

The 14th National Information Day: Open Science, Open Data, Open Access, Bulgarian Open Science Cloud

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Abstract. The paper gives an overview on the current landscape and the activities on national and institutional level regarding Open Science, Open Access to scientific information, Open Data, Bulgarian Open Science Cloud.

Keywords: Open Access, Access to Knowledge, Open Science.

1 Introduction

The 14th National Information Day is devoted to the presentation of successful initiatives and projects for open access (OA), open data sharing and open science; strategies for promotion of OA; development of the Bulgarian Portal for Open Science and the national repository; copyright and licenses under OA; best practices and examples of policies for the development and promotion of open access at the national and institutional levels, etc. The event will support academic staff, research project managers, policy-makers and staff working in research funding bodies. It will demonstrate the main concepts for the implementation of OA principles and a national OA roadmap, key terms, strategies, business models, work plans, copyright and licenses, best practices, examples and policies for OA, open data and open science.

The European Open Science Cloud (EOSC) (European Commission, Directorate-General for Research and Innovation, 2022) forms an ecosystem of research data and related services that enable and enhance access and reuse of FAIR research outputs. Bulgarian scientists are working in many areas of the EOSC. In the last decade Open Science principles have been successfully advocated for and are being slowly adopted in different research communities.

Scientific research, together with new technologies and innovation, provide answers to the crises of our time and can provide solution to securing our future. The pandemic, the war in Ukraine and the supply chain problems, the climate and energy crisis, and currently, the issue of inflation and the lack of trust in science and democracy, are indeed persisting challenges for European society and economy. In this context, the member states, and Bulgaria in particular, are preparing the conditions for reforms in the programming and management of scientific research and innovation. Current priorities for instruments such as the Recovery and Resilience Mechanism, the European Research Area and Horizon Europe show that the strategic objectives for science and innovation are linked with other policy areas, such as foreign, health and agricultural policy, and play a greater role than before. Bulgaria supported many of the activities of the European Research Area (ERA). ERA goals, such as Open Science, the new approach to evaluating scientific activity and strengthening the science and innovation system are elements of the new legislation being prepared and will all be included as measures in the new operational plan for the period 2024-2027 for the implementation of the National Strategy for Scientific Research.

OpenAIRE network, constituted by pioneers in Open Science, had been pioneers in the digitalization of data by aligning with European policies, providing training and services federated with the EOSC (Pispirigas & Aritzi, n.d.). OpenAIRE is offering scholarly communication services that can support different actors at many levels.

2 Bulgaria OA Journals, Repositories and Portals

The total number of OA journals in Bulgaria (DOAJ: Directory of Open Access Journals) is 84.

The existing Bulgarian National (open datasets) Portals are:

- **Bulgarian portal for open science** (<https://bpos.bg/>). The National repository is multidisciplinary and welcomes doctoral dissertations and peer reviewed manuscripts or published versions of scientific publications, created by researchers. The items need to be described by a mandatory set of metadata: author/s, title, publication date, resource type (e.g., journal article, part of a book, conference paper, report, etc.), resource identifier (e.g., DOI, Handle), access rights (open, metadata only, restricted, embargoed access). The system also performs selective harvesting of metadata from Bulgarian institutional repositories with open access that support the Open Archives Initiative Protocol for Metadata Harvesting. It is also integrated with the national database for doctoral dissertations in the Register of academic staff.
- **Open Data portal** (<https://data.egov.bg/>). Access to public open data sets in machine-readable format. It contains about data sets from many organizations. This portal provides REST based API. Supported main formats for datasets are CSV, JSON, XML. The system is based on Elastic search engine. The following topics are included: Agriculture, Fisheries, Forestry & Foods, Education, Culture and Sport, Environment, Energy, Transport, Science & Technology, Economy and Finance, Population & Society, Government & Public Sector,

Health, Regions & Cities, Justice, Legal System & Public Safety, International Issues.

- **National Statistical Institute** (<https://www.nsi.bg>) like the Open Data Portal provides free and unrestricted access, but for selected data sets in machine-readable data formats in CSV, JSON.

Data for the Open Access Bulgarian repositories in 2023 are shown in Table 1.

Table 1. Open Access Bulgarian repositories in 2023.

Open Access Bulgarian Repositories 2023	Software	Link
New Bulgarian University Repository	EPrints 3.4.3 OAI 2.0	http://eprints.nbu.bg
BulDML at IMI-BAS	DSpace 7.3	http://sci-gems.math.bas.bg
Digital repository of Sofia University	DSpace 1.8.2	https://research.uni-sofia.bg
D.A.Tsenov Academy of Economics - Digital Library	DSpace 6.3-SNAPSHOT	http://dlib.uni-svishtov.bg
Academic Research Repository at the Burgas Free University	Dspace 1.8.1	http://research.bfu.bg
Central Medical Library - MU, Sofia	Dspace 6.3	http://cml3.mu-sofia.bg:8080/xmlui
Medical Academic Repository - Medical University - Varna Prof. Dr. Paraskev Stoyanov	Dspace 6.2	http://eprints.mu-varna.bg
BGOpenAIRE at IMI-BAS	DSpace 7.3	http://www.bg-openaire.eu
Bulgarian Portal for open science (BPOS)	Elastic	https://bpos.bg/

3 The Main Open Science Activity in Bulgaria – 2022-2023

National Priorities within the OS Initiative:

- Provide the necessary trusted infrastructure for long-term storage, sharing and access to scientific publications and other research results from publicly funded research.
- Foster new skills and competences.

- Raise awareness on Open Science and ensure the active involvement of researchers, universities and research organizations.
- Consolidate ambitions and planned actions in the National Open Science Plan.

National Policy and Infrastructure

Bulgaria has a National Open Science Plan since January 2021. The general ambition of the plan is to provide the research community and society with access to scientific publications and research data in an open and non-discriminatory way at the earliest stage possible and ensure the possibility for their use and re-use. The plan provides for the adaptation of the national policies, initiatives and research infrastructures with a view to integrating and creating conditions for inclusion and interoperability with the European Open Science Cloud.

The National Centre for Information and Documentation (NACID) have 3-year National Open Science Plan. Overview of the plan and the implemented measures and actions in 2022-2023 are given in Table 2.

Table 2. Overview of the National OS plan and the implemented measures and actions in 2022-2023.

PLAN	ACTIONS	Time period
Build skills and competences and promote the benefits of OS practices.	Over 900 researchers took part in the organized trainings and workshops.	2020 - 2022
Provide transparency of the work processes of BPOS and demonstrate its compliance with the latest standards.	BPOS was certified as a Trustworthy Data Repository by the CoreTrustSeal Standards.	March 2022
Create incentives for researchers to adopt OS practices.	The Council of Ministers adopted a national program aimed to induce the publication activity, as well as promote the culture of OA sharing.	2022-2025

As a result of the continuous efforts of the universities, research organizations the Bulgarian Open Science Cloud (BPOS) continues its rapid development. As of March 2023, over 45 000 open access publications, dissertations, books, conference reports have been published in BPOS. Total number of publications in BPOS is giving in Figure 1. The number of resources by access rights are: Embargoed access - 39, Restricted access – 637, metadata only access -5 091, Open access - 45 081. The content providers currently are a total number of 110 organizations (these are universities, research institutes, publishers, institutional repositories, etc.). The registered researchers are almost 4000, which is approximately 1/3 from the Bulgarian research staff. In 2023 there are

182 organization administrators, 284 moderators, 3525 scientists. BPOS is certified as a trustworthy repository by the CoreTrustSeal standards. A representative of BPOS was appointed as member of the Assembly of Reviewers of CoreTrustSeal. The assembly consists of qualified experts reviewing applications for certification. Participation in the review process provides valuable insight into the best practices of other organizations in data management, organizational infrastructure, technical infrastructure, etc.

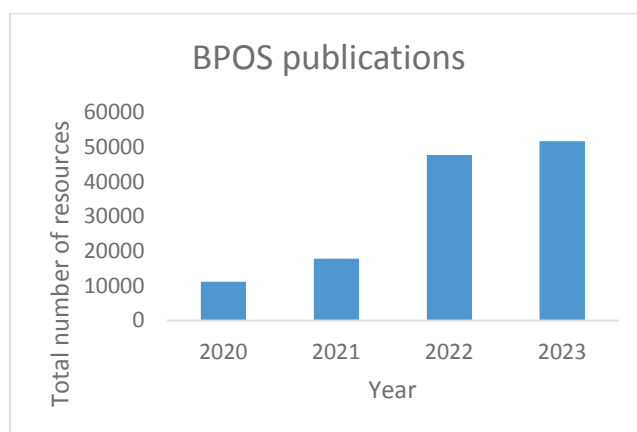


Fig. 1. Annual progress in the number of published resources in BPOS.

Activities are being carried out to create and operate a public open science platform and institutional repositories for open access of scientific publications and data with a view to moving from subscriptions for scientific publications to open science. The National Program "Stimulation of publication activity in authoritative international scientific journals and open access to scientific information" aims to stimulate the publication activity of the scientific research staff and to increase the number of scientific publications in authoritative scientific journals, referenced or indexed in the global databases Web of Science or Scopus, as well as to promote the culture of sharing scientific information with open access and the adoption it as standard practice by the research community. Universities and scientific organizations with program accreditation for the educational and scientific degree PhD by the National Agency for Assessment and Accreditation and having a profile in the Bulgarian Open Science Portal can apply for funding under the national program. A necessary condition for participation is that scientific organizations and universities have and apply internal mechanisms and rules to stimulate the publication activity of their research teams, as well as open access to scientific information. Researchers are provided with additional remuneration, prizes or other financial incentives for authorship of scientific publications in journals referenced or indexed in the global databases Web of Science or Scopus, tied to sharing scientific results in BPOS and in institutional or international repositories. In June 2022, the Ministry of Education and Science concluded a new three-year agreement with Elsevier. The agreement is in implementation of the National Strategy for the Development of Scientific Research in the Republic of Bulgaria and provides subscription access for

higher schools and scientific organizations to the publishing house's databases. The most important feature of the new agreement between the Ministry of Education and Science and the publishing house is the Open Access pilot project. The service grants the right to publish open access articles in the main hybrid journals owned by Elsevier. Corresponding authors from Bulgaria may publish a certain number of open access articles within the term of the agreement without paying a publication fee. In the event that the maximum number of articles per subscription year is reached, the agreement provides for preferential prices for Bulgarian users included in the list of users:

- 100 open access articles for the subscription year 01.03.2022-28.02.2023;
- 180 articles with open access for the subscription year 01.03.2023-29.02.2024;
- 260 articles with open access for the subscription year 01.03.2024-28.02.2025.

Open Data and Cloud Computing National Initiative in Bulgaria

The *National Initiative Open Data and Cloud Computing* (NI ODCC) was established in December 2021 by 9 research organizations. In 2022 - 2023 the organizational structure was agreed and a set activities of the NI ODCC to implement the National Plan for Open Science.

The work during the last year includes:

- Identification of digital resources, general and thematic cloud services owned by the partners.
- Development and provision of training materials on open data and cloud computing to the academic community.
- Technical assistance to ensure compliance with EOSC requirements.
- Promotion of EOSC and FAIR principles and their adoption by scientific data providers.
- Participation in the National Information Day on Open Science, 23 September 2022.
- Participation and presentation of NI ODCC at the EOSC regional conference, held in Budapest (Hungary), 28-29 September 2022.
- Participation and presentation of NI ODCC at the EOSC-A Tripartite Conference in Bulgaria, 28 March 2023, Sofia (hybrid event).
- Regular announcing of EOSC-related events. Participation in the EOSC Symposium in Prague, 17-19 November 2022.

The activities were presented and analyzed at the annual meeting of NI ODCC representatives held on 11 May 2023.

Training and Support

The National Centre for Information and Documentation, the Ministry of Education and Science and NOSCI continued their joint efforts to raise awareness on Open Science and ensure the active involvement of researchers, universities and research organizations:

- Took part in scientific forums, online meetings, seminars and specialized trainings.

- Lecture at the Library and Information Centre of the Technical University of Sofia.
- Giving seminars at the University of Mining and Geology „St. Ivan Rilski” in Sofia.
- Organizing from Ministry of Education and Science (Directorate of Science) and the National Centre for Information and Documentation workshop for development of the Bulgarian portal for open science.
- Publishing papers.

Outreach and Dissemination

The main dissemination event during the considered period was Bulgaria's first tripartite conference on open science (**EOSC-A National Tripartite Event**) held on March 28, 2023 in a hybrid format. The conference was jointly organized by the Ministry of Education and Science, the European Commission and the European Open Science Cloud Association, with the aim of informing about progress in the implementation of national and European Open Science policies, as well as sharing good practices. The aim of this international event was to promote policies, strategies and activities on the topic of open access to scientific information and to give insight into the progress in implementing plans to achieve national and European policies and practices regarding open science. The target audience of the event included universities, scientific institutes, relevant national centers and libraries, researchers, experts, representatives of Ministries and Agencies, associations and representatives of NGOs. The topics for the morning session featured an EOSC-Association overview, presentation on the European Commission Perspectives on Open Science, the role of the EOSC Steering Board, relevant ESFRI support and coordination measures and a dedicated session on EOSC development at country level for Bulgaria. For the first time, the Bulgarian strategy for open science and the participation in the European Open Science were discussed at such a forum. A team of the Bulgarian Open Science Portal presented the development of the Portal, emphasizing the sustained interest of the Bulgarian scientific community. The Bulgarian National Initiative for Open Data and Cloud Computing was also presented as well as its first activities and results.

The most important South-Eastern European regional dissemination event was **EOSC Regional Conference in Budapest**, held on 28-29 September 2022, organized in the framework of NI4OS-Europe, with active participation of the Bulgarian team. A lot of presentations and enlightening talks, as well as in-depth discussions among members of the regional & EOSC community, highlighted NI4OS-Europe contribution to EOSC and the fruitful outcomes of the regional and European collaboration, as well as the challenges ahead towards building, delivering and ensuring sustainability of the European Open Science Cloud. At this conference Bulgaria presented NI ODCC and successful research projects in the area of Climate & Meteorology and Digital Cultural Heritage that run services from NI4OS-Europe catalogue of services.

In the frame of OpenAIRE we work in support of researchers and research-supporting organizations to facilitate the shift into Open Science research practices, easing the transition with services, training, and appropriate consultations. For example, we:

- Support with the creation, adoption, and implementation of Open Science policies, being aligned to the European research policies and the global standards.
- Prepare for the interoperability between services and research outputs and EOSC.
- Offer consultation and guidance to publish in open publications, data, and software.
- Train researchers for RDM and to discover and link publications with other research output in the context of a project.
- Monitor outcomes, policy uptake, and (scientific, economic, and societal) impacts.

OpenAIRE activities in Bulgaria supports training all the research community.

Thanks to OpenAIRE Services, the research community is guided throughout the research data management lifecycles of:

- ARGOS tool for data management plan.
- ZENODO a catch-all repository in which is possible to archive not only publications, but also datasets, codes, and software.
- AMNESIA facilitate the anonymization of the data to share datasets protecting personal data.
- MONITOR a service showing indicators for Open Science, cost related to publications.

Task Forces

- Participating in the European Open Science Cloud – Steering Board;
- Participating in EOSC-Association - <https://eosc.eu/members/sofia-university-st-kliment-ohridski>;
- Participating in the Research Data Alliance;
- Participating in the National Initiatives for Open Science in Europe – NI4OS-Europe (IICT-BAS and IMI-BAS);
- Participating in the OpenAIRE AMKE (IMI-BAS);
- Participation in EGI-ACE (IICT-BAS);
- Participation in Skills4EOSC (IICT-BAS);
- Participation in EOSC hub and EGI-ACE (IICT-BAS);
- Participation in the EOSC TF on Data Interoperability (IICT-BAS).

4 The 14th National Information Day: Open Science, Open Data, Open Access, Bulgarian Open Science Cloud. Topics for Discussion

- Bulgarian roadmap for open science.
- Stimulation of publication activity in respectable international scientific journals and open access to scientific information.
- Bulgarian portal for open science and the national repository.

- Institutional repositories and other e-infrastructures.
- FAIR data requirements and tools.
- Transformative agreements with publishers.
- Open Data.
- Open Sources.
- Open Access Indicators.
- Best Practices.
- Contribute to the problems of the Harmonization of National Legislation and Practices.

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