcher's bibliography.

The implementation of display of the scientific article in the Researcher's Bibliography

Besides basic bibliographic information (authors, title, source title with ISSN, year, pages, etc.) for each scientific article in the researcher's bibliography the following data is displayed if available:

- link to the appropriate record of the Journal of Citations Reports (JCR) database for particular ISSN and year (built in COBISS interface),
- link to the appropriate record of the Source Normalized Impact per Paper (SNIP) database for particular ISSN and year (built in COBISS interface),
- link to the appropriate record in Web of Science database (WoS), number of citations, number of citations without self-citations, citations per author,
- link to the appropriate record in Scopus database, number of citations, without self-citations, citations per author,
- link to the Altmetric,
- link to the Plumx.

An example of a display of the bibliographic unit in researcher's bibliography:

2. CURK, Tine, DOBNIKAR, Jure, FRENKEL, Daan. Optimal multivalent targeting of membranes with many distinct receptors. *Proceedings of the National Academy of Sciences of the United States of America*, ISSN 1091-6490. [Online ed.], 2017, vol. 114, no. 28, str. 7210-7215, ilustr. <http://www.iop.cas.cn/xwzx/kydt/201707/P020170703429098795360.pdf>, doi: [10.1073/pnas.1704226114](https://doi.org/10.1073/pnas.1704226114). [COBISS.SI-ID [526561561](#)], [ICR, SNIP, WoS up to 28. 1. 2018: no. of citations (TC): 3, without self-citations (CI): 3, Scopus up to 29. 1. 2018: no. of citations (TC): 3, pure citations (CI): 3]



JCR database is included into the COBISS system and includes the years from 1994 to present day, while SNIP from 1999. Access to the data of JCR database in the COBISS system is IP controlled and

enabled only for the Slovenian users. A connecting database between COBISS and WoS/Scopus systems is also established in the COBISS system. Links between bibliographic records for publications in the WoS or Scopus databases and corresponding bibliographic records in the COBIB.SI shared database are established automatically daily. Once established, links are saved within the COBISS system. For linked publications, citation data is updated weekly.

For bibliographic units with identifier DOI, the open access visibility display provided by Altmetric and PlumX is enabled. Altmetrics is not included in the quantitative evaluation.

The implementation of the quantitative evaluation of the scientific article according to the SRA methodology

Depending on the serial publication, where the article is published, an article belongs to the certain category and gets specific number of points. If the serial is found in the JCR database and/or also only for social sciences and humanities in SNIP database, the article belongs to one of the following categories:

- categories 1A1-1A4: depending on the value of the impact factor, the article is also scored between 40 and 300, depending on the quarter (1, 2, 3 or 4), impact factor value, minimum and maximum impact factor value of the quarter and average value of the impact factor for all JCR/SNIP category.

$$1A1 (1. quarter): 100 + 70 * \frac{(IF - IF_{min})}{(IF_{max} - IF_{min})}$$

$$1A1 (1. quarter): 100 + 80 * \ln \frac{IF}{IF_{min}}$$

if $IF_{max} - IF_{min} > 3x$; x is average IF of the JCR/SNIP category

$$\left. \begin{array}{l} 1A2 (2. quarter): 80 \\ 1A3 (3. quarter): 60 \\ 1A4 (4. quarter): 40 \end{array} \right\} + 20 * \frac{(IF - IF_{min})}{(IF_{max} - IF_{min})}$$

The articles in the serials, which do not meet the above criteria, are classified and scored as follows:

- category 1B: scientific articles in serials indexed in A&HCI and Scopus with 40 points,
- category 1C: scientific articles in serials indexed in other 50 different international databases from [BIBLIO-A](#) list, e.g. MEDLINE, DOAJ, COMPENDEX with 30 points,
- category 1D: scientific articles in other serials from the SRA's list [BIBLIO-B](#) with 20 points.

The rest of the articles is not included in the scientific performance.

Besides category and points, the next important criteria is also the level of scientific performance. An article published in the serial with impact factor could also be included in the above average scientific performance:

- A'' quantitative score: exceptional achievements (serial is on the 1st or 2nd place in the categories of SCIE (ranked by impact factor) or has an impact factor greater than 8 or belongs to top 5% of SCIE category or top 10% of SSCI category or 1A1 of SNIP for social sciences and humanities),
- A' quantitative score: high quality achievements (A'' plus serial belongs to 1A1 category of SCIE, to 1A1 or 1A2 of SSCI and to 1A1, 1A2 or 1A3 of SNIP for social sciences and humanities or to A&HCI),
- A^{1/2} quantitative score: important achievements (A' plus 1A2 categories of SCIE).

An example:

category: 1A1 (Z, A", A', A1/2); indexed in: SCI, Scopus, MBP; verified by OSICN
points: 71.33, no. of authors: 3

On the [BIBLIO-A](#) list we can also get information on serials that carry quantitative scores.

For one author the number of points is normally divided by the number of all authors. If the number of authors is greater than 10, the number of points is divided by $10 \cdot \log_{10}$. This applies for all types of the publications, except editors of serials.

Implementation of the evaluating bibliographic indicators of research performance according to SRA methodology on the summary level

Summary data of the bibliographic indicators is displayed in the researcher's bibliography online and offline (with a delay of 2 days) on the presentation level of the researcher presentation in SICRIS as well:

Upoš. tč.	A"	A'	A1/2	C10	Cmax	h10	A1	A3
530,06	276,76	487,47	500,81	158	34	7	2,24	0

Upoš. tč. = Cons. pts. = Considered points

- Considered points
By SRA methodology all the bibliographic units are divided either into scientific part (scientific articles, scientific conference contributions, scientific monographs, etc.) or professional part (professional article, professional conference, professional monographs), basically according to the types from the "Typology of Documents/works for Bibliography Management in COBISS". The formula is:

$$\text{Considered points} = \sum Z + \min\left(\frac{15}{85} \sum Z, \sum S\right) \quad Z - \text{scientific points}; S - \text{professional points}$$

The works published in the last 5 years are taken into account.

- A" – exceptional achievements
Besides scientific articles that satisfy the criteria for A" this group also includes scientific monographs, published by an important publisher from the SRA list ([BIBLIO-C](#)) and patents from European Patent Office, USA or Japan.
The articles published in the last 5 years are taken into account and also patents in the last 10 years.
- A' - high quality achievements
Besides scientific articles that satisfy the criteria for A' and whole A" this group also includes any monographs in the field of social sciences or humanities (based on the UDC) and scientific chapters in monographs published by an important publisher from the SRA list ([BIBLIO-C](#)).
The articles published in the last 5 years are taken into account.
- A^{1/2} - important achievements
- Besides scientific articles that satisfy the criteria for A1/2 and whole A' this group also includes scientific chapters in any monographs in the field of social sciences or humanities (based on the

UDC).

The articles published in the last 5 years are taken into account.

- CI10 – pure citations from WoS or Scopus in the last 10 years.
- CImax – number of pure citations, WoS or Scopus, in the last 10 years for the most cited work
- H-index for WoS or Scopus in the last 10 years
- A1 – quantitative score is calculated as follows:

$$A_1 = \frac{\text{Considered points} * 4}{1500} + \frac{A''}{1500} + \frac{A'}{1500} + \frac{A^{1/2}}{1500}$$

↓
7

↓
4

↓
1

↓
1

↓
1

limit values

Maximum value of the A1 is limited to 7.

- A3 – score of funding other than that provided by the SRA.
The data for the calculation of the A3 score is obtained from SRA that sends the data to IZUM before new data for the call for proposals is prepared and published. In the SICRIS system, this data is displayed but does not depend on researchers' bibliographic units.

More about this on <http://home.izum.si/COBISS/bibliografije/Formule.pdf> website.

Normally, is CI10 prescribed for SRA public tenders the minimum threshold of quantitative scores A1 and A3 and the number of pure citations in WoS/Scopus in the last 10 years. The majority of decisions for SRA tenders goes through human reviews.

Implementation of the Bibliographic performance indicators for the habilitations at universities

The reason that we already have national systems COBISS.SI and SICRIS (with all researchers and their bibliographic records) caused that in the past many faculties in Slovenia wanted to have their own kind of automated implementation for the habilitation purposes. But IZUM always insisted on the position that we implement such tool only for the whole university. The first agreement was achieved with the University of Primorska and in 2013 inside SICRIS the new service was established. The second was the University of Maribor in 2016, and nowadays we are almost at the end of the implementation for the biggest university in Slovenia, the University of Ljubljana, which includes 26 faculties.

... next time

Conclusion

IZUM has developed the COBISS system as well as the SICRIS system, together with Researcher's Bibliographies application, which actually joins both systems. First researcher's bibliography implementation in the online world, open to the public, goes back to 1996, even before SICRIS was established, and until now many different implementations have taken place. Nowadays the system for evaluating bibliographic performance indicators for public SRA tenders is quite stable with minor changes. Currently we're in the last stage of implementing the new service Bibliographic performance indicators for the appointment to titles at the University of Ljubljana.

References

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