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Supporting the development of territorial Responsible Research and Innovation

WBC-RRI.NET
Responsible Research and Innovation in the Western Balkans

Final report on the existing Open Science practice in the Western Balkan countries

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INTRODUCTION

One of the key principles of Open Access and Open Science (OA/OS) is that publicly funded research should be accessible to the public, enabling the scientific community, industry, citizens, etc., to benefit from research results. This principle is emphasized in all OA and OS policies, highlighting the social responsibility of scientific research (Law on Science and Research, 2019; UNESCO, 2021). Therefore, OA/OS plays a crucial role in enhancing trust in science, addressing the so-called crisis of reproducibility in science, and improving the reliability and integrity of research. The attitude of decision-makers and the research community towards Open Science is reflected in their readiness to make rules and procedures related to scientific research transparent. This transparency is achieved through policies, infrastructure, and raising awareness of the importance of this topic for science and research results. OA/OS policies regulate research-related rules and regulations, introducing new academic practices into the scientific community.

The main purpose of this report is to provide a comprehensive overview of the existing strategies, recommendations, policies, and technical infrastructure aimed at fostering OA/OS in Western Balkan countries (WBC). This comprehensive analysis is necessary to understand past efforts and future developments of OS involving a variety of stakeholders, such as decision-makers, research funds, research institutions, and researchers, among others. This report includes data and analysis up to December 1, 2023. The report is divided into five parts: the first one refers to the data collection methodology, the second to national and institutional legislation, while the third covers infrastructure capacities. The fourth part is dedicated to Open Access publishing practices, while a comprehensive review of WBC OA/OS resources is considered in the fifth part.

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SECTION 1: METHODOLOGY

Questionnaire

The questionnaire used in the survey was custom-made to address all relevant issues related to OA/OS resources in WBC. The first part of the questionnaire aimed to identify national or institutional legislative documents relevant to the implementation of OA/OS principles and provide a link (URL) to the full document, preferably in English. The second part was related to existing open science practices, technical resources, and information infrastructure in WBC. The third part focused on attitudes towards OA/OS among decision-makers and included questions such as "How do researchers at your institution pay for APC (article processing charge)?" or "If your institution does not have a repository, do you think there is a need to develop one?"

The questionnaire was prepared using the Google form open-source software and distributed online in English language. The questionnaire is provided in Appendix 1.

Sample

The invitation to participate in the survey was distributed widely to the universities and research institutes in Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, and Serbia. It is estimated that the questionnaire was directly addressed to approximately 50 institutions.

The questionnaire was completed by responsible individuals from the following organizations: Co-PLAN, Institute for Habitat Development, Albania, POLIS University, Albania, Center for Development Evaluation and Social Science Research, BiH, University of Zenica, BiH, University of East Sarajevo, BiH, University of Banja Luka, BiH, University of Sarajevo, BiH, Ministry of Science and Technological Development, Montenegro, NCDIEL - National Centre for Development of Innovation and Entrepreneurial Learning, North Macedonia, University Ss. Cyril and Methodius in Skopje, Faculty of EE and IT, North Macedonia, University of Belgrade, Serbia, Univeristy of Novi Sad, Serbia, University of Nis, Serbia, University of Arts in Belgrade, Serbia, University of Kragujevac, Serbia, University of Pristina in Kosovska Mitrovica, Serbia, Union-Nikola Tesla, Serbia, Institute of Physics Belgrade, Serbia, Institute for Biological Research "Siniša Stanković" National Institute of the Republic of Serbia, University of Belgrade, Serbia, Institute of Chemistry, Technology and Metallurgy – IHTM, Serbia, Mathematical Institute of SANU, Serbia, Vinča Institute of Nuclear Sciences, Serbia and Institute of Technical Sciences of SASA, Serbia.

The report presented the result as of July 1th 2022 with additional data collected until December 1th 2023. The questionnaire is still available for all interested participants at the WBC-RRI.Net website:

https://docs.google.com/forms/d/e/1FAIpQLSdjmzK5i0GQWKKAlMWdpkJwSUPUP4AT2nwLWYQwpDwAWorkgg/viewform

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SECTION 2: OPEN SCIENCE POLICIES

In the broadest sense, OA/OS policies can be classified as national, funding, and institutional. This classification is not always explicit, as funding policies may sometimes serve as de facto national policies. Documents considered as policies may vary and include laws, strategies, or guidelines.

Albania

The most significant development regarding OA/OS policies in Albania occurred through an initiative among researchers. While Albania currently lacks a national OA/OS policy, there is a noteworthy effort among researchers to endorse the Declaration on Open Science at the national level as part of the National Initiatives for Open Science in Europe (NI4OS) project. Furthermore, research grants funded by public sources require adherence to an OA Policy Regulation document, and specific projects incorporate Data Management Plans.

Bosnia and Herzegovina

As of now, Bosnia and Herzegovina does not have any national or institutional OA/OS policies. However, the Data Archive for Social Sciences in Bosnia and Herzegovina, established in 2018, plays a crucial role as the national service responsible for the long-term preservation and dissemination of social science research data. The Data Archive has adopted a preservation policy, and both the policy and repository were developed within the Centre for Development Evaluation and Social Science Research (CREDI). Ministry for Scientific and Technological Development, Higher Education and Information Society in August 2023, adopted the Strategy for the Development of Science and Technology, Higher Education and Information Society in the Republic of Srpska for the period 2023-2029. The text states that the recommendations of the European Commission were taken into account during the drafting of the Strategy, such as: introducing the concept of smart specialization, promoting open access to scientific data - "Open Science", improving the quality of education by modernizing curricula and programs for better alignment with needs domestic labor market, developing and improving electronic services and digital skills. Also, the University of Banja Luka (UNIBL) joined the rank of institutions who have signed the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities in 2016 and actively promote OA in publishing of scientific outcomes.

Montenegro

The Ministry of Education of Montenegro adopted the National Policy of OA/OS in 2020. This policy includes an action plan aimed at achieving several key objectives, such as providing open access to peer-reviewed scientific papers, enabling direct open access to national academic publishing, and facilitating open access to research data. The policy encourages the preparation and submission of a data

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management plan within the research process. Additionally, it emphasizes the availability of research infrastructures (premises, devices, and digital infrastructure) if their procurement or establishment is financed by public funds, ensuring the interoperability of digital infrastructures with international counterparts. The policy also focuses on raising awareness, strengthening skills, and conducting training in the field of OS for all researchers. Furthermore, it recognizes the practice of OA/OS during scientific evaluation.

North Macedonia

The National Open Science Cloud Initiative in North Macedonia adopted a National Policy in the form of a declaration in 2021. This policy allows all researchers and stakeholders the freedom to sign the declaration, relying on The European Open Science Cloud ecosystem and existing international thematic repositories.

Serbia

The Ministry of Education, Science and Technological Development of Republic of Serbia adopted National open science platform in 2018. The Ministry stipulates that open access must be provided to an electronic copy of the final, published version (if allowed by the publisher's policy) or the peer-reviewed version (accepted for publication) of every scientific publication and recommends that open access to primary data collected during the research should be enabled immediately after publishing the results based on them in a publication, whenever there are no legal and/or ethical limitations. Almost all higher education and research institutions adopted institutional open science policies in following years. The University of Novi Sad adopted Decision on Amendments to the Bylaw on Doctoral Studies, related to the Data Management Plan. In case a student has created a factual material during his research and work on his doctoral dissertation that can be subject to testing the achieved research results, when submitting the report on evaluation of a doctoral dissertation and the doctoral dissertation for making it public by publishing at the University and Faculty website, the student also submits a Data Management Plan. Also, Science Fund of the Republic of Serbia has regulated open access publishing and open data treatment in accordance with FAIR principles on all projects applying for research grants.

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Table 1. Links to the OS policies at WBC

COUNTRY	National OS policies	Institutional OS policies	Open data policies
ALBANIA	Declaration on OS		
BOSNIA AND HERZEGOVINA			Data Archive for Social Sciences in Bosnia and Herzegovina – DASS-BiH
MONTENEGRO	Ministry of Education of Montenegro		
NORTH MACEDONIA	National Open Science Cloud Initiative		
SERBIA	Ministry of Education, Science and Technological Development of Republic of Serbia	University of Novi Sad University of Kragujevac University of Belgrade State University of Novi Pazar University of Niš University of Priština University of Arts in Belgrade Criminal Police University Institute of Technical Sciences of SANU Balkan Institute of SANU Institute of Plant Protection and Environment Institute of Architecture and Urbanism of Serbia Institute of Animal Husbandry, Belgrade-Zemun Institute of Field and Vegetable Crops University of Belgrade – Faculty of Chemistry Faculty of Special Education and Rehabilitation Maize Research Institute „Zemun Polje“	University of Novi Sad: Decision on Amendments to the Bylaw on Doctoral Studies – related to the Data Management Plan

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SECTION 3: OPEN SCIENCE INFRASTRUCTURE

The second part of the previously described survey was related to the technical resources, and information infrastructure at WBCs, as well to attitudes towards OA/OS among decision makers and includes questions such as "How do researchers at your institution pay for Article Processing Charges (APC)?"

Albania

In Albania, researchers primarily rely on international OA/OS repositories, such as Zenodo. Public publications exist within the non-profit organization Co-PLAN, which is dedicated to sustainable development by enabling good urban and regional governance, tackling key environmental issues, developing civil society, impacting policies, and promoting community participation knowledge-making. Responsible persons for maintenance of repository are from IT sector or researchers (Figure 1), by institutional recourses.

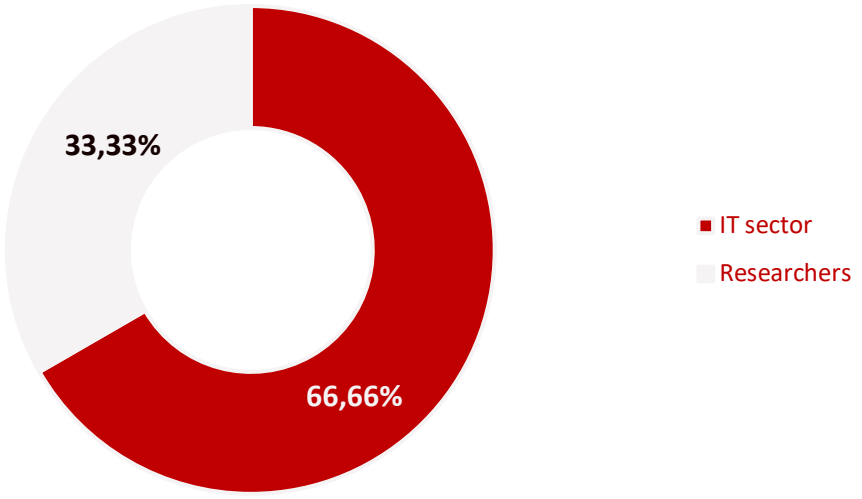

Figure 1. Responsibility for maintenance of repositories

APC costs for publishing in open access journals are mostly paid by project funds (Figure 2). However, researchers must also rely on both their own resources and institutional.

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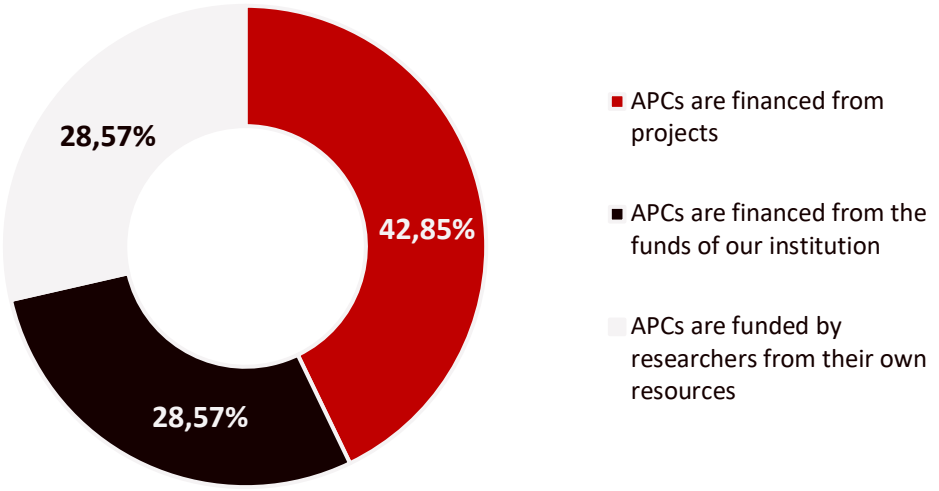

Figure 2. APC charges

In general, there is no systemic solution to the OA/OS challenges and researchers face the need for OA/OS mainly relying on internationally established resources.

Bosnia and Herzegovina

Although no OA/OS policies have been adopted in BiH, some higher education institutions have developed repositories to help researchers make the results of scientific work more visible. The University of Banja Luka, the University of Zenica, and Data Archive for Social Sciences in Bosnia and Herzegovina – DASS-BiH maintain digital repositories with the support of the Federal Ministry of Education and Science and with their own funds (Figure 4). The IT sector, librarians and researchers are in charge of maintaining the repositories (Figure 3).

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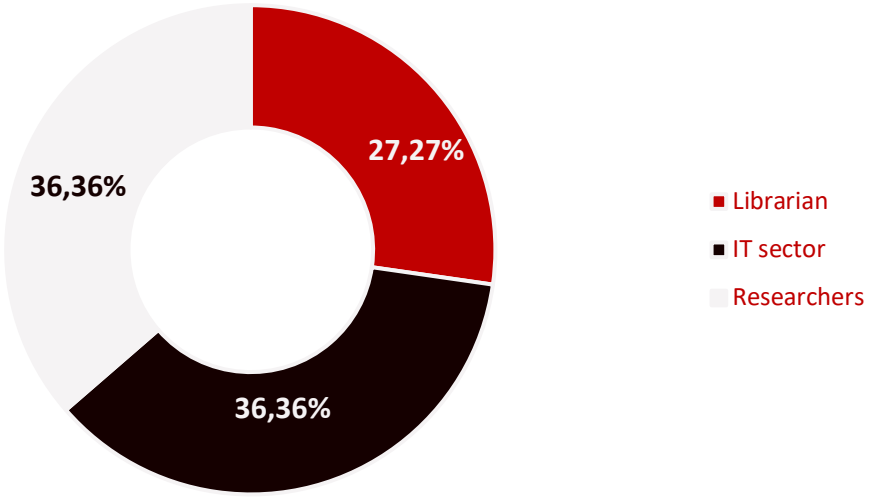

Figure 3. Responsible persons for maintenance of repositories

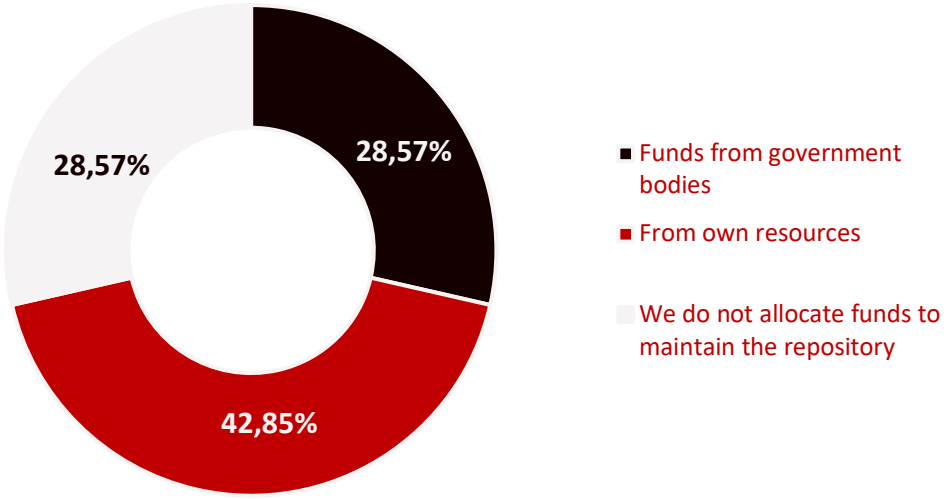

Figure 4. Funds for maintenance of repositories

The costs associated with Article Processing Charges (APC) for publishing in open access journals are primarily covered by project funds (Figure 5) and the researcher's personal resources. Occasionally, research institutions also provide support to researchers in this process. The prevailing attitude that APC

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should not be paid highlights the potential benefit of a systemic solution for green open access publishing, which could enable researchers to avoid additional publication costs.

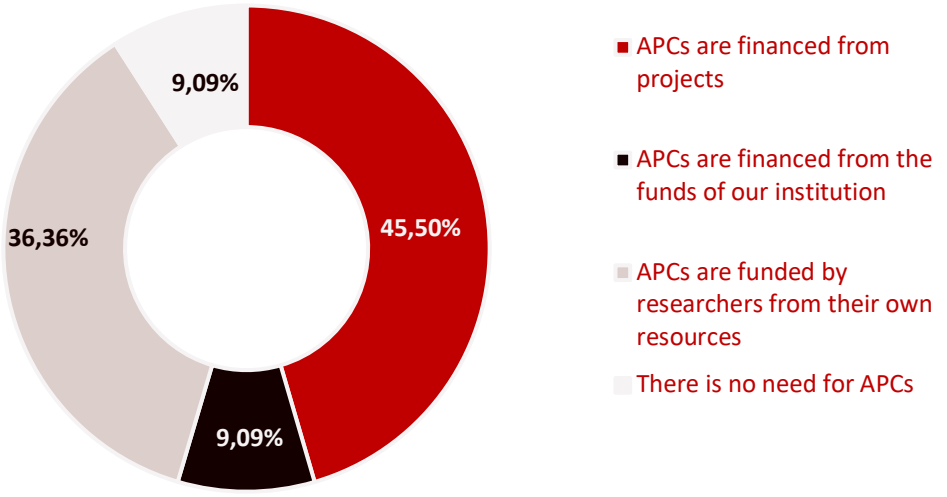

Figure 5. APC charges

Overall, there are research institutions in Bosnia and Herzegovina that actively take responsibility for the visibility of scientific research results by developing and maintaining resources. The advantage of this bottom-up approach is evident in the willingness of researchers and decision-makers to address the challenges of Open Access and Open Science (OA/OS). Some institutions even provide occasional support. However, it is acknowledged that these positive initiatives may not fully represent the entire research community in Bosnia and Herzegovina.

Montenegro

In Montenegro, only the University of Montenegro currently practices depositing research results into an institutional repository. However, the survey lacks information on how the repository is financed and maintained, as well as the resources researchers depend on for APC.

North Macedonia

In North Macedonia, only the University Ss. Cyril and Methodius in Skopje, Faculty of EE and IT has the institutional OA/OS repository. Apart from that, research institutions do not allocate funds for OA/OS resources. The repository is maintained by researchers and so far, there is no support from the IT

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sector or librarians. However, it seems that researchers have substantial support from institutions for APC chargers (Figure 7).

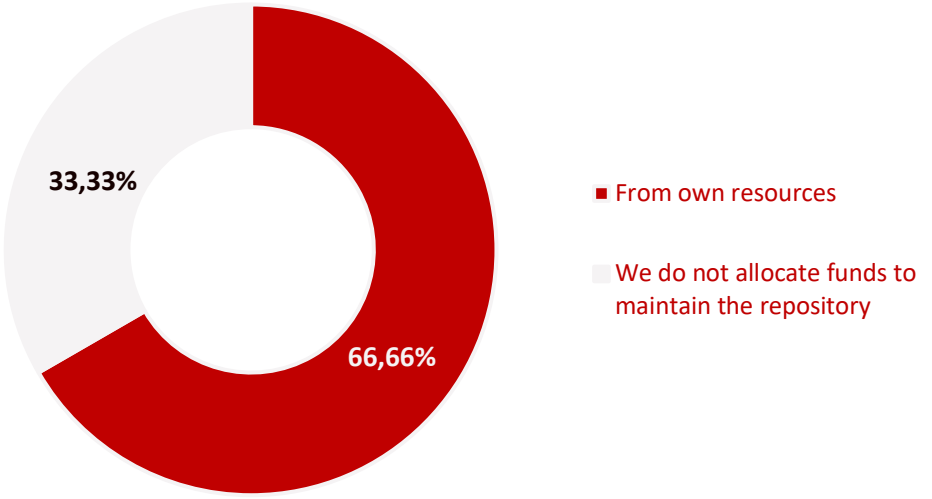

Figure 6. Funds for maintenance of repositories

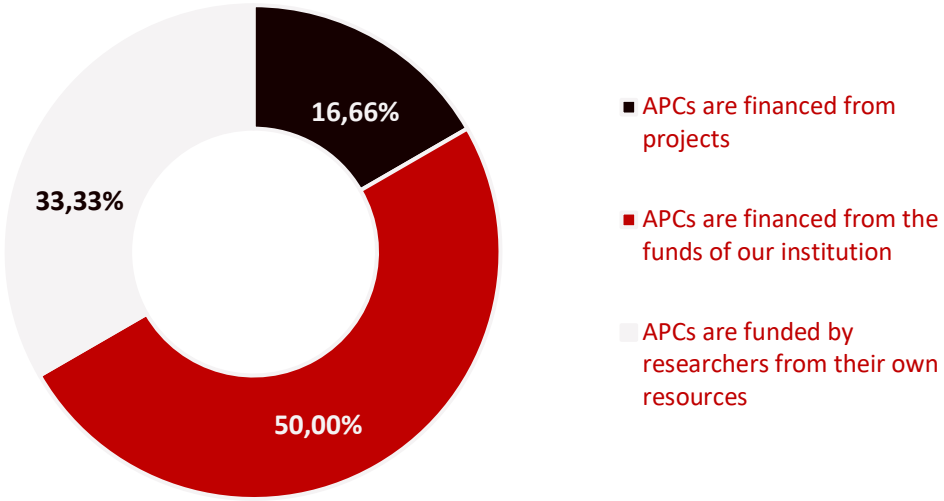

Figure 7. APC charges

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Serbia

Serbia hosts numerous research institutions equipped with digital repositories; nevertheless, some repositories face challenges in terms of continuous maintenance and functionality. Examples include the repositories associated with the University of Niš, State University in Novi Pazar, and the University of Arts in Belgrade, as outlined in Table 2. The responsibility for repository maintenance is predominantly shouldered by librarians and the IT sector (Figure 8), underscoring their pivotal role in supporting science and research initiatives.

A notable issue within the landscape of open access/open science (OA/OS) repositories in Serbia is the absence of a standardized system. Many repositories rely on the dedication of individual institutions rather than a regulated framework, hindering overall progress in this domain. Funding for repositories primarily comes from institutional resources (Figure 9), making them susceptible to fluctuations in institutional income and financial stability. On the other hand, researchers mainly use project grants or their own resources to pay for APCs (Figure 10), which is also a consequence of the lack of institutional support for open science practice.

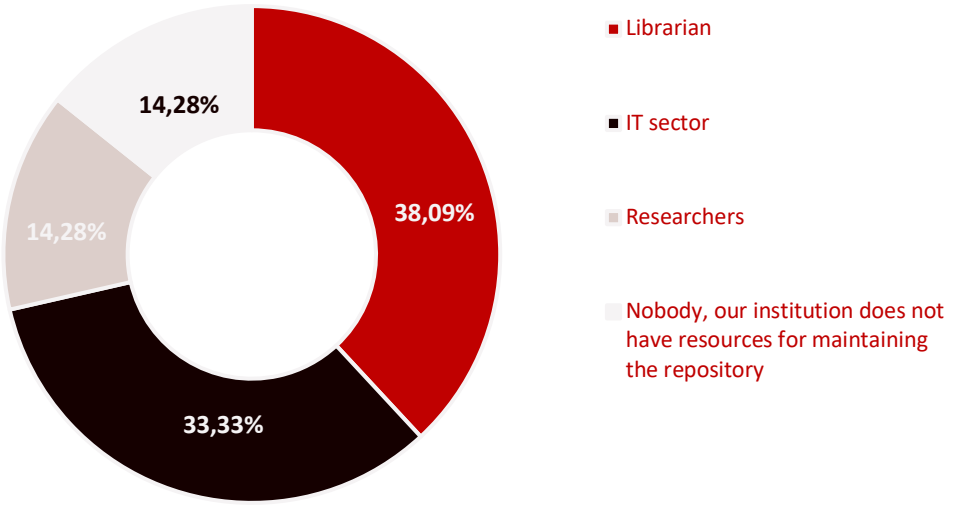

Figure 8. Responsible persons for maintenance of repositories

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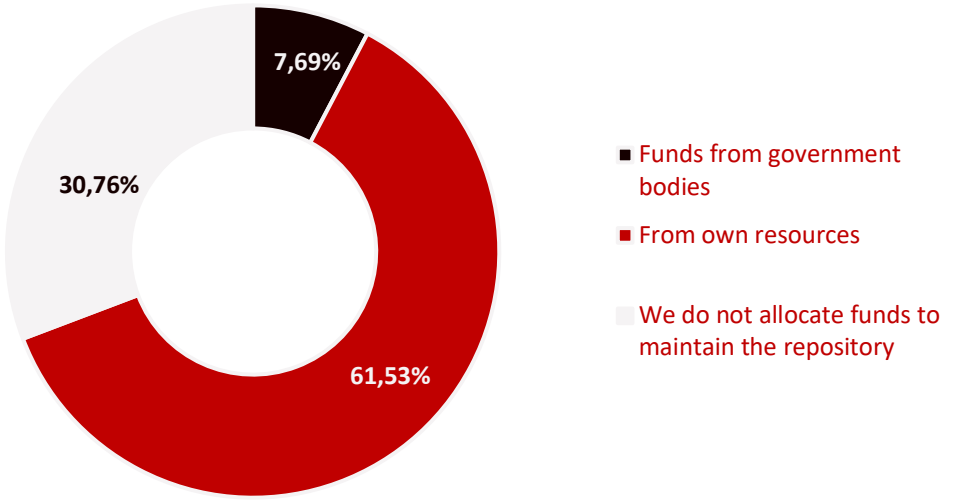

Figure 9. Funds for maintenance of repositories

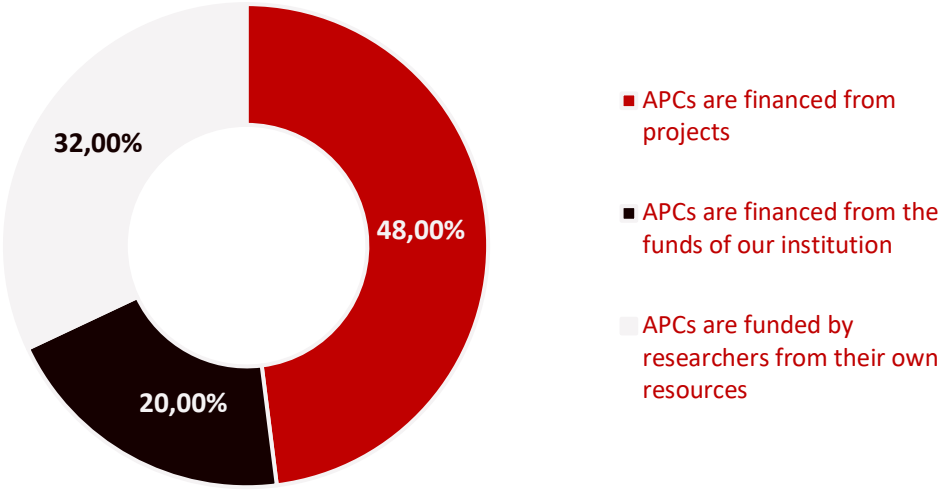

Figure 10. APC charges

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Table 2. Links to the OS repositories at WBC

COUNTRY	National repositories	Institutional repositories	Thematic repositories
ALBANIA		Co-PLAN: a non-profit organization	
BOSNIA AND HERZEGOVINA		University of Banja Luka	Data Archive for Social Sciences in Bosnia and Herzegovina – DASS-BiH
		"E-theses" of the University of Banja Luka	
		University of Zenica	
MONTENEGRO		University of Montenegro	
		"E-theses" of the University of Montenegro	
NORTH MACEDONIA		University Ss. Cyril and Methodius in Skopje, Faculty of EE and IT	
SERBIA	NaRDuS (National Repository of Dissertations in Serbia) Repositories of the PhD theses at the University of Belgrade, University of Novi Sad, University of Niš and University of Kragujevac are included in NaRDuS	University of Belgrade - SPIRA Collection of 32 institutional repositories	*National Repository of Agricultural Education* - CaSA NaRA
		University of Kragujevac	The Jewish Digital Library
		University of Novi Sad	Repository of psychological instruments in Serbian - REPOPSI
		State University of Novi Pazar*	
		University of Arts in Belgrade*	
		University of Niš*	
		Full lists of repositories in Serbia can be found at National portal of Open Science	
* *repository not maintained*			

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SECTION 4: OA PUBLISHING PRACTICE IN WBC

In all WBCs, a prevailing culture exists wherein universities and scientific institutions actively publish scientific journals. These national resources serve as vital platforms for researchers, forming a cornerstone of academic discourse. Aligning publishing practices with the principles of OS/OA becomes crucial for ensuring the continued growth and relevance of these journals. Notably, a significant number of these journals follow the *diamond* OA model, where government funding supports their publication, relieving researchers from the burden of APCs. The indexing of these journals in the DOAJ holds paramount importance, as it enhances their visibility and accessibility on a global scale. Table 3 provides an overview of the current number of journals from WBCs indexed in DOAJ, signifying their presence and recognition within the broader scholarly community.

These numbers highlight the substantial presence of OA journals, particularly in Serbia. The inclusion of scientific journals in the DOAJ indicates a commitment to OS/OA principles, making research findings more accessible to a global audience. This approach enhances the visibility of local research and fosters collaboration and knowledge exchange on an international scale.

Table 3
Number of scientific journals indexed in DOAJ in WBCs

Country	Number of journals
Albania	4
Bosnia and Herzegovina	44
Montenegro	9
North Macedonia	16
Serbia	211

In order to gain an insight into the practice of OA publishing in the WBCs, a bibliometric analysis of all scientific articles indexed in the Scopus database, since 2012, was conducted. The dataset was compiled in December 2023 using the Python wrapper for the Scopus RESTful API, *pybliometrics* package (Rose & Kitchin, 2019). In the first step, all scientific articles affiliated with one of the WBCs were retrieved, while in the second dataset was limited to articles published in OA. In the Gold OA model, articles are published in fully OA journals. These journals make their content freely accessible to the public. Authors typically pay an APC to the publisher to cover the costs associated with the publication process. This funding model ensures that the final published version of the article is immediately available to readers without any subscription or paywall barriers. Green OA refers to the practice of authors self-archiving a version of their manuscript in a repository, such as an institutional repository or a subject repository, after it has been published in a subscription-based (non-open access) journal. The term "Bronze Open Access" is not as commonly used as Gold or Green. It might be used informally to refer to articles that are freely available on a publisher's website but are not published in fully open access journals. In the Hybrid Open Access model, a journal is a traditional subscription-based journal, but individual articles can be made open access on payment of an additional fee (Article Processing Charge or

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APC). This allows authors to choose which articles to make OA while the rest remain behind a paywall. Table 4 shows the number of papers published in different options of OA from all WBCs.

Across all countries, Green OA is the dominant category, with the highest percentage of articles made freely accessible through repositories or institutional platforms. The distribution between Bronze (predominantly self-archiving) and Gold (articles published in fully open access journals) varies, with percentage of the Gold OA being higher in Bosnia and Herzegovina and Montenegro. Hybrid OA, where some articles are freely accessible while others require payment, represents a relatively small percentage across all countries. Serbia stands out with a notably higher total number of articles, reflecting a substantial contribution to OA publishing in the region.

Table 4

Number and % of OA scientific articles indexed in Scopus from WBCs

Year	Albania			Bosnia and Herzegovina			Montenegro			North Macedonia			Serbia		
	N	OA	%OA	N	OA	%OA	N	OA	%OA	N	OA	%OA	N	OA	%OA
2012	245	54	22,04	612	177	28,92	186	75	40,32	464	165	35,56	6052	2323	38,38
2013	412	239	58,01	607	214	35,26	235	104	44,26	556	195	35,07	5982	2458	41,09
2014	447	277	61,97	633	263	41,55	300	146	48,67	629	290	46,10	5961	2698	45,26
2015	366	210	57,38	696	348	50,00	267	108	40,45	673	318	47,25	5944	2807	47,22
2016	286	126	44,06	731	394	53,90	319	147	46,08	663	355	53,54	6069	2984	49,17
2017	292	152	52,05	904	474	52,43	382	184	48,17	658	359	54,56	6145	3228	52,53
2018	355	195	54,93	1015	583	57,44	384	217	56,51	713	431	60,45	6431	3593	55,87
2019	399	236	59,15	1204	779	64,70	472	307	65,04	774	453	58,53	7002	4369	62,40
2020	544	335	61,58	1283	844	65,78	533	362	67,92	780	488	62,56	6941	4427	63,78
2021	684	475	69,44	1532	1051	68,60	501	347	69,26	844	584	69,19	7692	5224	67,91
2022	757	501	66,18	1462	1069	73,12	457	316	69,15	925	616	66,59	7883	5540	70,28
Total	**4787**	**2800**	**58,49**	**10679**	**6196**	**58,02**	**4036**	**2313**	**57,31**	**7679**	**4254**	**55,40**	**72102**	**39651**	**579,18**
Bronze		332	11,85		697	11,24		276	11,93		518	12,17		4330	10,92
Gold		488	17,42		1657	26,74		511	22,09		693	16,29		6572	16,57
Green		1814	64,78		3726	60,13		1470	63,55		2921	68,66		27893	70,34
Hybrid		166	5,92		116	1,87		56	2,42		122	2,86		856	2,16
		2800			6196			2313			4254			39651	

Note. N – number of published articles; OA – number of articles published in OA; %OA – % of articles published in OA

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Albania

Figure 11 shows the keyword coincidence analysis of scientific articles published in OA from Albania. The visualization reveals distinct clusters of OA articles, each representing a thematic concentration within the academic landscape. The orange cluster emerges prominently, encompassing scientific papers primarily focused on COVID-19. This cluster extends to incorporate related health behaviors and conditions, such as obesity, public health, and depression, highlighting the interconnectedness of these topics in the literature. The red cluster stands out as well, featuring a substantial number of OA articles related to economic themes. Topics within this cluster span economic growth, savings, and migration, showcasing a significant scholarly discourse on economic subjects in the Albanian OA literature. The light blue cluster is indicative of marine science, pollution, and biodiversity. This thematic grouping reflects a notable concentration of research on environmental aspects, particularly those related to marine ecosystems and pollution dynamics.

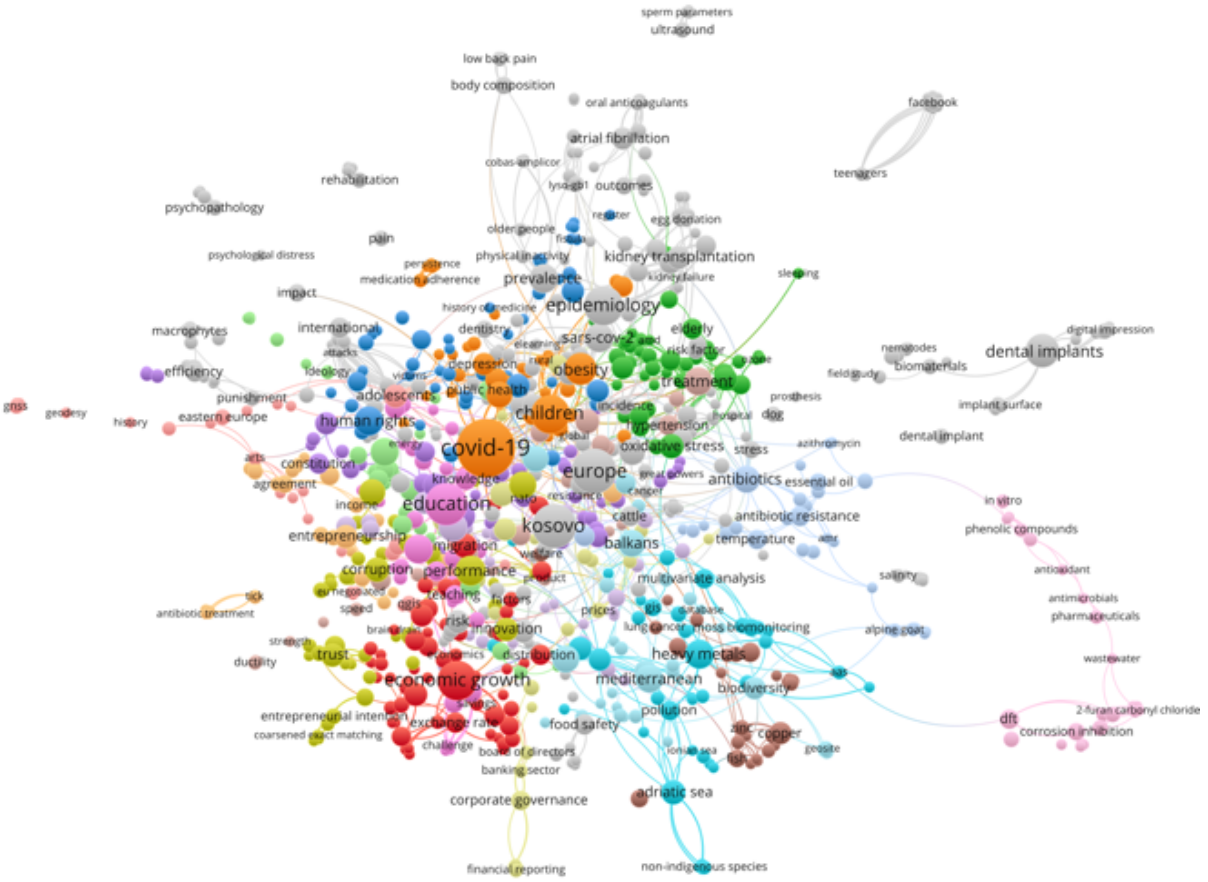

Figure 11. Keyword coincidence map for OA articles in Albania

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Bosnia and Herzegovina

Figure 12 shows shows the keyword coincidence analysis of scientific articles published in OA from Bosnia and Herzegovina. Similar to the previous case, the largest cluster is centered around the topic of COVID-19, signifying a significant scholarly focus on this subject. This cluster is closely associated with the green cluster, which encompasses health-related topics such as epidemiology, prognosis, and pregnancy, indicating a comprehensive exploration of health aspects related to the pandemic. Furthermore, two distinct clusters in light and dark purple delve into broader themes including Europe, education, Bosnia, Herzegovina, the Balkans, and trauma. These clusters suggest a multidisciplinary approach, encompassing geopolitical, educational, and sociocultural dimensions within the scholarly discourse. Additional thematic clusters are evident in the analysis: a brown cluster relates to antioxidants, showcasing a focused exploration of this specific area. Meanwhile, a red cluster pertains to sustainability and traffic, indicating a scholarly interest in issues related to environmental sustainability and transportation dynamics.

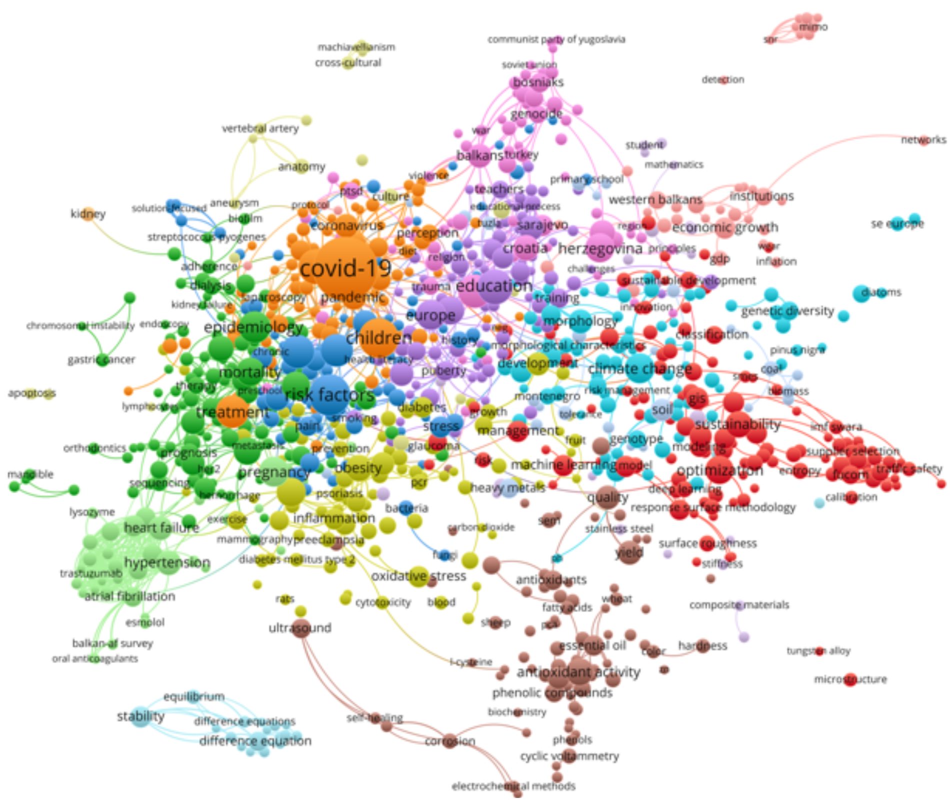

Figure 12. Keyword coincidence map for OA articles in Bosnia and Herzegovina

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Montenegro

Figure 13 provides a visual representation of the shows the keyword coincidence analysis of scientific articles published in OA from Montenegro. A notable and entirely independent cluster is dedicated to physics-related topics, possibly in collaboration with CERN, and specifically mentions hadron-hadron scattering. The independence of this cluster underscores the depth and breadth of scientific contributions in the field of physics from Montenegro. Other clusters within the analysis cover diverse topics. The light green cluster focuses on body composition, suggesting a specialized area of research in health sciences. The red cluster is associated with taxonomies in biology, indicating an interest in systematic classification within the biological sciences. In addition, the dark green cluster encompasses topics in medicine, including risk factors and disease prognosis. This cluster suggests a substantial body of research in medical sciences, emphasizing factors influencing health outcomes and prognostic indicators.

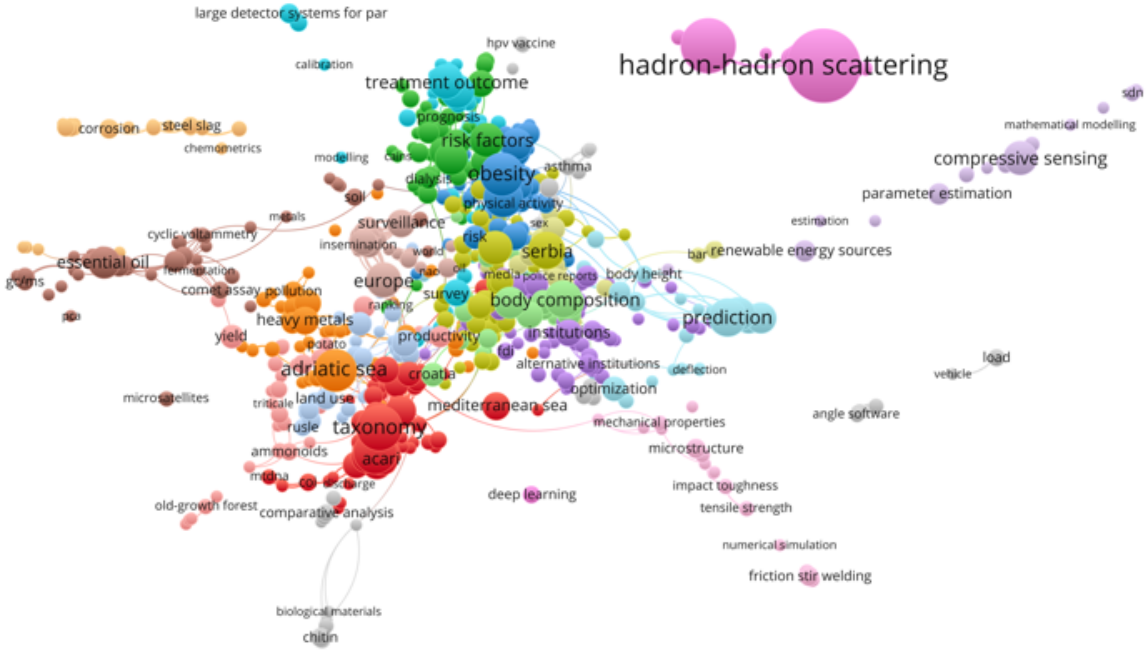

Figure 13. Keyword coincidence map for OA articles in Montenegro

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North Macedonia

Figure 14 shows the keyword coincidence analysis of scientific articles published in OA from North Macedonia. The largest cluster, highlighted in red, is dedicated to the topic of COVID-19, indicating a significant focus on research related to the pandemic. The second-largest cluster, depicted in green, encompasses broader geopolitical themes such as Europe and the Balkans. This suggests a multidisciplinary approach within the scholarly discourse, exploring regional and international dimensions. The purple cluster is notable for its emphasis on medical topics, primarily focusing on mental health. This suggests a substantial body of research in the field of medicine, particularly addressing aspects related to mental well-being. The prominence of this cluster underscores the importance of mental health research within the scientific output from North Macedonia.

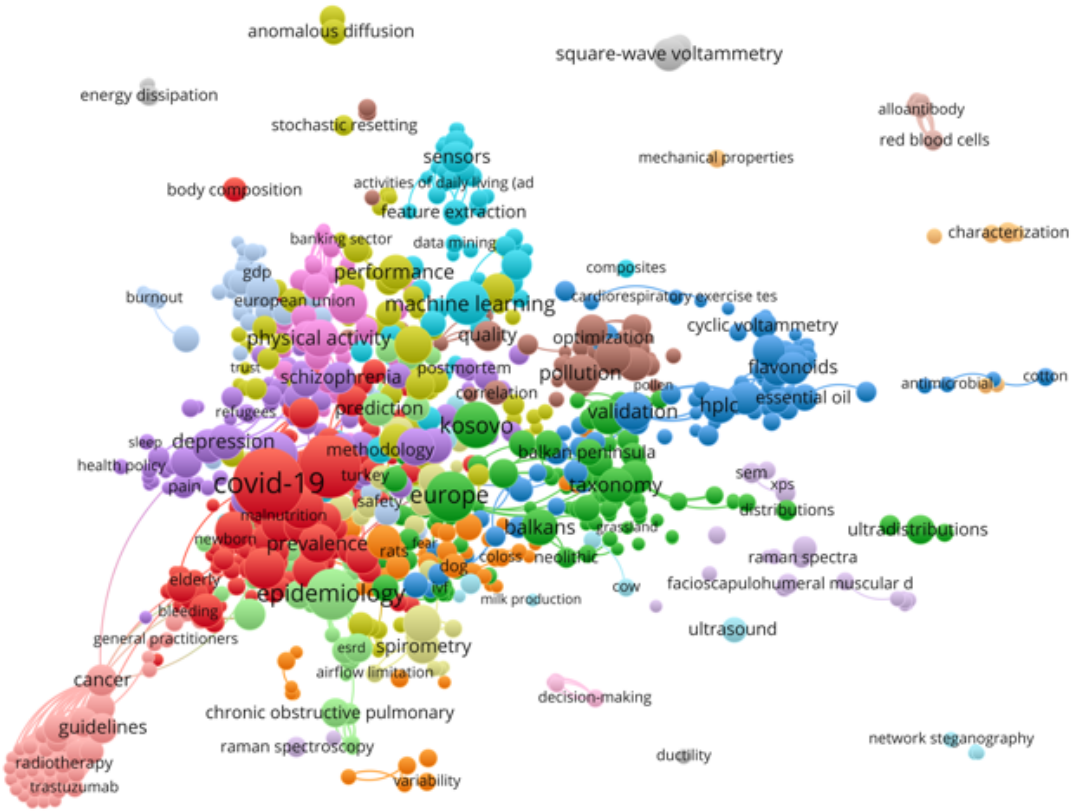

Figure 14. Keyword coincidence map for OA articles in North Macedonia

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Serbia

Figure 15 shows the keyword coincidence analysis of scientific articles published in OA from Serbia. Similar to Montenegro, there is a notable and independent cluster dedicated to physics, specifically focused on hadron-hadron scattering, indicating collaboration with CERN. Additionally, another independent cluster in light pink also pertains to physics, covering diverse topics such as galaxies, black holes, and polarization, showcasing the breadth of research within this field. The largest cluster, marked in red, is dedicated to the COVID-19. Intriguingly, this cluster intertwines with a range of other themes, including sustainability, education, and even machine learning, indicating a multidisciplinary approach in studying the pandemic's various aspects.

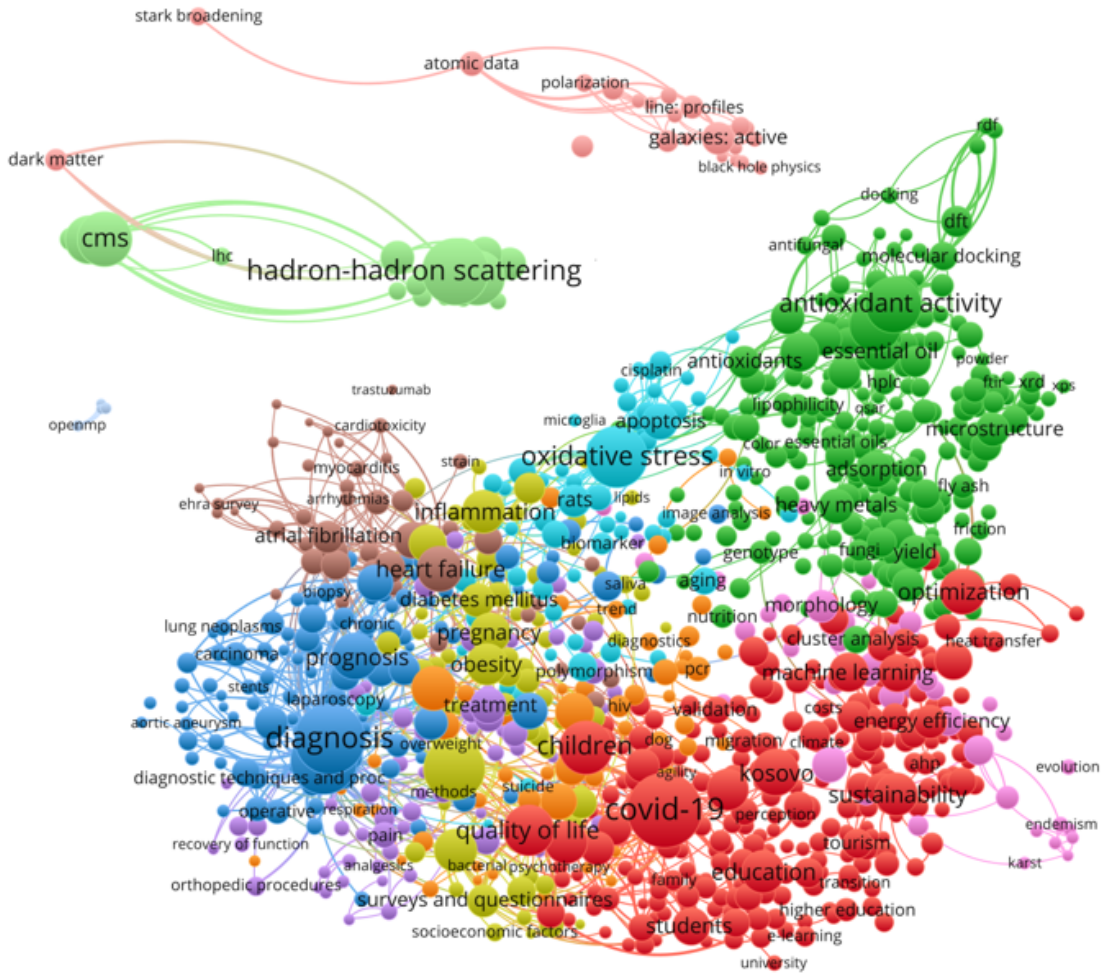

Figure 15. Keyword coincidence map for OA articles in Serbia

The blue cluster concentrates on medical topics, encompassing diagnostics, prognosis, and diagnostic techniques. This suggests a substantial body of research in the field of medicine, particularly

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focusing on diagnostic methods and prognostic indicators. Another noteworthy cluster, marked in green, is associated with the study of antioxidants with heavy metals and essential oils, reflecting research in the field of chemistry and environmental science.

These findings collectively underscore the dynamic and varied research landscapes within the WBCs, emphasizing both global concerns like COVID-19 and region-specific interests in fields such as physics, medicine, and environmental science. The OA nature of the publications emphasizes a commitment to the accessibility and dissemination of research findings, as well as resources for APC.

SECTION 5: OVERVIEW

The landscape of OA/OS policies and resources in the WBC is diverse and it would be impossible to apply a single model in all countries and institutions. Although national policy should provide a flexible framework for defining policies at lower levels and a solution for infrastructure, existing policies declaratively regulate OA/OS, respecting its importance, without an action plan for infrastructure maintenance. Also, OA/OS policies and resources are often determined by available resources and local context. For example, although national policies have been adopted in Montenegro and Macedonia, resources for their implementation are not available to researchers. Researchers in Albania rely solely on international policies and repositories, such as Zenodo, without regulating this topic at the national or institutional level. Although there are no national policies in Bosnia and Herzegovina, leading universities have developed institutional repositories. An excellent resource is the Data Archive for Social Sciences in Bosnia and Herzegovina – DASS-BiH, which illustrates the response of researchers to the challenges of OA/OS and the bottom-up up approach in solving them. Serbia is among the leading countries in terms of adopted OA/OS policies. The importance of OA/OS is recognized in the Law on Science, National Policy, Research Funds and Higher Education and Research Institutions. However, none of these policies provide a solution for the resources needed to implement the OA/OS principles. Therefore, functional OA/OS repositories exist only within the University of Belgrade and research institutes, which rely on their own resources. Although other universities have repositories, their maintenance is not ensured, which reduces the enthusiasm of researchers for their use.

Overall, the WBC generally have developed OA/OS policies, except for Albania and BiH. BiH has strategy for development science and technology which includes OA/OS. Policies in other countries do not define the resources that institutions and researchers would rely on to adhere to new research practices. Also, with the rise of internationally coordinated infrastructures, such as EOSC, these policies need to meet some internationally agreed requirements. It will be necessary to revise all national, funding, and institutional policies as respond to this development. Research institutions and researchers develop OA/OS repositories mainly through internationally funded projects, leading to a lack of their sustainability. In other words, OA/OS is implemented through a bottom-up approach, which depends on the enthusiasm of participants in the research process, such as researchers or librarians. A systematic approach to addressing all OA/OS challenges therefore needs to be developed involving all stakeholders. Decision-

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makers should be better informed about internationally accepted standards and requirements, while researchers should be introduced to new research practices.

In the context of OA publishing practices, a substantial number of journals in WBCs adopt the diamond OA model, funded by the government, alleviating researchers from Article Processing Charges (APCs). The indexing of these journals in the Directory of Open Access Journals (DOAJ) enhances their global visibility. Serbia stands out with 211 journals indexed in DOAJ. A bibliometric analysis of articles since 2012 reveals active engagement in OA publishing, with Green OA being dominant. Bosnia and Herzegovina and Montenegro show a higher percentage of Gold OA, emphasizing fully open access journals. Despite positive trends, challenges persist, such as limited institutional support and reliance on individual funds for APCs, indicating a need for a structured and sustainable framework. Collaborative efforts between institutions, librarians, and the IT sector are crucial for overcoming challenges and fostering a robust OA publishing culture. Researchers often resort to project grants or personal funds for APCs, underlining a significant gap in widespread institutional support for open science practices. Addressing these challenges requires a concerted effort to establish standardized practices, secure dedicated funding, and promote collaboration among institutions, librarians, and the IT sector.

In the context of the WBC-RRI.NET project, subsequent to the round table discussion involving representatives from the WBCs during the Open Science Days held in Belgrade in 2022, a set of recommendations was formulated to enhance the implementation of open science practices (WBC-RRI.NET, 2022). These recommendations have been translated into all Western Balkans languages to foster the dissemination of fundamental OA/OS principles among diverse stakeholders.

Acknowledgment

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Appendix

WBC-RRI.NET project – open science short survey

In the framework of the Horizon 2020 project „Embedding RRI in Western Balkan Countries: Enhancement of Self-Sustaining R&I Ecosystem", with acronym WBC-RRI.NET, one of the important tasks is to create a map of existing institutional open science repositories in the Western Balkan countries as well as to provide an overview of existing open science and open access legislation in the Western Balkan region. We would like kindly to ask you to fulfil the following questions related to these topics. We really appreciate your time (maximum 10 minutes) and devotion!

WG3, WBC-RRI.NET project team

sgoran@uns.ac.rs (not shared) Switch account

* Required

1. What policies regulate the topics of open science and open access at your institution? (Multiple answers possible) *

- [ ] a) Institutional platform of open science (e.g., regulations, recommendations, etc.)
- [ ] b) Institutional policy of open data (e.g., Data management plan)
- [ ] c) None of the above documents exist
- [ ] d) I do not know that such documents exist
- [ ] Other:

2. Link to the institutional policy of open science:

Your answer

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3. Link to institutional open data policy:

Your answer

4. If your institution does not have an open science policy, do you think there is a need to adopt it? (Multiple answers possible)

- [ ] a) Yes, it will significantly increase the visibility and citation of researchers
- [ ] b) Yes, this is required by government bodies (e.g., EU; National)
- [ ] c) Yes, this will allow easier access to project financing
- [ ] d) No, I do not see the benefit of such a policy for our researchers
- [ ] Other:

5. Does your institution have a repository for depositing the results of scientific work? *

- ( ) a) Yes, there is a repository and it is regularly maintained
- ( ) b) Yes, there is a repository but it is not maintained
- ( ) c) No, there is no repository at our institution
- ( ) d) The repository does not exist, but its development is planned
- ( ) e) The repository does not exist, but researchers have the obligation to deposit their work in international thematic repositories
- ( ) Other:

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6. Link to the institutional repository:

Your answer

7. If you have an institutional repository, who is responsible for its maintenance? (Multiple answers possible)

- [ ] a) Librarian
- [ ] b) IT sector
- [ ] c) Researchers (e.g., young researchers, etc.)
- [ ] d) We have a contract with a specialized agency, institution, etc.
- [ ] e) Nobody, our institution does not have resources for maintaining the repository
- [ ] Other:

8. If you have an institutional repository, what funds are used for its maintenance? (Multiple answers possible)

- [ ] a) Funds from government bodies (e.g., Ministry for Science etc.)
- [ ] b) From own resources
- [ ] c) We do not allocate funds to maintain the repository
- [ ] Other:

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9. If your institution does not have a repository, do you think there is a need to develop it?

- ○ a) Yes, it will significantly increase the visibility and citation of researchers
- ○ b) Yes, this is required by the line ministry
- ○ c) Yes, this will allow easier access to project financing
- ○ d) Yes, but we do not have the resources to create a repository
- ○ e) No, I do not see the benefit of a repository for our researchers
- ○ f) There is no need for our institution to built its own open repository, but all research content/product should be published in existing international open repositories
- ○ Other: _____

10. How do researchers at your institution pay for APC (article processing charge)? (Multiple answers possible)

- ☐ a) APCs are financed from projects
- ☐ b) APCs are financed from the funds of our institution
- ☐ c) APCs are funded by researchers from their own resources
- ☐ d) There is no need for APCs
- ☐ Other: _____

11. Your institution is in: *

Choose ▾

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12. Type of your institution: (Multiple answers possible) *

- [ ] University/Faculty
- [ ] Research institution
- [ ] NGO
- [ ] Government institution
- [ ] Business
- [ ] Media
- [ ] Other: _____

13. The name of your institution:

Your answer

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