United Nations
Educational, Scientific and
Cultural Organization

Regional Centre for
Library Information Systems and
Current Research Information Systems
Regionalni center za knjižnične
informacijske sisteme in informacijske
sisteme o raziskovalni dejavnosti

IZUM

2030

2025

STRATEGIC PLAN
of the Institute of Information Science, Maribor

On the way towards the strategic plan

Dear readers,

Before you is a document on the further 5-year development strategy of the Institute of Information Science. In it, we will boldly look forward to the future development period 2025–2030, and we will look critically, but also with satisfaction, at the past, as in one of the chapters we assess the extent to which we have fulfilled the goals we set in the Strategic Plan 2019–2024.

The publication of the medium-term development strategy is equally important for both COBISS system users and Institute employees. If we follow the common thread of development and have a clear picture of the goals we have set over a longer period of time, we can work more efficiently at and we will be able to cope with the problems we can expect on new paths. Short-term goals will continue to be written in the Institute's annual work plans, which are adopted by the Governing Board according to the established procedure and then confirmed by the parent Ministry of Higher Education, Science and Innovation of the Republic of Slovenia.

Given the new tasks and responsibilities that rapid technological development and the development of the information society pose to us, in this document we present six strategic goals and the planned measures and processes for their realization, whereby, as before, cooperation with the government or ministries, Slovenian Research and Innovation Agency, universities, libraries, professional associations and others will be key.

All strategic goals are equal and we will pursue them simultaneously, but I would like to highlight one of them at this point. This is an upgrade of the open research infrastructure, when the currently operating HPC Vega supercomputer will be replaced by the even more powerful HPC Vega 2 supercomputer. The supercomputer centre, in conjunction with the artificial intelligence factory, will support not only the scientific research ecosystem, but also the economy by strengthening the innovation capacity and application projects of start-ups and small and medium-sized enterprises.

Without a doubt, the near future of society – in addition to the economic and geopolitical situation in the world – will be determined mostly by artificial intelligence, which is why we will continuously analyse, take into account, and incorporate its achievements and impact into the technological solutions of our applications.

The 5-year strategy document is also a commitment that IZUM will strive to achieve important strategic goals in specific areas during this period and to provide Slovenia and the wider region of Southeast Europe with even higher quality system solutions and user-friendly services.

Dr Aleš Bošnjak
Director

MISSION AND VISION

IZUM was founded to meet the professional and personal needs of the professional and lay public (primarily in the fields of science, education, and culture) and the social demands of our environment. This remains the common thread of the vision for the development of the Institute of Information Science (IZUM) and its results. In the future, we see IZUM primarily in the role of a successful top-of-the-line library information service in the national mutual bibliographic system on the one hand and a national information system on research activity on the other; both, of course, closely intertwined with services without which it is impossible to exist today. Despite all this, we remain convinced that this is a matter of national interest and an exceptional opportunity to promote Slovenian knowledge in the world.

The terms COBISS and SICRIS have been generic terms for several decades. These are brands that are already firmly anchored in people's minds. This is a flattering recognition, but also an important commitment to continue. Strengthening the quality of these services (of course, along with their further development and expansion of the range and purpose of their services) is one of IZUM's most important tasks.

In recent years, they have been joined by a completely new activity – supercomputing. The previously unknown field quickly became part of IZUM's most prestigious flagships. During the period covered by the previous five-year strategic plan, the focus was on demanding, intensive, and high-performance computational operations that were not possible (or feasible) to solve in a reasonable time using conventional computing tools. Today, the field of artificial intelligence is joining this paradigm. IZUM has no ambition to become a mass producer of artificial intelligence products, but it can certainly become a central development point for breakthrough visionary teams from Slovenia, Europe, and other parts of the developed world who need a quality and capable development platform. The target audience is also an important shift. It is no longer (only) about basic research systems in fundamental sciences, but also about development in economic environments.

Similar institutions face two dangers: complacency with consequent introversion, and ignorance of those who think similarly or differently in similar professional environments. IZUM, with its results, demonstrates the skilful avoidance of these pitfalls. We insist on cooperation, which, along with shared responsibility, also gives us greater synergistic power and consequently a broader horizon and more focus on goals. That is why we successfully align ourselves with global trends, everyday experiences, professional needs, real usability, life needs, and approaching the general user.

We still cultivate the principle of "use for the public good". Regardless of the formal form, which is of course in the hands of the founder, we are inclined to think that the financing of public service activities performed by IZUM should continue to be regulated centrally – as it has been so far. The commercialization of IZUM's activities in the Slovenian public space would represent a serious obstacle for both IZUM and its users.

SWOT ANALYSIS

STRENGTHS

- international cooperation and integration into a common European educational and research network and global library environments
- rapidly developing electronic communications market
- a good starting point and readiness to transition to trendy technologies
- good results to date and high level of solution development
- working operational level for more than three decades
- experience with e-service interoperability
- enviable position among the world's largest players in IZUM's core activities
- high-quality and connectable central databases
- highly qualified (although insufficient) human resources

WEAKNESSES

- lack of development resources (financial, human, technical)
- the gap between declarative and operational support
- unstable political and organizational environment (absence of visions in the field of IZUM's operations) and consequent delays in the preparation of development and operational documents
- in strategic documents at the national level, IZUM is not sufficiently recognized as a promoter and driver of the development of the information society
- geographic, demographic and other types of digital divide in the provision and use of e-services
- poorly developed complementary approach at the interdepartmental and intersectoral level
- absence of competent interlocutors in public administration entities

OPPORTUNITIES

- good starting points for the development and implementation of a digital society and innovation, including the development of ICT and mobile technologies
- significantly higher coordinated investments in the development of the information society
- clear political support for development efforts and a high level of awareness of development opportunities
- Slovenia's example as a reference environment for new ICTs
- development of creative e-content and new e-competences
- digitalization of education, research and culture
- employment of professional staff

THREATS

- insufficient support for some concrete efforts to develop the information society
- insufficient sources of financing for the management and development of e-services and e-content
- threatening synergy due to the influence of partial interests
- failure to meet the agreed common European objectives
- digital infrastructure lagging behind in non-urban areas
- negative impacts of different types of digital divide
- unequal position of Slovenian science due to poorer accessibility of relevant sources
- loss of digital cultural heritage

CONTENT ELEMENTS

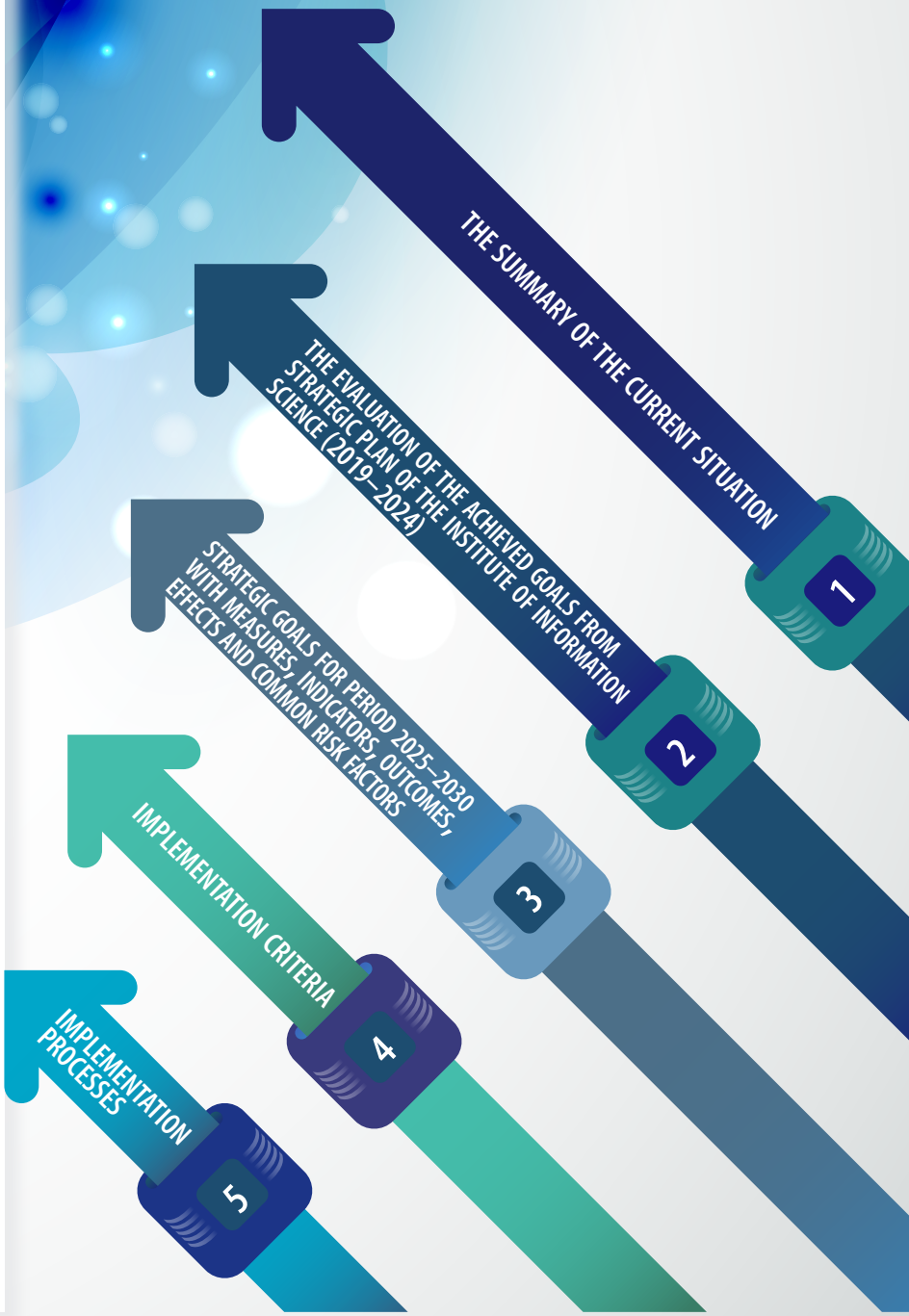
THE SUMMARY OF THE CURRENT SITUATION is a snapshot of the situation at the time of writing this document, and is based on archival documents and annual reports on IZUM's work over the past five years.

THE EVALUATION OF THE ACHIEVED GOALS mentioned in the Strategic Plan of the Institute of Information Science (2019–2024) will be carried out by determining, for each of the seven strategic goals mentioned in the document, what was implemented in the five-year period, what was not, and why not.

The core is represented by presentations of six **STRATEGIC GOALS**. Each goal is identified and briefly described. For each, **MEASURES** for its realization are listed. The expected results (**OUTCOMES** and **EFFECTS**) are shown and the **INDICATORS** described, with which we will be able to monitor the implementation. **SPECIFIC RISK FACTORS** with instruments for their management have been added, while **COMMON RISK FACTORS** are described separately.

The chapter on **IMPLEMENTATION CRITERIA** summarizes aggregated, individually mentioned indicators, and describes general indicators.

The section on the **IMPLEMENTATION PROCESSES** focuses primarily on the jurisdictions and responsibilities of the intended actors involved. In the first place is, of course, IZUM, but all other entities from which we expect responsible engagement are also mentioned: ministries, the government, Slovenian Research and Innovation Agency, universities, research organizations, professional associations and the like.



LEGAL GROUNDS AND COMPLIANCE WITH DEVELOPMENT POLICIES

IZUM is a public institution founded by the Republic of Slovenia, and the founding rights and obligations are exercised by the Government of the Republic of Slovenia. The status of IZUM as a public institute is defined by the **INSTITUTES ACT** (Official Gazette of the Republic of Slovenia – old, no. 12/91, Official Gazette of the Republic of Slovenia/I, no. 17/91 – ZUDE, Official Gazette of the Republic of Slovenia, no. 55/92 – ZVDK, 13/93, 66/93, 66/93, 45/94 – Constitutional Court decision 8/96, 31/00 – ZP-L, 36/00 – ZPDZC, 127/06 – ZJZP), the **SCIENTIFIC RESEARCH AND INNOVATION ACTIVITY ACT** (Official Gazette of the Republic of Slovenia, no. 186/21 and 40/23), which defines it as an infrastructure institution, the **LIBRARIANSHIP ACT** (Official Gazette of the Republic of Slovenia, no. 87/01, 96/02 – ZUJIK, 92/15) and the **DECISION ON THE ESTABLISHMENT OF THE INSTITUTE OF INFORMATION SCIENCE** (Official Gazette of the Republic of Slovenia, no. 71/02 and 51/16). The role and position of IZUM as a library information service in the national mutual bibliographic system is determined by the Librarianship Act in Articles 4, 44 and 45.

At the operational level, in accordance with the founding act, the ministry responsible for research activities is responsible for IZUM, which, among other things, gives consent to the annual work program and financial plan and regular annual reports, concludes regular contracts with IZUM on co-financing activities, and is also the administrator of the budget items from which IZUM draws financial resources for the implementation of its primary activities. In the current mandate, this is the Ministry of Higher Education, Science and Innovation. The implementation of the IZUM program is also closely linked to the Ministry of Culture, Slovenian Research and Innovation Agency, and the Ministry of Education.

The **BASIC FUNCTIONS OF IZUM** arise from the aforementioned normative and other documents:

- coordination of the development and operation of the mutual bibliographic system and its services from its field of work;
- coordination of the development and use of computer support standards for the needs of the shared bibliographic system and its services;
- development and maintenance of software for the needs of the mutual bibliographic system and its services;
- determining the competence of library professionals to participate in shared cataloguing in cooperation with the national library;
- planning and maintaining shared computing and communication capabilities for system operation;
- organization of the offer of databases on electronic media with direct access in agreement with their producers;
- organization of professional education and consulting in the field of activities carried out for the national shared bibliographic system;
- preparing professional bases from their field of work for the work of the National Council for Librarianship;
- development, organization and maintenance of an information system for monitoring research activities in Slovenia;
- participation in public programmes for the development of Slovenia as an information society;
- engineering in the development and maintenance of computer and communication infrastructure in educational, research and cultural organizations;
- research, development and consultancy work in its field of work;
- management and support of the Vega supercomputer and its successors (HPC Vega 2) in the development period 2026–2031;
- other tasks based on adopted long-term development guidelines and annual work programmes.

IZUM, together with other information activity providers in the country, ensures Slovenia's inclusion in the informatization trends of the modern world. According to the **SCIENTIFIC RESEARCH AND INNOVATION ACTIVITY ACT**, it is defined as a public infrastructure institution and also registered as a research organization, and according to the **LIBRARIANSHIP ACT**, it is defined as a library information service in the national bibliographic system COBISS.SI.

The management of the institute is regulated in accordance with the **INSTITUTES ACT** and legislation in the field of research and library activities. The governing body is the IZUM **GOVERNING BOARD** (consisting of nine members appointed by the Government of the Republic of Slovenia).

The advisory body for forming and coordinating the positions of the Slovenian library professional community regarding the development of the COBISS system and services is the **COBISS MEMBERS COUNCIL**. It is composed of library representatives based on the criteria of records contributed to the COBIB.SI shared database; in the current term, it has nine members.

An **EXPERT COUNCIL** was established to address professional matters within the scope of IZUM's work. It is appointed by the IZUM Governing Board, upon the proposal of the Director, from among recognized experts in the fields of information, library and computer activities, as well as from among IZUM's leading professional staff. In the current mandate, it has eleven members.

Legal and formal relations with libraries included in the COBISS.SI system are regulated by contracts. In other countries, such relationships are regulated by umbrella contracts on the implementation of the COBISS system in each country and by other agreements concluded with the competent ministries and institutions from the target countries.

Relations with providers of other domestic and foreign databases and information services are regulated separately. Access to foreign information services and their databases is generally regulated on the basis of consortium agreements. At the business level, IZUM is developing cooperation with important foreign partners, including the world's most prestigious bibliographic and information services (OCLC, ISSN, Clarivate Analytics, ProQuest, ExLibris etc.).

IZUM is a member of important international professional associations in the fields of information science and library science or their active partner (IFLA, DLF, IFIP, ALA, ELAG, LIBER, euroCRIS etc.).

IZUM coordinates its development with the adopted strategies of the Republic of Slovenia and the European Union (EU) in the areas of research, education and culture, and the transition to the information society. Therefore, IZUM's programme guidelines have several points of contact with numerous development

policies, strategies, resolutions and other development plans in Slovenia and the EU.

For example, the **SLOVENIAN DEVELOPMENT STRATEGY 2030** places "quality of life for all" at its centre. Connecting science, education and business for the exchange and transfer of knowledge is crucial, and key instruments include developing knowledge and skills, improving reading, mathematical, digital and financial literacy, and empowering the population to use the latest technologies. The creation of high added value will be supported by innovation, basic and applied research, and the exploitation of digital potential.

The text **DIGITAL SLOVENIA 2030**, which is the overarching strategy for the digital transformation of our country by 2030 and is the response of the Government of the Republic of Slovenia to the development challenges of digitalization, mentions the term "digital deficit", which is identified as one of the key problems of our population. The solution to the problem, according to the authors of the document, is directly related to the desire to increase the use of Internet-connected computer equipment in public places, such as libraries. At the same time, this can be understood as a combination of providing digital infrastructure together with related digital skills and competences.

Similarly, the **RESEARCH INFRASTRUCTURE ROADMAP 2030** mentions libraries as well as computer networks, which include the national library information system, high-performance computing services, and the research information system, as important parts of the national research infrastructure. Among the measures is also the promotion of the integration of all actors. It directly mentions COBISS, SICRIS and the HPC Vega supercomputer.

THE RESOLUTION ON THE SLOVENIAN SCIENTIFIC RESEARCH AND INNOVATION STRATEGY 2030 is a key Slovenian strategic document for the field of research, development and innovation, which will serve as the basis for the formulation of policies related to the areas of social, economic and sustainable development and societal challenges. It is connected and intertwined with numerous sectoral strategic documents at the national level in terms of content and complementarity. Its first goal is stated to be the effective management of the scientific research and innovation system.

The second **DIGITAL AGENDA FOR EUROPE FOR 2020-2030** focuses on creating safe digital spaces, ensuring fair competition in digital markets and strengthening Europe's digital sovereignty, in line with the twin transition (digital and green). Digital Compass has been introduced with four digital goals to be achieved by 2030: digital skills, secure and efficient e-infrastructure, digital transformation of businesses and digitalisation of public services.

THE EUROPEAN DECLARATION ON DIGITAL RIGHTS AND PRINCIPLES promotes a digital transition shaped by European values. With it, the EU wants to enable people to fully benefit from the opportunities brought by the digital transition. A set of digital rights and principles has been adopted, reflecting EU values and promoting a safe, sustainable and human-centred vision of digital transformation. It also includes commitments by the EU and its Member States to take action on a number of digital issues.

THE DIGITAL DECADE BY 2030 is a policy programme adopted at the level of the European Parliament and the Council of the European Union, which, inter alia, sets out monitoring and cooperation mechanisms to create an environment conducive to innovation and investment, by setting a clear direction for the digital transformation of the Union and achieving digital objectives at Union level by 2030, based on measurable indicators.

IZUM AND ITS SERVICES WITH A SUMMARY OF THE CURRENT STATE

Today, IZUM is an internationally recognized leader in the development of integrated library systems and information systems for monitoring research activities. Around 1,500 libraries, more than 6,600 librarians and almost one and a half million end users depend on IZUM in the region. The advantage of COBISS lies in its cooperative and integrated design and in its continuous development over a quarter of a century. Today, it is one of the few public information systems that Slovenia exports abroad.

Thanks to IZUM, Slovenia is one of the few countries that has all types of libraries connected into a single library information system, and the only country in the world that has the national research information system SICRIS directly connected to the national library information system (COBISS.SI). Slovenia is also the country with the most organized system of managing researchers' bibliographies within the library information system and the only one that has a national bibliography of researchers directly linked to the global Web of Science databases. COBISS.SI is an indispensable information basis for evaluating the research performance of Slovenian researchers within the framework of the Slovenian Research Agency (ARIS) and for habilitation procedures in higher education. Furthermore, it is an indispensable information basis for the payment of library royalties to authors of published works within the framework of the Slovenian Book Agency (JAK). From the above it follows that IZUM is one of the key national factors in the field of information infrastructure of science, education and culture.

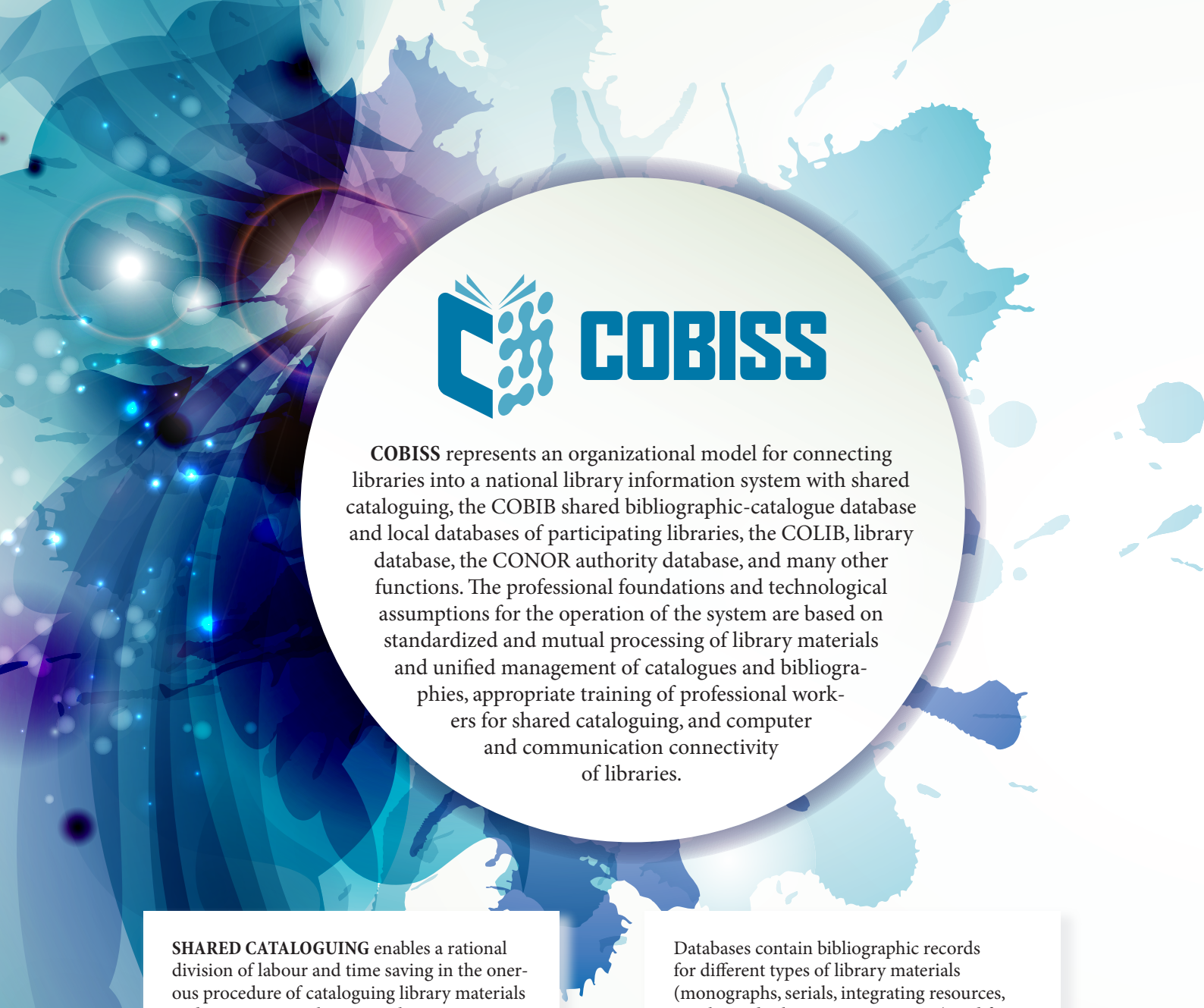
The first priority of IZUM's activity program is the implementation of activities that ensure the smooth operation of the COBISS.SI and SICRIS systems. The reliability of the system and services, while reducing outages of central services, is at a top level.

The content of IZUM's operations, which is confirmed in addition to formal legal documents and the institute's activities to date, includes:

- ensuring the presence of bibliographic information about Slovenian creativity on the global internet, which includes an appropriate technological platform and standardization;
- access to global knowledge for all those who act as experts and on whom our international competitiveness largely depends;
- integration and intercultural dialogue in the region, which has a significant impact on the development of European integration;
- contribution to information literacy, especially among young generations, who cannot succeed in the EU development race without information knowledge and skills;
- developing new knowledge, especially in the research areas of computer science and information science, which is essential for the perspective of library activities.

The instruments for achieving individual program objectives are development activities, which are defined as projects and development and maintenance tasks. They are classified into the following groups by content:

- shared cataloguing,
- COBISS+,
- local applications,
- support for research activity processes,
- other applications and other development tasks,
- application and system infrastructure,
- documentation management and
- COBISS.net.



COBISS represents an organizational model for connecting libraries into a national library information system with shared cataloguing, the COBIB shared bibliographic-catalogue database and local databases of participating libraries, the COLIB, library database, the CONOR authority database, and many other functions. The professional foundations and technological assumptions for the operation of the system are based on standardized and mutual processing of library materials and unified management of catalogues and bibliographies, appropriate training of professional workers for shared cataloguing, and computer and communication connectivity of libraries.

SHARED CATALOGUING enables a rational division of labour and time saving in the onerous procedure of cataloguing library materials and managing catalogues. Only one processing is required for each unit, after which the record in the COBIB shared bibliographic and cataloguing database is accessible to all participants in the system and in the COBISS.net network.

A close connection between local databases (catalogues) of individual libraries and the shared database (union catalogue) is a characteristic feature of shared cataloguing. In the process of shared cataloguing, data is entered into local databases with simultaneous updates to the COBIB shared database. In addition, indexing is carried out using search indexes for bibliographic and authority data, as well as holdings data. For creating records for serial titles, the international ISSN database is used as the authority database; from the ISSN database, the relevant data is downloaded into COBIB and local databases. It is also possible to download bibliographic records from the WorldCat database and the Library of Congress catalogue.

Databases contain bibliographic records for different types of library materials (monographs, serials, integrating resources, articles and other component parts) and for the purposes of managing bibliographies also records for performed works.

For the preparation of personal bibliographies of researchers within the COBISS system, a unified typology of documents/works must be used. The bibliographic units are classified in accordance with the aforementioned typology. The type of every bibliographic unit is specified (e.g. original scientific article, review article, professional article, scientific or professional monograph, scientific or professional conference contribution, etc.) according to the definitions in the prescribed typology.

In both, the COBIB shared bibliographic database and in the local databases of all participating libraries the structure of bibliographic records and that of summary holdings data is the same. The local databases additionally contain uniformly structured copy-specific holdings data, vital for the library local functions and for the display in the COBISS+ system.

To exchange data in the COBISS system, the COMARC/B format is used for bibliographic data, the COMARC/A format for authority data, and the COMARC/H format for holdings data. The first two formats are based on the UNIMARC format; the third was developed entirely by IZUM. For the international data exchange, the MARC 21 format is used. Possible are conversions from the COMARC format into the MARC 21 format and vice versa. Records can be exported in either the ISO 2709 structure (MARC 21, COMARC) or XML (Dublin Core, MODS, MARC 21, COMARC).

The self-developed information tool **COBISS+** kprovides libraries, their users and the general interested public with *unified online access* to the COBIB.SI shared bibliographic and cataloguing database (the shared catalogue of Slovenian libraries participating in the COBISS.SI system), local databases (library catalogues in the COBISS.SI system), other databases in the COBISS.SI system (specialised databases that are part of the COBISS.SI system) and other information resources (foreign and domestic specialised databases). COBISS+ is intended for all users who are looking for relevant information or material available in Slovenian libraries, including in electronic form, and is *freely accessible* to all users. In addition to search, there are also **MY LIBRARY** service options available, which are tied to an individual library. For library users with automated loan of material using COBISS software, COBISS+ also provides information on the availability of individual copies (whether the material is available or on loan, return deadline). Users can view their loan history, renew their loan period, reserve material, order material through interlibrary loan, check the current status of debts, settle outstanding debts online, and order electronic notification services.

A version of COBISS+ adapted for mobile devices is also available to users. It takes advantage of modern phones and tablets that run on Android, iOS or Windows.

The **COBISS LIB** application enables libraries to operate and manage library services efficiently. The application consists of the following software modules: Acquisitions, Serials and Electronic resources (include procedures for acquiring all types of library material and managing the balance of financial resources in funds), Holdings (enables comprehensive management of holdings data), Loan and Interlibrary loan (supports the entire automated library operation related to loan processes, member records, financial operations system etc.), Reports (enables the preparation of various types of reports, statistical reviews and data export for further processing) and Settings and administration (includes maintenance of data about the home library, partners and viewing user settings and server activities).

MOST READ BOOKS is a web application that allows preparing the list of most frequently borrowed items within a certain period of time (based on loan statistics of libraries with automated circulation).

LIBRARY ROYALTIES is a web application that allows the preparation of lists – loan statistics for library material by authors who are eligible to receive monetary library royalties based on the number of loans of their works (according to the criteria specified by the competent government body). In the COBISS.SI system, the *Rules on Implementing Library Royalties*, adopted by the Ministry of Culture, apply (lists have been prepared on the following bibliographic records from the COBIB.SI database, authority records for personal names from the CONOR.SI database, as well as archival data on loans in public libraries in a specific period).

The **SICRIS INFORMATION SYSTEM** contains the following entities: research organizations, research, programme and project groups, researchers and national research programmes and projects. Data is available for evaluating the success of research work according to various criteria and methodologies, as well as bibliographic performance indicators and other information that together represent Slovenia's research potential.

Web application **BIBLIOGRAPHIES** enables you to prepares multiple versions of reports for personal bibliographies from the COBISS system as well as from the SICRIS system based on entered bibliographic units of authors in the COBISS system. In the COBISS system you can prepare a report of personal bibliographies for any author or serial. In the SICRIS system you can prepare a personal or group bibliography, bibliography evaluated with the ARIS methodology, reports required for electing into academic titles at universities and citation reports (e.g. for research organisations, project groups etc.). By selecting input parameters you can create different reports.

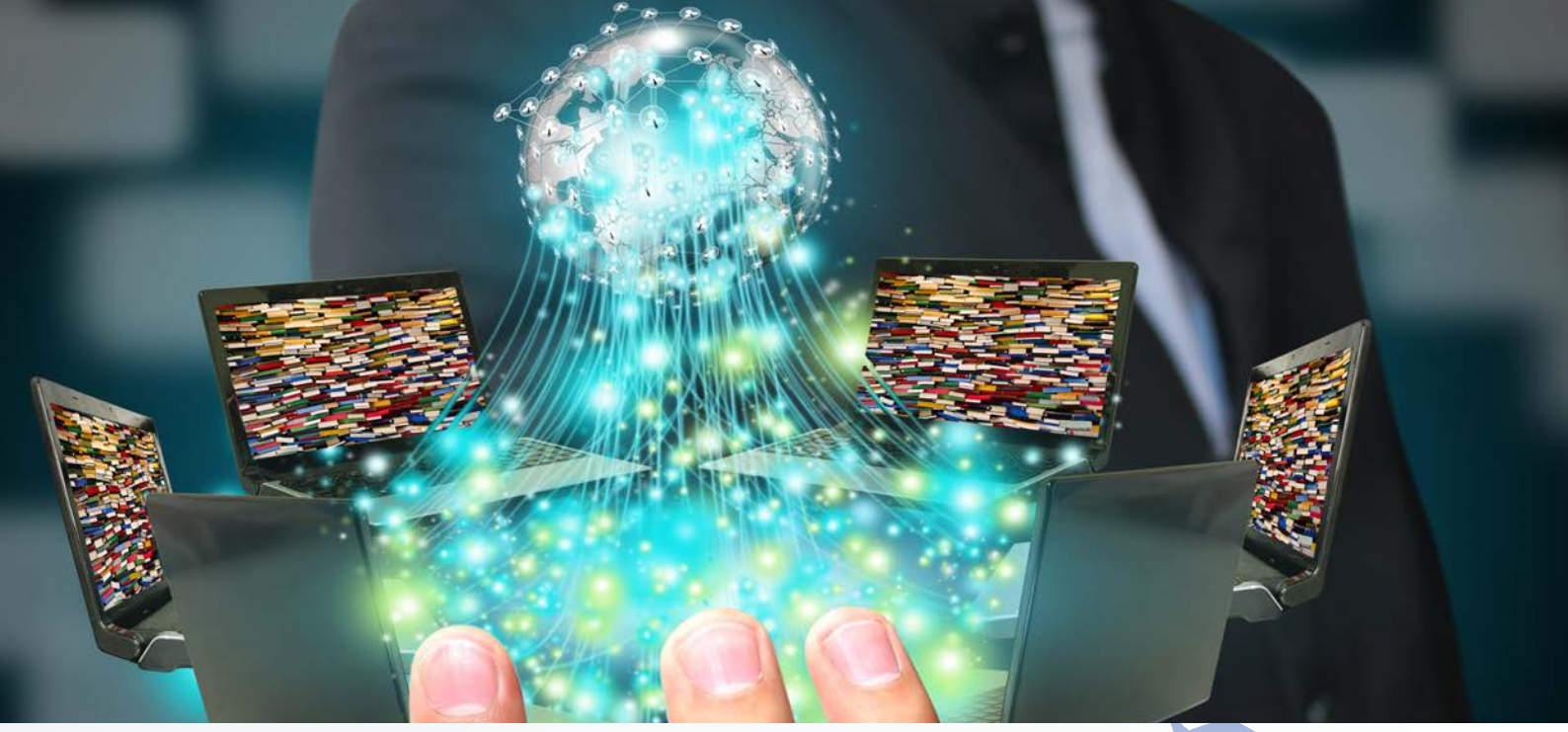
SERVERS Z39.50 and **SRW/SRU** allow users to access bibliographic databases in the COBISS system based on a specific agreement with the national COBISS centre (for accessing the COBIB shared database) or with the individual library (for accessing its local database).

THE LDAP SERVER enables libraries to authenticate library users when using their information services.

THE SIP2 SERVER enables the installation of devices that aid the lending process, i.e. self-checkout, answering machines and other devices that support SIP2 protocol.

When monitoring the success of the implementation of annual programme plans, IZUM uses more or less uniform general physical indicators that cover IZUM's activities in their entirety. In most cases, this is data on the use and users of information products and services, which is always the result of the operation of all organizational components of the institution: from research, development, implementation and maintenance to user assistance, user education and management. The role of libraries and other external factors should also be added to the list.

After more than three decades, we can say that COBISS and SICRIS are truly public goods in Slovenia. They are used by researchers, educational participants, professionals, authors, and library visitors.



COBISS.NET is a contemporarily designed information network acting in the countries of Southeastern Europe as a catalyst for the renewal of these societies and as an infrastructure for exchange of information on intellectual production and thereby also as a catalyst for inter-cultural dialogue in the region.

Given the population, the number of users outside Slovenia has not yet reached the scale and share we have in Slovenia. Since some countries have potentially very large library information communities (Serbia and Bulgaria), and the same applies to new areas that have joined in recent years (Albania and the Republika Srpska), the numbers will quickly reach millions, making COBISS one of the largest European library information systems.

IZUM's role in the region was also recognized **UNESCO**, which, at its 36th General Assembly in Paris in 2011, granted IZUM the status of UNESCO Regional Centre for Library Information Systems and Research Information Systems.

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IZUM

Informacijski servis slovenske znanosti, kulture in izobraževanja

EVALUATION OF THE STRATEGIC PLAN 2019-2024

This chapter briefly presents the strategic goals set out in the *Strategic Plan of the Institute of Information Science 2019–2024*.

For individual goals, the expected outcomes and effects achieved are described, and for those not achieved, the reasons are stated. We commented on the feasibility and effectiveness of the planned measures and provided a final assessment.

NEW GENERATION OF COBISS SOFTWARE

A fully online version of the COBISS3 application, called COBISS Lib, has been released. Among other things, it has improved the user experience with a newly designed main window, search window, and a completely new loan window called Card. The COBISS Lib application supports mobile devices, in a container, and is scalable. Endurance is guaranteed – if one instance (container) fails, a new container is automatically started.

We did not implement a multi-client model because the analysis showed that it would require too much development work and that it would significantly change the architecture of the existing system, which would not justify the added value. With the introduction of containers, the installation and upgrade process has been greatly simplified and automated.

Migration to CentOS Linux and later to AlmaLinux was performed. We migrated all data from Oracle to PostgreSQL.

The planned measures have proven to be very sensible. We were able to use the server logic almost 95%. By implementing our own UI generation framework, we managed to migrate almost 90% of the UI from the desktop to the web application. This was crucial and enabled us to develop the new COBISS Lib application in a very short time. We have changed the architecture of the application. The online part of the application does not run on virtual servers, but in containers (Docker Swarm). The migration from Oracle to PostgreSQL required very few code changes. We automated the processes, thereby significantly reducing the costs of system upgrades and maintenance. We have split the COBISS3 application into two microservices. These are the COBISS4 service, where the business logic runs, and COBISS Lib, which is a web application and communicates with the COBISS4 service, which in turn communicates with various other microservices (MARC Service, Authentication and Authorization Service, Libs, etc.).

The planned objectives were mostly achieved.

MOVING TOWARDS OPEN-SOURCE SOLUTIONS

We have migrated all services to open source solutions (CentOS or AlmaLinux, PostgreSQL, Elasticsearch, Apache Solr, Java, WildFly, Prometheus, Grafana, etc.). We have developed installation tools and fully automated all processes. We do not need any licensed software to operate the software.

The initial training for the CentOS (Red Hat) operating system and the PostgreSQL database was useful and saved us time.

The migration plan helped us carry them out without complications.

Supporting application and system tools helped us automate processes and manage the system.

The planned objectives were achieved in full.

NORMALISATION, STANDARDISATION AND GLOBALISATION OF CATALOGUING PROCESSES

Every year, we check the quality of randomly selected bibliographic records. We notice that the number of errors in them is decreasing on average. Data entry is more consistent, which is especially noticeable in applications where

accurate data is essential, e.g. an application for calculating library royalties – we receive fewer and fewer notifications from authors about missing data, and there are also fewer and fewer records that we have to edit before calculating royalties. We have introduced authority control of subject headings in the system with the COBISS General List of Subject Headings (SGC) and prepared training and instructions for using the catalogue. The SGC list has become by far the most widely used list in the system and the only one available as an authority database. Search and navigation through content are improving, but the issue remains of records created before the introduction of the list and records from libraries that have retained their old list to maintain uniform processing of their collection.

Training of cataloguers is essential for the quality of records. We offer less extensive courses online, which has increased their attendance. We have conducted the SGC usage course the most often, and we have noticed that its use is growing along with the number of courses conducted. We also use SGC at IZUM and add subject headings to records from the shared database, which is most noticeable in school library collections, for which we catalogue the material. We perform record checking and notify cataloguers of deficiencies in several ways. Informal phone calls to advise on improvements are very well received. We find that cataloguers later correct most of the errors we point out to them. Formal letters with a detailed report on the records reviewed serve primarily as a reminder that uniform rules must be followed in a shared system if the records are to meet the needs of all participating libraries. Validating records with software is very effective – older records from times when it did not exist yet contain significantly more inconsistencies than newer ones.

Data quality is increasing. The planned measures to achieve the expected results proved to be very well defined. New data is constantly being added to the system by new cataloguers, so activities to maintain and improve quality must be carried out in advance.

The planned objectives were achieved in full.

ACADEMIC DIGITAL COLLECTION AS A RELEVANT NATIONAL RESOURCE OF DATA FOR RESEARCHERS AND STUDENTS

The developed tool of the Academic Digital Collection of Slovenia (ADZ) enables Slovenian academic and research institutions to search for resources that are also accessible in full text. Previously, institutions had their own search tools that did not include all sources or were time-consuming for the user due to their technical limitations, and accessible resources were often overlooked. With ADZ, institutions have gained a simple and transparent content search engine that allows users to access all relevant global resources for academic research and academic learning. With ADZ, five discovery portals were developed, which are adapted in terms of content and graphics to the needs of individual universities and institutions. They have a unified process for searching, viewing and editing content, as is typical and familiar to users of the COBISS+ system. As a result, users find their way around resources more quickly, as the COBISS+ environment is familiar to them from previous levels of education and searching for general educational content stored and offered by Slovenian libraries. Today, ADZ provides a common point for simultaneous searching of all types of materials – both printed and electronic, as well as digital content from Slovenian and foreign repositories. The central index of electronic resources contains more than 5 billion records that Slovenian users can search. In addition to the included remote access management services and other search engine tools, users are also able to easily order material through interlibrary loan.

All planned measures have proven to be very important and essential for achieving results. Based on an analysis of the integration options of the participating test providers, financing for the purchase/lease of an appropriate information search (discovery) tool was secured after a successful public tender.

The planned objectives were largely achieved. Reading lists may not have fully taken off in the Slovenian academic environment yet, which is why they are not yet supported in the ADZ. In practice, it has been shown that it would make sense to combine the display of search results for electronic resources and the COBIB shared catalogue, which requires agreement and technical implementation with the discovery tool provider.

SUPPORT FOR OPEN ACCESS

The newly developed dCOBISS application (COBISS Digital Repository) and Slovenian institutional academic repositories enable the entry and storage of published publications that are funded by public funds and are accessible

to the general public. Perhaps the expected number of entries into repositories has not yet been achieved, which can be attributed to still unfinished processes in Slovenian libraries.

COBISS+ enables searching for open access content with links to full texts in repositories and public display of records, including open access data (license, embargo, projects, costs, payers, etc.).

It is possible to enter open access metadata into the COBISS system, including information on the costs that had to be paid to the publisher for open access (Article Processing Charge, APC)).

dCOBISS and Slovenian institutional academic repositories enable the entry of all relevant open access data. Given the requirements of open science monitoring, it will likely be necessary to support the acquisition of additional data and develop new functionalities.

Links to records in dCOBISS and Slovenian institutional academic repositories have been implemented in COBISS+ and Researchers' Bibliographies. These records also include the full texts of the material. dCOBISS supports the export of all relevant data on open access publications, but there is no support for research data.

dCOBISS supports the entry of open access publishing data and its export to Microsoft Excel. For the development of additional functionalities of open access analytics, requests from funders and other interested participants and designers of Slovenian open science monitoring are expected.

dCOBISS is compatible with OpenAIRE (Open Access Infrastructure for Research in Europe). In the future, integration with the European Open Science Cloud (EOSC EU Node) will be required.

The planned measures to achieve the expected results proved to be very well defined. With the development of the dCOBISS application, the goals of supporting open access publishing have been fully achieved. There is currently no support for entering research data, and given the needs of monitoring open science, additional functionality will likely need to be developed.

The planned objectives were achieved in full.

IZUM AS A SUPERCOMPUTER AND NATIONAL DATA CENTRE

The supercomputer contributed to increasing the scope and quality of research and development projects, the technological level of experimental research work rose, some existing research methods were updated, and new ones were created. This has strengthened innovation activity, improved the support environment for the economy, education and research, and has had positive effects on science. The number of scientific articles and researchers has increased, and broader development of personnel in the field of High Performance Computing (HPC) has been enabled. The supercomputer enabled the analysis and storage of massive amounts of data. The equipment's capabilities enabled multi-level and multi-criteria optimization of new products and services. All expected outcomes and impacts were achieved.

Ensuring the best possible working conditions and additional remuneration for key technical experts have proven to be very important and sensible measures in the area of difficulties in obtaining appropriate technical personnel with specific knowledge. The negotiations with the relevant ministries and other entities to manage financial costs after the project ends in 2020 were also successful and for this reason, all the more important.

The planned goals, such as strengthening national high-performance computing capacities, upgrading existing research infrastructure accessible under the principle of open access, as well as establishing hardware and service infrastructure for open research data, were fully achieved. The establishment of a data warehouse for the needs of the Slovenian research, innovation and economic space has been partially realized. This is a multi-year process that largely depends on the active participation, capabilities and needs of individual research communities. IZUM provides them with all the support they need and will continue to do so in the future.

EXPANDING AND TRANSFERRING KNOWLEDGE WITHIN THE COBISS.NET NETWORK

As part of the program to expand the COBISS.net network by including new libraries and increasing the use of COBISS system services, which is being carried out with the assistance of the COBISS.net Council, we carried out several activities that achieved the expected outcomes and effects. By optimizing the training system, we improved the process of acquiring the knowledge and licenses necessary to work in the COBISS system, which contributed to greater efficiency of libraries. By training local instructors to work

with COBISS software, we have significantly reduced the need for IZUM experts to conduct training. In addition, online courses and video content made it easier to transition to new software versions, which reduced potential problems when using the system. The training was also aimed at promoting formal education of librarians, which further improved the knowledge and competencies of employees.

We supported the integration of new COBISS services, which were not yet in use in some places. In order to ensure the quality and use of COBISS system services, we monitored the growth of records and holdings, as well as loan work, and then, based on these results, we helped and motivated libraries that needed it. We held several presentations of new features in the COBISS software and several webinars for libraries in all participating countries. In addition, we encouraged field visits to libraries with the aim of transferring knowledge and providing assistance. Promoting the use of digital repositories dCOBISS and E-CRIS systems has further contributed to the integration of various information sources. The inclusion of new libraries has increased the possibilities for information exchange and cooperation between libraries, which has strengthened the entire COBISS.net network. We achieved an important breakthrough in Albania, where we signed an agreement with the Academy of Sciences of Albania to establish a centre for the coordination and dissemination of scientific information. Thus, after more than ten years of COBISS presence in Albania, we have gained a formal partner who has taken on the role of the COBISS Centre in Albania.

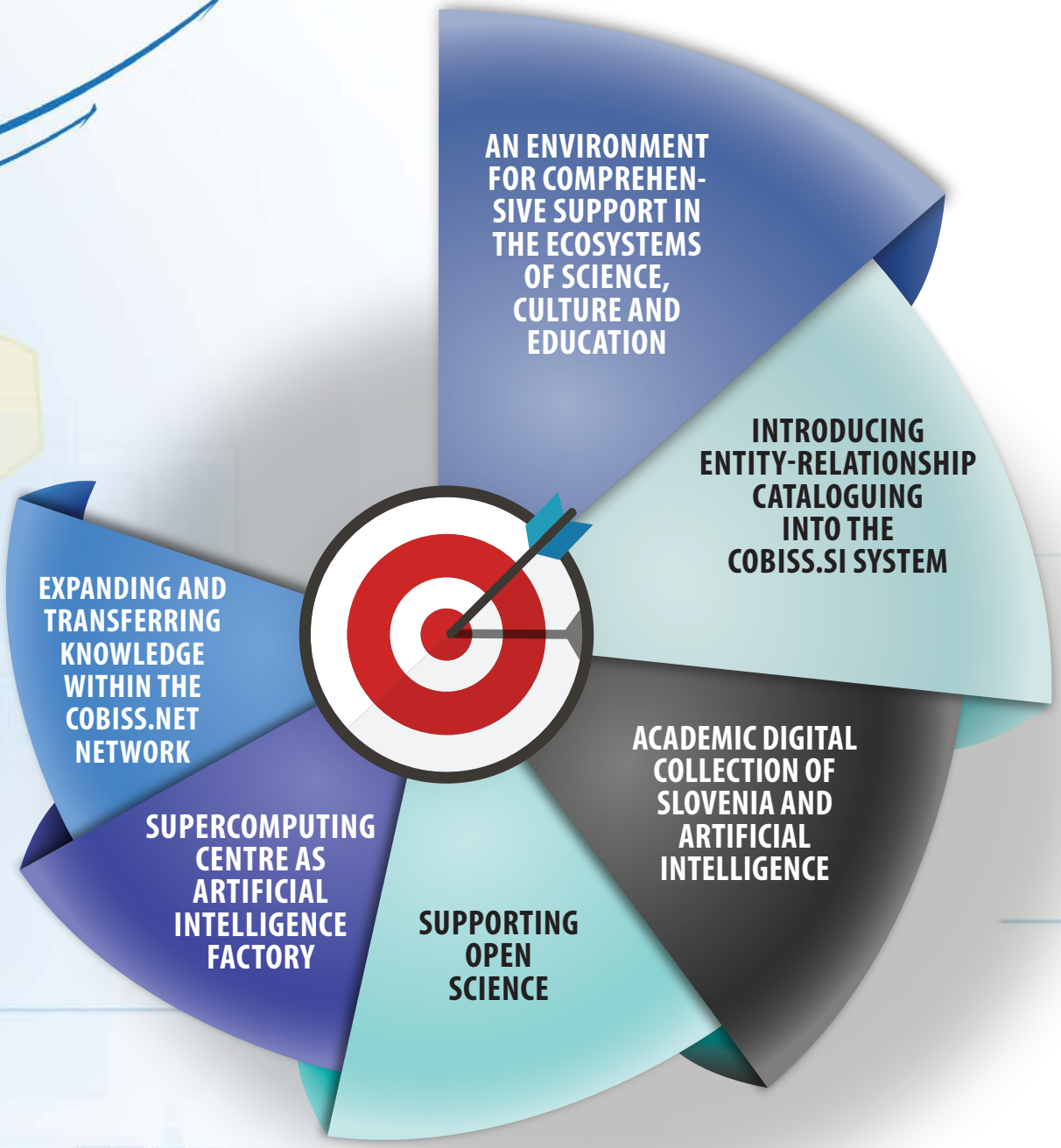
We also carried out activities necessary to integrate countries that do not yet use the COBISS system (e.g. Croatia, Turkey).

The effect in the form of an increase in the network of COBISS.net member countries (outside Slovenia) was successfully realized, as 168 new libraries were included from 2019 to 2024. Over the past five years, more than ten million bibliographic records have been entered into all local databases in the COBISS.net network, which represents a 25% increase in total. Also during this period, a 44% increase in the use of the COBISS/Loan software module can be observed, which is now used by 266 libraries in countries outside Slovenia. The number of bibliographic records exchanged between countries remains at the same level, around 60,000 annually. Apart from Slovenia, we are seeing an increase in the use of the E-CRIS system in two countries, while no noticeable increase can be detected in the remaining countries. There, the relevant ministries would need to be interested in this, which we have not yet succeeded in doing to a sufficient extent.

Promotional activities in the form of COBISS days, remote meetings, conferences and other events, where we promoted the use of the COBISS and E-CRIS systems, played an important role in increasing the interest of librarians and users of library services. The relevant ministries or embassies also showed interest in these events, joining in on the action or presenting the advantages of the E-CRIS and COBISS systems to them. Training local instructors in COBISS software has proven to be an effective measure. We did not detect any measures that did not have an impact on the integration of new libraries and the increase in the use of COBISS system services. In any case, the interest of the competent ministries in the target countries is of key importance for all measures.

The planned goals have been largely achieved. However, IZUM's mission in the countries participating in the COBISS.net network is closely linked to the cooperation and support of UNESCO. It focuses on multicultural cooperation and the flow of information on intellectual production in the South-Eastern European region; more specifically, it addresses specific problems related to the modernization of library systems in this region and ensuring the conditions for their integration into the global library network for access to international bibliographic databases, as well as for the integration of their own bibliographic information into these databases. IZUM unites libraries from different countries into a multinational, interconnected library information system and as such contributes to the development of the information society and to promoting access to information and knowledge, promotes the effective use of ICT in education, science and culture, and enables freedom of speech. In the countries of the South-Eastern Europe region, it is crucial to promote knowledge integration processes by creating development capacities and strengthening library information systems based on improved automation and integration of libraries and E-CRIS systems. We want to expand the COBISS.net network to a wider region, which we will try to achieve with an even more extensive and effective form of promotion in potential target countries.

STRATEGIC GOALS



1 AN ENVIRONMENT FOR COMPREHENSIVE SUPPORT IN THE ECOSYSTEMS OF SCIENCE, CULTURE AND EDUCATION

ANALYSIS OF THE CURRENT STATE

Individual components of the COBISS and SICRIS systems already have existential significance in individual operational, strategic and management activities in the fields of science, culture, and education. Today, it is quite clear that these three seemingly completely disjointed areas are in fact quite closely related and often intertwined. The most obvious example is the bibliographies of researchers; these are built on bibliographic records that are the result of the demanding professional work of specially trained library experts – cataloguers. This provides the basis for a wide variety of evaluations that the system automatically makes if it is an established or at least well-defined methodology. On the other hand, at the primary and secondary levels of formal education, school libraries are a link between the cultural and educational fields, as libraries make extensive use of COBISS functionalities, which are intended primarily for schools (teaching material, textbook collection, home reading, school-leaving examination material, etc.), and bibliographic data is generally contributed to the system by other libraries.

Until recently, users of individual dedicated tools of IZUM services had to be familiar with specific characteristics. We would like to unify the entire user environment to the point where similar instruments are used in a similar way.

OBJECTIVE DESCRIPTION

- *one-stop shop*;
- (almost) exclusively web applications that run in regular browsers (sometimes also as progressive web applications – PWA);
- functional unification of seemingly separate systems;
- integration with other systems and portals;
- improved user experience;
- more complete scalability, robustness and responsiveness.

WE WILL ACHIEVE THE GOAL

- by adapting the application architecture;
- by upgrading the software;
- by involving experts from user spheres into planning;
- with systemic analysis from an outside-the-box perspective;
- by following global trends.

EXPECTED RESULTS AND EFFECTS

- unifying access to all relevant information;
- interoperability;
- harmonization;
- responsibility for and trust in quality at the primary source;
- a single entry point for presenting Slovenia's development and social potential;
- internationalization.

INDICATORS

- results of the analysis of the cases handled in the internal claims management system;
- new user experience.

SPECIFIC RISK FACTORS AND MANAGEMENT MEASURES

Risk: Obstacles to constructive cooperation between key actors from substantively separate environments.
Measure: Active consultation, joint workshops and quality planning based on analyses.

Risk: Underestimating the impact and successes of artificial intelligence.
Measure: Up-to-date monitoring of global trends and additional intensive training.

Risk: Political influences in encouraging individual actions.
Measure: Awareness-raising, broad open discussions and timely announcements.

2 INTRODUCING ENTITY-RELATIONSHIP CATALOGUING INTO THE COBISS.SI SYSTEM

ANALYSIS OF THE CURRENT STATE

Due to the need for efficient description and access to information resources, greater usability of (meta)data, and the development of new technologies, cataloguing standards based on the entity-relationship model have been developed in the international environment in recent decades. With the stabilization of the IFLA Library Reference Model (LRM), the concept of entity-relationship cataloguing (ERC) began to be transferred to the implementation level. Thus, the National and University Library (NUK) has decided to prepare new cataloguing rules based on the Resource Description & Access (RDA) content standard. The new Slovenian cataloguing content standard is currently in the initial stages of preparation.

The content standard can be implemented through various scenarios. Analysis of trends and foreign systems shows that the implementation scenario of the new content standard is taking place gradually, most often with the scenario of bibliographic/authority data via the MARC format, which allows for easier transformation and connectivity with existing data or catalogue records. Certain functionalities are being introduced into software and tools for the purpose of linked data.

The COBISS.SI system has more than 6 million bibliographic records in the COBIB.SI shared database, which were created in different periods of cataloguing practice, and the data is used for various related systems, such as managing researchers' bibliographies, library royalties, etc. Therefore, it makes sense to initially introduce ERC into the COBISS.SI system via the COMARC format and continue building authority databases and establishing relationships between records. This strategic direction has its limitations and weaknesses, such as data redundancy. Once the development of international library standards at the implementation level (such as BIBFRAME) has become sufficiently established, a transition to the long-term goal, i.e. to a linked data environment, would follow.

The COBISS.SI system already has good foundations for introducing a new concept, such as the highly structured COMARC format, the CONOR and SGC authority databases and authority control, data exchange in various formats, experience with FRBRsation, etc. Nevertheless, the introduction of ERC brings a series of changes that will affect not only the development of a standardized metadata scheme (format) and software, but also the need to:

- define ERC concepts in relation to the content standard and the subject headings system;
- design the architecture and functional requirements of applications/products;
- determine methods of migration/transformation of existing databases;
- find solutions for connected systems and
- design support programmes for training system users.

The introduction of the new concept affects many aspects of the operation of the COBISS system, and therefore must be based on principles that take into account the specifics of the system, so that:

- the accuracy and quality of data/records that will be the result of the transition are ensured;
- the usefulness of data for libraries and their end users is increased;
- the interoperability and exchange of data are ensured;
- the continuity and usefulness of data in the wider ecosystem of the COBISS.SI system and the COBISS.net network are ensured;
- the work processes and activities of libraries are taken into account or have the least possible impact on them during the transition, while providing solutions that will increase the efficiency and quality of work, and
- the effective training of professional workers (cataloguers).

OBJECTIVE DESCRIPTION

In accordance with the analysis of the starting points for the formation of strategic directions, which was carried out in 2024, the introduction of the ERC into the COBISS.SI system will focus in the first phase on:

- supplementing the COMARC/B (format for bibliographic data) and COMARC/A (format for authority data) formats in accordance with the application profile of the data elements of the content standard. The development of the format will be based on the international UNIMARC standard, which already supports the structured description of entities with their attributes and relationships. The format is aligned with the ERC in such a way that some data elements are added, while other elements are supplemented or preserved in the existing form, which allows for the reuse of existing data. The format is also supplemented by the inclusion or mapping of code lists with vocabulary coding schemes. The development of the format must take into account the specifics of individual types of material, the needs of libraries and their users;
- preparation, creation and implementation of solutions for new sets of authority records for selected entities based on existing bibliographic and authority records. The COBISS+ FRBRsation project has shown greater limitations in software integration, so the creation of authority records will be prioritized for the entities work and expression;
- continuing the development of the concept of reciprocity and architecture in the COBISS.SI system in a direction that includes high-quality bibliographic and authority records in the COBIB.SI system. The new architectural design would support the requirement for greater up-to-dateness of records, and would thus enable system members to all have the same quality data and well-structured records, without the need for demanding manual editing/synchronization procedures at the local level of individual libraries. The new design would also enable flexible solutions for the specific needs of system members. The principle of data reuse would be upgraded, and the SGC could also be used when describing individual entities. In this regard, the existing situation will also need to be resolved. Solutions must be found for bibliographic records that are only in local databases or that are different in different local databases, missing relations between bibliographic and authority records, new authority records for agents who do not yet have them, and additional record enrichment and activities related to data quality should be carried out. Finally, there is the upgrade of existing records with new data elements;
- establishing a linked data service, which would enable greater accessibility to data outside library systems, increase interoperability and data exchange, and publish data in various formats and schemas;
- designing updates of the publicly available COBISS+ catalogue for end users, so that it will increase the informativeness of descriptions of information resources and enable the display of relations between them.

WE WILL ACHIEVE THE GOAL

- by analysing the COMARC format in relation to the application profile of the content standard and other formats for exchanging records/data, participating in working groups in preparing the application profile and coordinating dilemmas on an ongoing basis;
- by developing analytical tools, profiling and data quality metrics;
- by preparing tools for transforming, upgrading and enriching records and creating new authority records;
- by supplementing and implementing new methods in the cataloguing application;
- by training staff, presentations and cooperating and coordinating with the library community (conferences, focus and working groups);
- by monitoring and participating in the development of international standards in the field of cataloguing.

EXPECTED RESULTS AND EFFECTS

- a supplemented COMARC format that will enable the description of information resources by entities, their attributes and relationships, and the publication of updates in manuals and updates in the cataloguing application;
- updated concept of shared cataloguing and architectural design, which will enable more rational and efficient operation of the system with increased potential for data reuse of the COBIB.SI shared database;
- new sets of authority records and enriched existing records, which will increase the informativeness and accessibility of information resources;
- upgraded cataloguing application, which will have new software/architectural solutions implemented and will enable faster implementation of cataloguing procedures and editing of existing records;
- transformed and supplemented existing bibliographic records and established links with authority records;
- increased accessibility of data of the COBIB.SI shared database and increased informativeness and accessibility to information resources for end users.

INDICATORS

- supplemented COMARC format for bibliographic and authority data;
- created authority records for works and forms of expression;
- number of newly linked bibliographic records with authority records and number of resolved records that are only in local databases and records that have different versions in local databases;
- updated software, applications for cataloguing and information resource management and the publicly accessible COBISS+ catalogue.

SPECIFIC RISK FACTORS AND MANAGEMENT MEASURES

Risk: Time delay of projects if the content standard (cataloguing rules) is not prepared in accordance with the planned timeline.
Measure: Active cooperation between various stakeholders and orientation towards projects focused on resolving old records.

Risk: Implementation limitations due to requirements of connected systems, e.g. bibliography management, library royalties, etc.
Measure: Active cooperation and search for appropriate solutions between various stakeholders.

Risk: Redundancy of some data elements due to connectivity with the previous record structure and transformation and upgrade of records.
Measure: Software solutions for streamlining the description processes of information resources in a cataloguing application.

Risk: Low-quality data in old records for transformation and limited data for resolving records in local databases when introducing a new architectural design.
Measure: Access to old data/records and the possibility of records that were created before the introduction of the ERC coexisting in the mutual database.

Risk: Unwillingness of COBISS.SI system members to cooperate in introducing the ERC concept.
Measure: Active cooperation between various stakeholders.

Risk: Technology-related software/application limitations when implementing individual solutions.
Measure: Finding alternative or working solutions, providing professional assistance to system users, etc.

3 ACADEMIC DIGITAL COLLECTION OF SLOVENIA AND ARTIFICIAL INTELLIGENCE

ANALYSIS OF THE CURRENT STATE

In 2020, IZUM, together with consortium libraries, established a unified search platform for searching and accessing full texts of electronic information resources for Slovenian users under the common name Academic Digital Collection of Slovenia (ADZ). The COBISS+ platform enables searching for subscribed and open access electronic resources, digital content stored in Slovenian digital repositories, and printed materials offered by Slovenian libraries to their users.

Five new (discovery) portals have been established, which are graphically and functionally adapted to the needs of individual academic institutions: The Digital Library of the University of Ljubljana (DiKUL), the National and University Library portal – mEga search engine, the University of Maribor search engine – UM:NIK and the Digital Portal of the University of Primorska – Digital : UP. The fifth ADZ portal includes a union of information from the aforementioned four portals and additionally information from other Slovenian academic and research institutions.

All five portals offer the ability to search and access content that is available to Slovenian researchers and students, including all the functionalities that are typical of such tools at universities around the world. The search engine allows you to search through more than 5 billion records of various types of material from thousands of global publishers, aggregators, and repositories.

New technological advances, based on the results of artificial intelligence, bring new challenges and enable the development of new functionalities that will help users search for and access content and acquire new knowledge.

OBJECTIVE DESCRIPTION

Students and researchers are now adept at search engines that offer conversational information discovery by "chatting" with the search engine in natural language. The questions asked and the continuous improvement of the search engine's generated answers improve the user experience in achieving the set goals. Traditional methods of searching through library catalogues, which are based on the principles of keyword searching and the use of Boolean operators, can represent a significant limitation in their use, especially among younger generations.

New generative tools, based on the achievements of artificial intelligence, enable new approaches in the field of information discovery. They help researchers and students find key content faster, enable them to tackle complex research tasks, and prepare visualizations of connections. This type of search engine assistance with chat, combined with a quality knowledge base of relevant and trustworthy information sources, offers the user a deeper and richer research and learning experience.

The most important functionalities that are being developed and enabled by artificial intelligence can be summarized in a few points:

- adaptive semantic content search through natural language conversation (chat) with the search engine;
- generated summaries of search engine content with included reference literature and links to full texts;
- more accurate recommendation services and guidance for selecting accessible content and preparing recommended reading lists;
- data visualization that illuminates research or learning material from different perspectives.

The future seems brighter in the context of resource discovery using artificial intelligence, as it simplifies the often quite complex content search processes. We want to offer this kind of experience and search engine assistance to Slovenian users within the framework of ADZ.

EXPECTED RESULTS AND EFFECTS

- intuitive conversational search for resources in natural language (also in Slovenian);
- easier, faster and more accurate discovery of new trustworthy sources that researchers and students need in the research and learning process;
- generated content summaries with included reference sources as added value for the search engine;
- improved recommendation services for literature selection and preparation of learning lists.

INDICATORS

- direct financial effects;
- number of accessible resources;
- increased use of library services, where the credibility of materials is significantly higher compared to free online searches.

WE WILL ACHIEVE THE GOAL

- with continued maintenance and development of new ADZ functionalities;
- by integrating artificial intelligence functionality into COBISS+ academic portals (ADZ);
- by providing financing for the purchase of a tool for integration into COBISS+ via API (Application Programming Interface).

SPECIFIC RISK FACTORS AND MANAGEMENT MEASURES

Risk: The inclusion of artificial intelligence assistance is currently still in development at the discovery tool provider. Integration into ADZ is planned for 2025, but it also depends on the developed functionalities and technical support of the provider.
Measure: Actively monitor the development of artificial intelligence functionality and negotiate with the discovery tool provider.

4 SUPPORTING OPEN SCIENCE

ANALYSIS OF THE CURRENT STATE

Slovenia is included in the European Research Area (ERA) and accepts the provisions of the Council of the European Union's decisions regarding open science. These decisions mainly discuss immediate open access to research results, evaluation of research work, and citizen involvement in research. Slovenian legislation is consistent with the provisions of the ERA and, in particular, with the Scientific Research and Innovation Act and the Regulation on the Implementation of Scientific Research Work, which represent the legal framework for fulfilling the provisions. The Open Science Action Plan clearly defines implementation tasks and measures.

An important part of supporting open science is the infrastructure of repositories. There are currently several institutional and sectoral repositories in Slovenia. dCOBISS is synchronized with most of these repositories and is an aggregator of content from Slovenian researchers who have published their work in open access. With the ability to enter open access data, including funds spent (APC), ADZ represents the basis for a relevant analytical tool for Slovenian researchers' open access publishing. Open access data is also regularly uploaded to the international OpenAIRE platform.

ADZ provides a common point of search and access to relevant resources (discovery) for research and study work. It includes resources that academic research institutions commission for their users, as well as open access resources that expand their share in the total volume of publishing in the world. The COBISS+ application also allows users to freely search and access material in the international open-access full-text database Unpaywall.

OBJECTIVE DESCRIPTION

IZUM's task, in cooperation with MVZI, ARIS, the Academic and Research Network of Slovenia (ARNES), universities and research institutes, is to establish all necessary activities for the implementation of open science at the national level, which are written in the Action Plan for Open Science.

It is necessary to maintain and preserve the existing support infrastructure needed by open science, as well as to upgrade and establish new functionalities, especially in the area of connecting metadata of research data and other research results stored in institutional repositories with the COBISS and SICRIS systems. It is also essential to connect with existing and new emerging international associations, such as the European Open Science Cloud (EOSC).

In the area of searching and providing access to the full texts of open access publications and other research results, further development is needed towards a common ADZ search platform, which allows researchers easy and fast access to global knowledge.

WE WILL ACHIEVE THE GOAL

- by developing, maintaining and operating a national open science infrastructure;
- with the operation of dCOBISS in accordance with international recommendations, standards and ARIS requirements regarding compliance with open publishing provisions;
- by upgrading bibliographic records in the COBISS system with metadata about digital objects in accordance with standards that enable FAIR metadata description of digital objects;
- by establishing the Slovenian open science monitor;
- by adapting the evaluation of research work in accordance with the principles of open science;
- by upgrading the work of the Central specialised information centres for research activity (OSIC) in managing researchers' research records in the COBISS.SI system, taking into account the diversity of research results (in addition to publications, also research data, software, and other);
- by developing new functionalities for searching and accessing open access full texts with the help of new technological solutions offered by artificial intelligence.

EXPECTED RESULTS AND EFFECTS

- all published publications by Slovenian researchers and other research results funded by public funds are stored in institutional repositories and accessible to the general public through a common search platform with all relevant open access data;
- the monitoring will quantitatively demonstrate Slovenia's performance in the area of open access to research publications, data, purpose-developed research software and other relevant digital objects;
- updated document typologies for bibliographic management in the COBISS system for all types of digital objects, including the use of the ORCID (Open Researcher and Contributor Identifier) as an important identifier of authorship in connecting with international services;
- new functionalities in the dCOBISS application that will meet the needs and requirements of research project funders, including supporting analytical tools;
- involvement in international associations for a wider impact of the results of Slovenian researchers and easier access to knowledge and connections with foreign research institutions;
- AI-powered solutions to help researchers find materials to solve complex research problems.

INDICATORS

- the proportion of published publications, research data and other research results that are publicly funded and accessible to the public;
- number of open access content in the COBISS+ search engine.

SPECIFIC RISK FACTORS AND MANAGEMENT MEASURES

Risk: The development of new functionalities and tasks will be based on the requirements of funders and other open science participants. There may be delays in this negotiation.
Measure: Active negotiation and quality analysis.

Risk: Publisher policies change and as a result, some open access monitoring indicators may become unnecessary or change.
Measure: Closely monitoring the activities and policies of publishing companies.

5 SUPERCOMPUTING CENTRE AS ARTIFICIAL INTELLIGENCE FACTORY

ANALYSIS OF THE CURRENT STATE

In April 2021, IZUM set up HPC Vega, the most powerful supercomputer in Slovenia, as part of the project "Upgrading National Research Infrastructures – HPC RIVR" with additional financial input from the EuroHPC JU (The European High Performance Computing Joint Undertaking), established by the European Commission. HPC Vega, as the first production system in the EuroHPC JU initiative, has placed Slovenia in a privileged position in the European space. In its three years of operation, it has hosted more than 300 projects, half of which were submitted by scientific and research groups and companies from Europe. HPC Vega is constantly utilized to its maximum potential. Among the largest users of HPC Vega are research groups from all Slovenian universities and major research institutes, as well as a few commercial customers from the economy, both foreign and domestic companies.

The acquisition of HPC Vega supported new areas of research and development of supercomputing services that require a combination of extreme computing capabilities, big data, distributed network computing, and open scientific repositories. This enabled support for state-of-the-art methods in the field of life sciences and genomics with appropriate support for the protection and permanent storage of data in the context of medical research and diagnostics, which is key to promoting highly successful activities in Slovenia in the field of modelling cellular processes, such as aging, degenerative diseases, processes of cancer metastasis with early stages of drug development, and diagnostics and development of targeted therapies for personalized medicine. Such research infrastructure also enables accelerated development and research in the field of fundamental sciences, such as quantum and high-energy physics, astronomy, the development of new materials, biochemistry and bioinformatics.

Recently, advanced machine modelling and analytics methods and big data mining methods have been introduced in all key research areas, especially the use of machine and deep learning and artificial intelligence, which is also present in the field of language technologies and is also manifested in image recognition with computer vision, which is particularly important for diagnostics in healthcare. Many supercomputing applications developed in academia, especially from engineering disciplines such as fluid dynamics, have long been used in business, especially in specialized small and medium-sized enterprises.

The supercomputing infrastructure has enabled Slovenian researchers to be more competitive both in independent applications for internationally funded projects and in access to collaboration with research groups and consortia abroad. At the same time, new opportunities have enabled interdisciplinary projects and even closer international cooperation, which has not only greatly encouraged involvement in project work and research activities, but also increased the need for new capacities.

OBJECTIVE DESCRIPTION

The needs of Slovenian scientists and other users have grown significantly in the last three years with the use of HPC Vega and include a wide range of applications that have become achievable with the powerful supercomputer. Therefore, they continue to expect such a powerful and efficient research infrastructure, which is essential for their everyday research and development work.

The development and use of artificial intelligence are priorities for the EU, as artificial intelligence is predicted to play a key role in the digital transformation of the economy, the public sector and society in general. Some of the technologies used in the field of artificial intelligence have been around for over 50 years, but in recent years, advances in computer capacity, access to huge amounts of data, and the development of new algorithms have led to major breakthroughs. From the perspective of maintaining competitiveness and security, it is becoming crucial for the EU to support the development of trustworthy artificial intelligence in both the scientific research ecosystem and the economy.

The success and recognition that HPC Vega has achieved gives Slovenian researchers, and thus also funders, the impetus to ensure continuity in the field of supercomputing by implementing a new supercomputer at a time when HPC Vega will be gradually withdrawn from operation due to obsolescence. At the same time, the need to establish a comprehensive HPC centre that will support a multitude of key services for the development and use of artificial intelligence has been expressed. Such a centre should contain the so-called Artificial Intelligence Factory, as the desire is to strengthen Europe's leading position in the field of trustworthy artificial intelligence by adapting supercomputers to the needs of artificial intelligence and making them accessible to start-ups and other small and medium-sized enterprises.

The Artificial Intelligence Factory, as envisioned by the European Commission, includes a supercomputer with a system architecture tailored to the needs of AI projects, as well as services to support these projects and AI users with competence development and user support. The Artificial Intelligence Factory will include entities that will provide infrastructure for supercomputing services with artificial intelligence, which will involve not only building new models, but also developing the discipline and interdisciplinary and applied work.

The goals of the supercomputing centre in conjunction with the Artificial Intelligence Factory are:

- establishing conditions in the national priority area of HPC and artificial intelligence with a multi-purpose regional supercomputing centre, which will place Slovenia at the very top of supercomputing capabilities and artificial intelligence development, and thus strengthening national high-performance computing capacities with strong support for artificial intelligence;
- promoting cooperation in the EuroHPC JU and other international projects and infrastructures by fostering connections with international research organizations and continuing numerous existing bilateral and project collaborations with centres of excellence and national competence centres in the region (especially in Austria and Italy) and in Central and Northern Europe;
- strengthening connections between national research organizations and establishing a key part of the ecosystem to attract international experts from the region;
- stimulating the interest of development departments in the economy, small and medium-sized enterprises and especially in innovative start-ups in the field of artificial intelligence for learning their models;
- establishing a system of broad access to services and data, which will enable broad access to the results of research work and the use of trained artificial intelligence models, thereby enabling the rapid and efficient transfer of acquired knowledge to the economy, the public sector and society;
- integration with data warehouses for the needs of the Slovenian research and innovation space and data warehouses in Europe, and continuity in providing hardware and service infrastructure for open research data.

WE WILL ACHIEVE THE GOAL

- by providing support in applying for European projects;
- by constructively collaborating in the construction of a new data centre to host the new HPC Vega 2 supercomputer – the Artificial Intelligence Factory, adapted to support artificial intelligence services;
- with the procurement, implementation, management and maintenance of HPC Vega 2;
- with accelerated cooperation within the Slovenian National Supercomputing Network – SLING for the development of Artificial Intelligence Factory services;
- by ensuring stable funding for professional and scientific research staff;
- by covering the ongoing operating costs of HPC Vega (until decommissioning) and HPC Vega 2;
- by providing the necessary communications infrastructure in Slovenia and connections with abroad.

It is strategically important to ensure stable operation and development of new services in the field of supercomputing and artificial intelligence to achieve long-term goals.

EXPECTED RESULTS AND EFFECTS

- continuity in the field of HPC will contribute to increasing the scope and maintaining the quality of research and development projects, which require increased computing capacity and system architecture adapted to artificial intelligence for their implementation;
- the supercomputer with the Artificial Intelligence Factory will significantly contribute to the broader development of personnel in the field of HPC and artificial intelligence technologies, as it will ensure wide accessibility for education and training purposes;
- the equipment's capacity will enable multi-level and multi-criteria optimization of new materials, products and, above all, services in the digital environment, which will indirectly be reflected in Slovenia's increased competitiveness on international markets;
- enabled analysis of mass data in various data warehouses and storage of large amounts of digital data (Open Science Data);
- raising the technological level of experimental research work, increasing the development of artificial intelligence models;
- some existing research methods will be updated; new methods will be introduced that will have a positive impact on raising the quality of scientific research achievements and improving the support environment for the economy, education and research; thus, they will contribute to a more competitive economy;
- strengthening innovation capacity through new technologies and innovation;
- increased research and development activities in various fields by individual actors, who will conduct their research using the HPC research infrastructure, which will be further adapted to artificial intelligence projects and accessible according to the principle of open research infrastructure; this will improve the possibilities for the work of various research organizations;
- increased number of scientific articles and professional publications, including in the field of machine and deep learning and artificial intelligence;
- increased number of new researchers;
- improved educational level of the population;
- improved conditions for research activities;
- positive impact on science and the economy.

INDICATORS

- number of users and projects;
- number of supported AI applications and/or models;
- number of experts in the field of HPC and artificial intelligence;
- use and utilization of computer capacities.

SPECIFIC RISK FACTORS AND MANAGEMENT MEASURES

Risk: Funding of the HPC Vega 2 – Artificial Intelligence Factory project by EuroHPC JU and Slovenia, non-selection in the call or funds already spent.
Measure: The earliest possible, high-quality application for the call for interested parties.

Risk: Assuming responsibility for undelivered services due to the inability to influence the remaining organizations in the SLING consortium, which will bear key responsibilities in providing Artificial Intelligence Factory services.
Measure: Negotiating with the Ministry of Higher Education, Science and Innovation, the Ministry of Digital Transformation and other Slovenian organizations to obtain solid assurances of constructive and transparent cooperation.

Risk: Difficulty in obtaining adequate technical and research staff in multiple scientific fields to support AI services, as both involve very specific knowledge.
Measure: Ensuring the best possible working conditions and remuneration for key technical experts as well as researchers in the field of artificial intelligence.

6 EXPANDING AND TRANSFERRING KNOWLEDGE WITHIN THE COBISS.NET NETWORK

ANALYSIS OF THE CURRENT STATE

COBISS.net is a contemporarily designed information network acting in the countries of Southeastern Europe as an infrastructure for exchange of information on intellectual production and thereby also as a catalyst for inter-cultural dialogue in the region.

COBISS.net is a network of interconnected library information systems COBISS.XX and E-CRIS.XX, designed according to the Slovenian model (Slovenian SICRIS is called ECRIS.XX abroad). Besides Slovenia, the following countries participate in the system: Serbia, Bosnia and Herzegovina (within which Republika Srpska acts as a stand-alone entity), Montenegro, North Macedonia, Bulgaria, Albania, and Kosovo.

The basis for the content and technological development of the COBISS.net network is the knowledge acquired by IZUM within the Slovene systems COBISS.SI and SICRIS. IZUM's first and foremost objective is to constantly improve the COBISS and SICRIS systems so that they can serve the Slovene users: librarians, library users, and researchers. This knowledge is transferred into the COBISS.net network in a way that a verified organization model is also used in the participating countries along with the software solutions. Within the network, the COBISS.XX systems are connected through shared catalogues of individual countries. Each country in the network, including Slovenia, has the option to download bibliographic records from a shared catalogue of any other countries.

A very high level of quality of COBISS and SICRIS services has been achieved in Slovenia. While the achieved state in Slovenia requires constant improvements of the mentioned information systems (which is IZUM's main mission), the organizational model of the target countries in Southeastern Europe is falling considerably behind.

We are expecting that even more similar synergies in the area of close cooperation of the research activity systems will emerge in the network during its development (e.g. in the scope of transfer of data on projects, where researchers from different countries in the network would take part in the same project).

OBJECTIVE DESCRIPTION

Activating the development potential of a region, regardless of the institution, is always closely linked to developing human potential and coexistence in linguistic and cultural diversity. Integration into COBISS.net, in light of the EU's development orientation, can contribute to the homogenization and harmonization of bibliographic systems, regardless of the very different status of countries in the target geographical area regarding EU membership or accession. This type of synchronisation is definitely a long-term benefit because it uses mechanisms of exchange and transparency to consolidate the geopolitical space in the area of knowledge, science, and culture.

COBISS represents an organizational model for connecting libraries into a library information system with shared cataloguing, union bibliographic/catalogue database COBIB, and local databases of participating libraries, as well as many other functions of the so-called virtual library.

Functioning of the system is preconditioned by the following professional outlines and technological assumptions:

- standardized and shared processing of library material and a unified management of catalogues,
- appropriate training of professionals for cross-cataloguing and
- connection of libraries through computers and communications.

We want to connect all research organizations and higher education, special, general and school libraries in target countries to the COBISS.net network, while also establishing compatible systems for evaluating research activities. This will drastically decrease the setback of the local environment development opportunities in these countries compared to Slovenia's achievements and allow them to come a lot closer to the level available to the users in Slovenia.

WE WILL ACHIEVE THE GOAL

- with appropriate financial instruments for the most affordable and stable network expansion;
- by providing support to the COBISS National Centres in each member of the network;
- by providing appropriate training for the COBISS system in target countries;
- by including as many libraries as possible in all segments of COBISS;
- by promoting the widest possible use of E-CRIS.XX systems in combination with COBISS.XX;
- by assisting in equipping individual libraries and National COBISS Centres;
- by implementing the management of researchers' bibliographies;
- by promoting formal education for librarians;
- by motivating the competent ministries in target countries to adopt the concept of national systems connected in COBISS.net;
- by conducting online courses (webinars) and preparing video content for additional help and easier transition to new software;
- by introducing new functionalities of the COBISS system;
- by training (local) instructors for COBISS applications;
- with conversions of local databases (catalogues) from other systems;
- by creating and uploading bibliographic records for researchers' bibliographies;
- by planning, coordinating, advising and promoting activities, holding conferences and professional meetings with the aim of presenting innovations and promoting the use of COBISS services;
- by monitoring and promoting the work of libraries.

EXPECTED RESULTS AND EFFECTS

- the largest possible network of COBISS.net member states with positive synergies through the simultaneous use of E-CRIS.XX systems;
- the largest possible number of shared bibliographic records between countries;
- active role in managing group activities in the network with the help of the COBISS.net Council.

INDICATORS

- measurement of quantitative and qualitative usage of the COBISS and E-CRIS systems in the COBISS.net network (number of libraries and use of individual modules in member countries);
- common troubleshooting in library information systems.

SPECIFIC RISK FACTORS AND MANAGEMENT MEASURES

Risk: Dislike of certain circles in target countries.
Measure: Improving the functionalities of the COBISS and E-CRIS systems and the best possible adaptation to the local requirements.

RISK FACTORS

The ISO 31000 standard defines the concept of risk management as the coordination of all activities to direct and control an organization in relation to risk. This is an important process, but unfortunately also a complicated one. There are several methodological approaches. When selecting a methodology, we follow the principle that a systematic treatment of risk factors must be ensured and their gradual evaluation must be enabled in a verifiable and repeatable manner. For a cycle that covers the entire treatment, we follow a combination of known recommendations; the basis is based on the diagram below.

Common risk factors are divided into time, financial, human resources, legal-organizational, technological, security, legislative and business components.

TEMPORAL COMPONENT

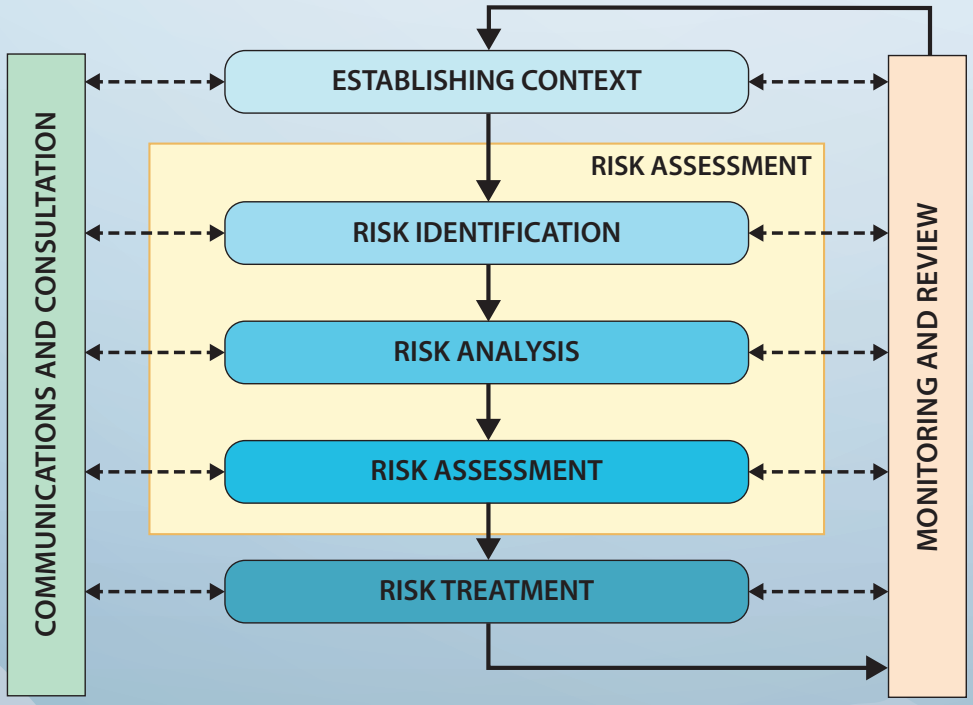
The outlined strategic objectives are achievable within the set timeframe, but their realization is strongly interdependent on other factors over which IZUM does not have a decisive influence.

Measures: Alerting outside subjects to the consequences and insisting that they also take a part of the responsibility.

FINANCIAL COMPONENT

The failure to secure or even partial shortages of planned financial resources certainly seriously threaten the planned strategic objectives. Some objectives require additional investments.

Measures: Quality preparation of financial plans, internal control instruments, warning external entities of the consequences and insisting that they take on some of the responsibility.



Adapted from: *Risk Management Strategy*. Northern Grampians Shire Council, 2019

PERSONNEL COMPONENT

This factor is present in all planned strategic objectives. For many years, we have been facing difficulties in recruiting suitable experts and retaining them in employment, as the proximity of the state border with the Republic of Austria, the boom in ICT employment, and uninspiring pay make it a very difficult task. The problem is, we need experienced top experts, who could help shape beginners at the personal as well as the professional level.

Measures: Creating the best possible working conditions, establishing a suitable rewards system and active participation in education processes at universities.

SECURITY COMPONENT

Cybersecurity brings a host of challenges at all levels – physical, network, system, application, and organizational. The current state of cyber and information security at IZUM is good, but it can never be perfect. The consequences of incidents can be catastrophic for both IZUM and the users of its services.

Measures: Review of overarching and sectoral security policies, compliance with the Cybersecurity Directive (Directive (EU) 2022/2555 – NIS2), education, internal standards.

LEGAL AND ORGANIZATIONAL COMPONENT

IZUM depends on the current state of the public sector, where partial requests from ministries, agencies, government offices, and other public and state offices can arise. On multiple occasions we witnessed ideas on changing IZUM's status or even direct attempts of changing IZUM's status, mission, and placement in Slovene public sphere.

Measures: Raising awareness and regular notifications to all stakeholders and external subjects on the issues and identified "grey areas" that can endanger the place and the status of IZUM because of lack of knowledge or because of recklessness.

LEGISLATIVE COMPONENT

When preparing specific acts IZUM is mostly not invited to participate. As a consequence, legally binding documents can be adopted that can threaten the successful operation of IZUM and ensuring its mission. On the other hand, we also occasionally face delays in adopting binding successive and/or implementing regulations.

Measures: Raising awareness and keeping external entities informed, which should be involved in the preparation of such documents.

TECHNOLOGICAL COMPONENT

IZUM is not a software factory that places its products on the market and, after a successful market launch, can easily move on to the next products. IZUM must constantly complement and upgrade its software solutions. The stability of invisible platform users (system and hardware) is a looming threat, as we regularly witness the extinction of certain once optimistically conceived technological environments.

Measures: A quality analysis of global trends and predicting them in time.

BUSINESS COMPONENT

Risks connected to the cooperation with third parties are closely related to financial risks. IZUM is also expected to enter into long-term agreements, which sometimes conflicts with our public procurement frameworks, and as a result, costs can be disproportionately higher.

Measures: Careful planning.

IMPLEMENTATION CRITERIA

The main theme of the described strategic objectives is the satisfaction of the end users of IZUM's services. We cannot measure this directly, as it is a very complex activity that is difficult to capture in simple physical indicators. COBISS and SICRIS are used by researchers, educational participants, professionals, authors, creators and library visitors.

An important element for assessing the effectiveness of realized strategic objectives can also be the economy of time. The added value as well as the costs saved are expressed in a better usage of time of all the people using our services. Considering that IZUM's services mostly support the most expensive professional work, frugality is that much more present. We can assess it in multiple areas:

- in libraries based on the number of downloaded bibliographic records and useful tips on information resources;
- in research organizations through relevant references on discussed issues;
- in schools with fast access to the most suitable resources of knowledge;
- in various processes of making decisions based on a comprehensive information on similar conditions in other environments;
- when representing Slovenia as a culturally developed and progressive country through the global availability of our bibliographic databases.

We have made a conscious decision not to define any specific milestones, but we have listed indicators in individual strategic objectives based on which we will monitor the success of the realisation of set strategic objectives. On this basis and supported with the outcomes of in-depth analyses of individual results, we could update or change this document eventually.

Even though we are only interested in success in the bottom line, some quantifiable results can be very helpful. Aside from specific measurements, which depend on the environment of the individual strategic objectives (e.g. number or the trend of some indicators), indirect financial effects, use of various resources and means, as well as measurable consequences of individual actions also undoubtedly represent a very important and provable aspect.

RECOMMENDATION: All mentioned indicators and other quantifiable results are regularly monitored in the annual reports.

IMPLEMENTATION PROCESS

JURISDICTIONS AND RESPONSIBILITIES

We see IZUM as a very important instrument in intensifying the construction of an information and digital society, or a modern knowledge society. The key characteristic should be synergy. Here at IZUM, we strongly reject any ideas of shifting individual responsibilities to third parties and we insist on dividing the jurisdictions and responsibilities among multiple stakeholders. Besides IZUM, this includes the following entities:

- competent ministry (of science),
- ministry of culture,
- ministry of education,
- the ministry of digital transformation,
- ministry of foreign affairs,
- ministry of cohesion and regional development,
- Slovenian Research and Innovation Agency,
- National Council for Library Services,
- Slovenian Library Association,
- National and University Library,
- Public Library Association,
- Slovenian Rectors Conference,
- Slovene universities and public research institutions,
- COBISS.net Council.

LIFE CYCLE

Most similar documents place its strategy in the centre of the development and life cycle. IZUM has a different view. Instead of thought-out, nicely-worded documents, real-life situation takes the centre stage. The mission, which is based on precisely defined frameworks, has been mentioned several times. That is why IZUM prioritizes production care, in other words: maintenance and management of key information systems. The two fundamental supporting pillars in this are standard development (new features, new functionalities, community requests, etc.) on the one hand, and new challenges with upcoming opportunities and visions on the other. The life cycle designed in this way is influenced by numerous internal and external factors, such as professional and lay users, the pulse of the user community, modelling oneself after similar successful systems, global development and technological trends, etc. Strategic plans (also popularly called "strategies", "development policies", "white papers", etc.) are therefore just one of the instruments available. **THE FINAL EFFECT IS IMPORTANT**. We must be aware that this circle of life is a story that never ends.

Conclusion

IZUM'S MISSION

Ensuring that the library information systems and research information systems that we develop, maintain and manage are constantly improved in terms of technical innovations in this field and that we also regularly and as best as possible adapt them to all their users, taking into account professional frameworks, global practice and world trends.

In addition to the above, it is equally important to ensure that all these systems are available as constantly and uninterruptedly as possible and that adequate support is available for them at all times.

Last but not least, it is also important to mention the concern for compliance with current legislation in this area, which is imposed on us by various regulations and laws.

In this document, we have identified six strategic goals that we believe can be complementary to the implementation of IZUM's core mission. They are all equal and their order is not related to priorities.

The first and certainly one of the most important strategic objectives is to create unified information support in the ecosystem of science, culture and education. The current tools of IZUM services used in these environments (COBISS, SICRIS) require the user to have considerable knowledge of their specific characteristics.

In the future, we want to unify the tools in such a way that they give the user the appearance of a so-called "one-stop-shop" or a service labelled "everything in one place". This would significantly improve the user experience, while also increasing the robustness and scalability of the tools.

IZUM's tasks also include coordinating the development and operation of a mutual bibliographic system. The basis for this is bibliographic records, especially their quality and completeness, and the correct use of international standards.

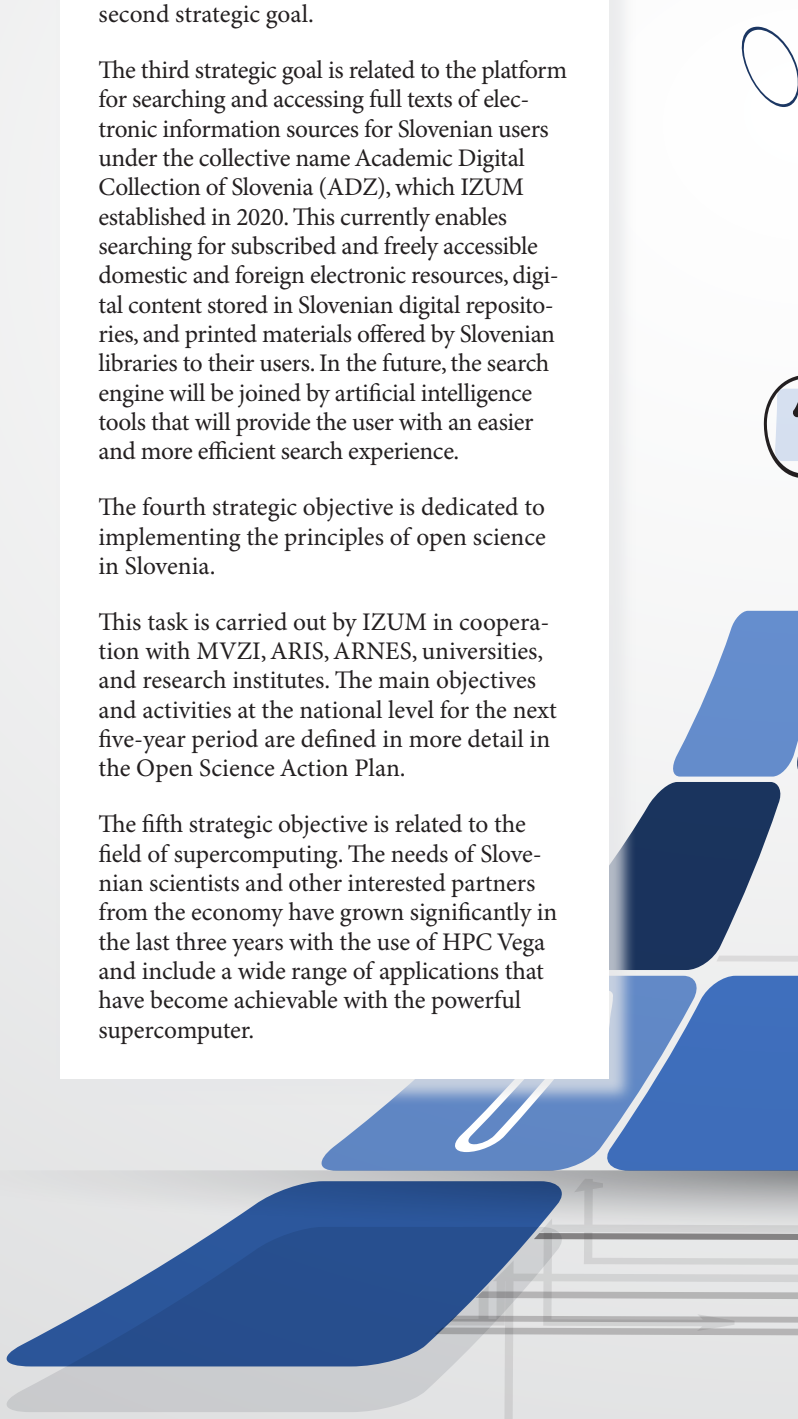
The Library Reference Model (LRM) of the world library organization IFLA prescribes the use of the concept of entity-relational cataloguing (ERC). Its introduction in the COBISS.SI system represents a long-term project, which in the document represents our second strategic goal.

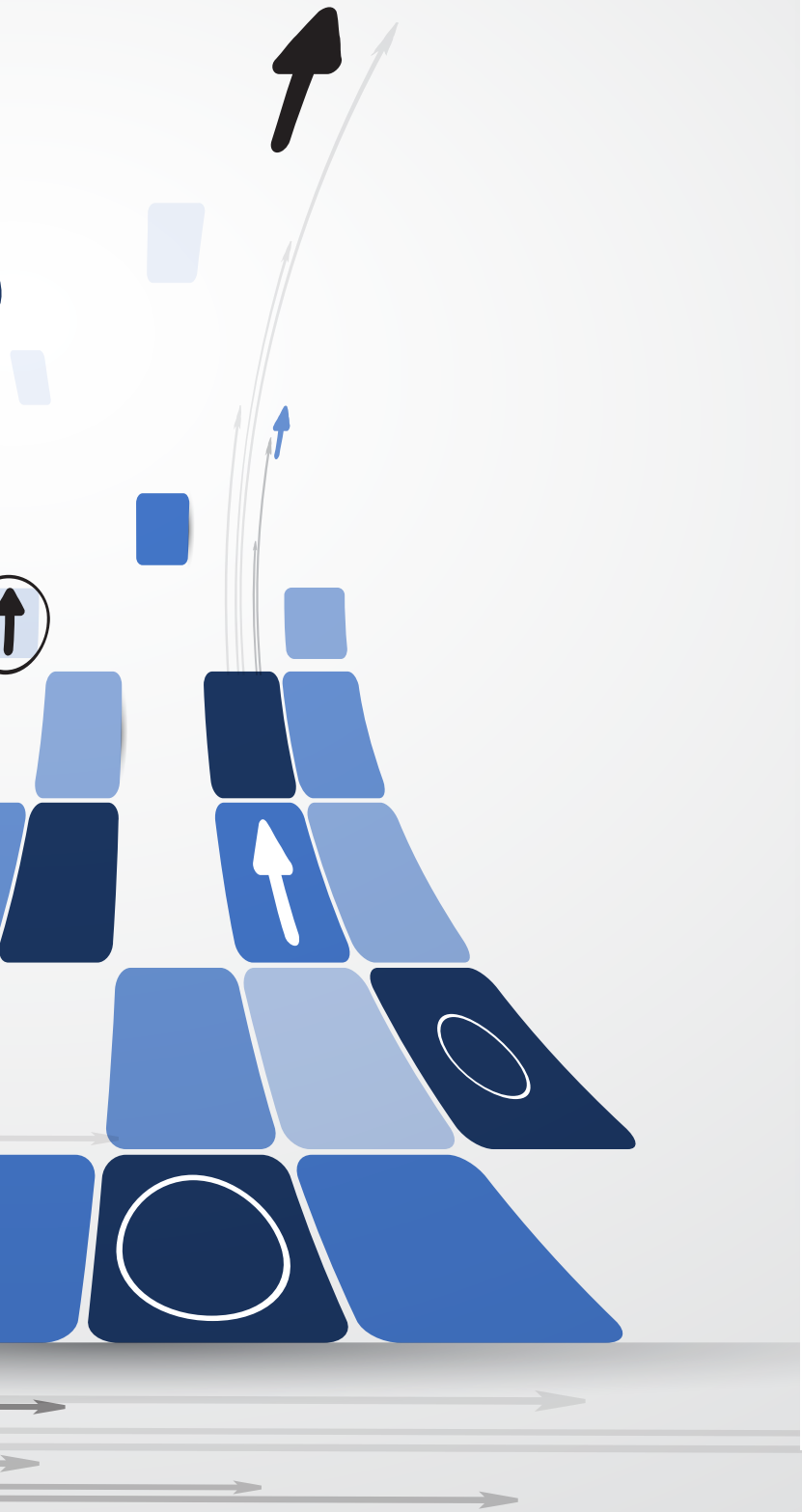
The third strategic goal is related to the platform for searching and accessing full texts of electronic information sources for Slovenian users under the collective name Academic Digital Collection of Slovenia (ADZ), which IZUM established in 2020. This currently enables searching for subscribed and freely accessible domestic and foreign electronic resources, digital content stored in Slovenian digital repositories, and printed materials offered by Slovenian libraries to their users. In the future, the search engine will be joined by artificial intelligence tools that will provide the user with an easier and more efficient search experience.

The fourth strategic objective is dedicated to implementing the principles of open science in Slovenia.

This task is carried out by IZUM in cooperation with MVZI, ARIS, ARNES, universities, and research institutes. The main objectives and activities at the national level for the next five-year period are defined in more detail in the Open Science Action Plan.

The fifth strategic objective is related to the field of supercomputing. The needs of Slovenian scientists and other interested partners from the economy have grown significantly in the last three years with the use of HPC Vega and include a wide range of applications that have become achievable with the powerful supercomputer.





In addition, the development and use of artificial intelligence have also recently been a priority for the EU, as artificial intelligence will play a key role in the digital transformation of the economy, the public sector and society in general. Some of the technologies used in the field of artificial intelligence have been around for a long time, but major advances in computer power, access to huge amounts of data, and the development of new algorithms have led to major breakthroughs in recent years.

The success and recognition that the Slovenian supercomputer HPC Vega has achieved in this field gives Slovenian researchers, and thus also funders, the impetus to ensure continuity in the field of supercomputing by implementing a new supercomputer. This is expected to be delivered even as HPC Vega is gradually phased out of operation.

For the new supercomputer, according to the tender conditions from EuroHPC, there is a strong need to establish key services for the development and use of artificial intelligence. Such a centre should also include the so-called Artificial Intelligence Factory, as there is a great desire to strengthen Europe's leading position in the field of trustworthy artificial intelligence, by adapting supercomputers to the needs of artificial intelligence and making them accessible to start-ups and other small and medium-sized enterprises.

The sixth strategic goal is focused on the geopolitical space of Southeast Europe. Inclusion into the COBISS.net network in the light of development orientation of the EU can contribute to the homogenization and harmonization of bibliographic systems regardless of the vastly different status of the countries in the target geographical area regarding the membership in the EU. This type of coordination certainly represents a long-term benefit, as it consolidates the geopolitical space in the field of knowledge, science, and culture through mechanisms of mutual exchange and transparency. We would like to connect all academic and research organisations in the COBISS.net network, as well as academic, special, and public libraries in the target countries and at the same time, establish compatible systems to evaluate research activities. This will drastically decrease the setback of the local environment development opportunities in these countries compared to Slovenia's achievements and allow them to come a lot closer to the level available to the users in Slovenia.

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List of abbreviations and acronyms

ADZ – Academic Digital Collection of Slovenia

ALA – American Library Association

APC – The cost of open access scientific publications

API – Application programming interface

ARIS – Slovenian Research and Innovation Agency

ARNES – Academic and Research Network of Slovenia

BIBFRAME – Bibliographic Framework

COBIB – Shared bibliographic-catalogue database

COBISS – Cooperative online bibliographic system and services

COBISS.SI – Cooperative online bibliographic system and services in Slovenia

COBISS+ – Online application for searching material and reviewing your library activities

COLIB – Library information database

COMARC – Standardized format of machine-readable records in COBISS

COMARC/A – Machine-readable record format for the description and exchange of authority data in the COBISS system

COMARC/B – Machine-readable record format for the description and exchange of bibliographic data in the COBISS systemS

CONOR – Authority collection of personal and corporate names

dCOBISS – COBISS Digital Repository

Digital UP – Digital portal of the University of Primorska

DIKUL – Digital library of the University of Ljubljana

DLF – Digital Library Federation

E-CRIS – Current research information system

ELAG – European Library Automation Group

EOSC EU Node – European Open Science Cloud

ERA – European Research Area

ERK –Entity-Relational Cataloguing

EU – European Union

euroCRIS – International Organisation for Research Information

EuroHPC JU – European High Performance Computing Joint Undertaking

HPC – High-Performance Computing

HPC RIVR – Project Upgrading National Research Infrastructures

IFIP – International Federation for Information Processing

IFLA – International Federation of Library Associations and Institutions

ICT – Information and Communication Technologies

ISSN – International Standard Serial Number

IZUM – Institute of Information Science

JAK – Slovenian Book Agency

LDAP – Lightweight Directory Access Protocol

LIBER – Association of European Research Libraries

Libs – Metadata service about the COBISS 3 server for each library

LRM – IFLA Library Reference Model

MARC 21 – Standardized machine-readable cataloguing format 21

mEga iskalnik – Portal of the National and University Library

MVZI – Ministry of Higher Education, Science and Innovation

NIS2 – Directive on network and information security 2

NUK – National and University Library

OCLC – International bibliographic service

OpenAIRE – Open Access Infrastructure for Research in Europe

ORCID – Open Researcher and Contributor Identifier

OSIC – Central Specialised Information Centres for Research Activity

PWA – Progressive Web Applications

RDA – Resource Description & Access

SGC – General List of Subject Headings COBISS

SICRIS – Current Research Information System of Slovenia

SIP2 – Standard Interchange Protocol 2

SLING – Slovenian National Supercomputing Network

SRW/SRU – Search/Retrieve via URL/Search/Retrieve Web service

SWOT – A strategic tool for creating a comprehensive strategy

UM:NIK – University of Maribor search engine

UNESCO – United Nations Educational, Scientific and Cultural Organization

UNIMARC – Universal MARC format

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