



European
Commission

ERA Country Report 2023

Bosnia and Herzegovina



Independent
Expert
Report

Research and
Innovation

ERA Country Report 2023: Bosnia and Herzegovina

European Commission
Directorate-General for Research and Innovation
Directorate A — ERA & Innovation
Unit A2 — ERA, Spreading Excellence and Research Careers
Contact Manuel Aleixo, Head of Unit A.2
Heiko Prange-Gstoehl
Marlene Schoder-Kienbeck
Email RTD-ERA-FORUM@ec.europa.eu
RTD-PUBLICATIONS@ec.europa.eu

European Commission
B-1049 Brussels

Manuscript completed in January 2024

The European Commission shall not be liable for any consequence stemming from the reuse.

© European Union, 2024



The reuse policy of European Commission documents is implemented by Commission Decision 2011/833/EU of 12 December 2011 on the reuse of Commission documents (OJ L 330, 14.12.2011, p. 39). Unless otherwise noted, the reuse of this document is authorised under a Creative Commons Attribution 4.0 International (CC BY 4.0) licence (<https://creativecommons.org/licenses/by/4.0/>). This means that reuse is allowed provided appropriate credit is given and any changes are indicated.

For any use or reproduction of elements that are not owned by the European Union, permission may need to be sought directly from the respective rightholders. The European Union does not own the copyright in relation to the following elements:

Image credits for cover page and throughout: © skypicsstudio # 286372753, © MicroOne # 288703015, © creativeteam # 323412491, © Viktoriia # 345410470, © Yurii # 372950117, 2022. Source: Stock.Adobe.com

ERA Country Report 2023

Bosnia and Herzegovina

Edited by Dalibor P. Drljača

as part of the project "POLICY ANSWERS: R&I Policy making, implementation and Support in the Western Balkans" funded by the HORIZON EUROPE programme of the European Union under Grant agreement ID: 101058873

Table of contents

ERA COUNTRY REPORT 2023: BOSNIA AND HERZEGOVINA.....	3
1. National context	3
1.1. Overview of the ERA policy agenda implementation	3
1.2. Policy context	4
2. Implementation of the ERA policy agenda	6
2.1. ERA Priority 1: Deepening a truly functional internal market for knowledge	6
2.2. ERA Priority 2: Taking up together the challenges posed by the twin green and digital transition and increasing society's participation in the ERA	8
2.3. ERA Priority 3: Enhancing access to research and innovation excellence and enhancing interconnections between innovation ecosystems across the EU	9
2.4. ERA Priority 4: Advancing concerted research and innovation investments and reforms	10
3. Country-specific drivers and barriers	10
4. Final remarks	11
5. Bibliography	12
6. Annexes	15
6.1. Annex 1: Graphs	15

ERA COUNTRY REPORT 2023: BOSNIA AND HERZEGOVINA

Key takeaways:

- The progress Bosnia and Herzegovina has made in implementing ERA priorities can be observed in the adoption of Open Science and Gender Equality initiatives, followed by the promotion of attractive research careers, and the strengthening of international cooperation and of research infrastructures.
- Bosnia and Herzegovina progress can also be recognised by increasing success in Horizon Europe. For example, for the first time since the beginning of the programme, the University of Sarajevo became the coordinating institution for a Horizon Europe research and innovation project. Moreover, the University Clinical Centre of the Republic of Srpska became the first partner institution in the project funded under the EU Cancer Mission.
- Innovation and technology parks in BiH have been very active and productive with the recent EU and GIZ funded EU4DigitalSME project, which connects academia with industry around established digital innovation hubs in Sarajevo, Banja Luka and Tuzla.

1. National context

1.1. Overview of the ERA policy agenda implementation

Bosnia and Herzegovina (BiH) is committed to align the strategic research and innovation (R&I) development with the ERA objectives. Although modest, progress in the implementation of the ERA Policy Agenda can be seen in the implementation of the principles of the Open Science and European Open Science Cloud (EOSC) initiatives.

As of July 2021, BiH became a part of DARIAH¹ ERIC, the pan-European Digital Infrastructure for the Arts and Humanities in research, with 11 institutions from BiH involved. In addition, BiH takes part in the RESILIENCE² project, which is a unique, interdisciplinary and invigorating research infrastructure for Religious Studies gathering 13 institutions from different countries. The project is mapped in the ESFRI Roadmap 2021.

As of January 2021, BiH became an Associated Country to the Horizon Europe programme, which is the most relevant progress in terms of international cooperation in R&I. The Ministry of Civil Affairs of Bosnia and Herzegovina (MoCA) provides grants to strengthen international R&I participation in Horizon Europe, COST and EUREKA programmes. Due to the fact that gender equality plans became mandatory in Horizon Europe, many public and private universities as well as other organisations have adopted Gender Equality Plans.

BiH continues its efforts to promote research careers, talent circulation and mobility by supporting and maintaining the EURAXESS Bosnia and Herzegovina network of service centres.

¹ <https://www.dariah.eu/network/members-and-partners/#bih> (1.10.2023.)

² Want to learn more about the RESILIENCE Research Infrastructure? (resilience-ri.eu) Want to learn more about the RESILIENCE Research Infrastructure? (resilience-ri.eu) (10.11.2023)

1.2. Policy context

In the European Innovation Scoreboard (EIS) 2023³, BiH is an *Emerging Innovator* with a performance at 36.2% of the European Union (EU) average, which is below the average of all the Emerging Innovators. The performance is decreasing and the gap to the EU average is becoming larger notably due to the fact that the environment for innovators in BiH is not very attractive; the industry in BiH is scarcely funding R&I resulting in lower innovation outputs considering its level of innovation investments. According to the Global Innovation Index 2023⁴, BiH ranks 77 among 132 economies.

MoCA competencies include determining the basic principles of coordinating activities, target aligning the plans of entity authorities and defining strategies at the international level in the areas of science and education. The Sector for Science and Culture and the Sector for Education of the MoCA perform tasks related to the coordination and development of science and education activities in BiH and monitor the implementation of agreements and strategic documents in these fields. The MoCA collects and analyses information, participates in the work of international organisations and actively follows the integration processes of BiH in the field of science, culture and education towards accession to the European Union (EU), by participating in the preparation of international agreements and contracts.

According to the BiH constitution, the Federal Ministry of Education and Science (FMON) within the Federation of Bosnia and Herzegovina entity has a coordinating role in the field of R&I, while all competencies lie with the Cantonal governments. Within the Republic of Srpska (RS), the Ministry of Scientific and Technological Development, Higher Education and Information Society of the Republic of Srpska (MNRVOID), among administrative and other professional tasks related to Science and Technology (S&T) in the Ministry's jurisdiction, performs analyses and monitors the state of science in the RS including the development of politics, strategies and plans of action in the field of science, the preparation of laws and other regulations within the scope of its work. The District Brčko also has its government with the Department for Education that deals with educational institutions. In line with the division of responsibilities and competencies, each of these institutions (MoCA, FMON and MNRVOID) has developed its strategy for the development of R&I.

In August 2023, MNRVOID 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*"⁵ aiming at creating optimal conditions for the development of science and technology by promoting excellence. Although the document underlines the principles, it is not structured according to the objectives of the ERA Policy Agenda. Other institutions dealing with the strategic development of R&I are still in the preparation phase for the relevant R&I strategic documents.

In 2019, the MNRVOID published the "*Roadmap of Research Infrastructures in the Republic of Srpska*"⁶, which proposes eight policy recommendations. These range from structural and legislative improvements related to Research Infrastructures (RI) and their better integration into large European infrastructures. The document also recommends further investments in RIs. Further efforts to improve the research landscape were undertaken by the Regional Cooperation Council (RCC) with the publication of the policy document "A Framework for

³ https://ec.europa.eu/assets/rtd/eis/2023/ec_rtd_eis-country-profile-ba.pdf (12.10.2023.)

⁴ <https://www.wipo.int/edocs/pubdocs/en/wipo-pub-2000-2023-en-main-report-global-innovation-index-2023-16th-edition.pdf> (12.10.2023)

⁵ https://www.vladars.net/sr-SP-Cyrl/Vlada/Ministarstva/mnk/Documents/%D0%A1%D1%82%D1%80%D0%B0%D1%82%D0%B5%D0%B3%D0%B8%D1%98%D0%B0_%D0%9C%D0%9D%D0%A0%D0%92%D0%9E%D0%98%D0%94_%D0%9A%D0%9E%D0%9D%D0%90%D0%A7%D0%90%D0%9D_270923_%D0%9D%D0%94.pdf (2.10.2023.)

⁶ <https://www.vladars.net/sr-SP-Cyrl/Vlada/Ministarstva/mnk/Documents/Roadmap%20of%20RI%20in%20the%20RS%20-%20FINAL.pdf> (28.11.2022)

Research Infrastructure Roadmap of Bosnia and Herzegovina⁷ (Framework for RI Roadmap) in March 2022. It summarises the existing research potential of BiH by identifying key research elements, such as research facilities, equipment, instrumentation and international cooperation, including the involvement in large European RIs and relevant projects.

Progress with regard to the development of a Smart Specialisation Strategy (S3) for BiH is currently limited. At the BiH level, the Directorate for Economic Planning (DEP), the MoCA and the Ministry of Foreign Trade and Economic Relations (MoFTER) established a working group to draft a S3 for BiH. Some of the activities were carried out in February 2021, when the DEP sent a letter of intent to the Joint Research Council (JRC) of the European Commission to sign a Memorandum of Understanding regarding support for the S3 process. Results are expected in 2024. In the Republic of Srpska, MNRVOID and the Government have established a task force to support the development of S3 according to the JRC S3 development model.

Since 2012, the BiH Agency for Statistics has been collecting and disseminating data in the field of Science, Technology and Innovation⁸ following the methodological recommendations of the OECD and Eurostat. The Agency stated that in 2020, BiH's gross domestic expenditure was 34.24 billion BAM (17.5 billion euros)⁹, 0.09% of which was allocated to R&I. The same year the Agency registered 2,037.42 full-time equivalents (FTE) of employees in R&I. The highest proportion of GERD is allocated to the higher education sector with 56.5%, followed by the business sector with 38.6%, and the governmental sector with 4.9% as most researchers are engaged in the higher education sector and where the majority of R&I is done. Most funding for R&I in the business sector is spent in the manufacturing industry (48.2%), followed by financial and insurance activities (23.8%), electricity, gas, steam and air conditioning supply (8.5%) and agriculture (8.5%).

Higher Education Institutions (HEIs) and their programmes are overseen by two regulatory bodies. The Agency for the Development of Higher Education and Quality Assurance of Bosnia and Herzegovina (HEA)¹⁰, established by the Framework Law on Higher Education in BiH¹¹ (Official Gazette of BH No. 59/07) as an independent body, has created transparent and accessible criteria for the accreditation of HEIs and adoption of norms setting minimum standards in the field of higher education. The Agency for Higher Education of the Republic of Srpska (AVORS)¹² promotes a culture of quality assurance in higher education throughout the Republic of Srpska, adhering to the principles of the European Higher Education Area (EHEA) and the European Research Area (ERA). Both agencies are maintaining the register of accredited higher education institutions, publishing it on their respective websites. Additionally, they are affiliated members of the European Network for Quality Assurance in Higher Education (ENQA)¹³.

The Agency for Gender Equality of Bosnia and Herzegovina published "The Gender Action Plan of Bosnia and Herzegovina (GAP BiH) for the period 2018-2022". Two agencies, the Gender Centre of the Republic of Srpska and the Gender Centre of the Federation of Bosnia and Herzegovina are supporting general gender issues.

⁷<https://www.rcc.int/download/docs/Framework%20for%20RI%20Roadmap%20BIH%20digital.pdf/41b22ea46441bd82bdeac746849563f7.pdf> (15.10.2023)

⁸ <https://bhas.gov.ba/Calendar/Category/28> (15.10.2023)

⁹ „Bosna i Hercegovina u brojkama 2021“, Agency for Statistics of Bosnia and Herzegovina, ISSN 1986-8561, Sarajevo 2021

¹⁰ <https://hea.gov.ba/> (3.10.2023.)

¹¹ https://hea.gov.ba/data/Dokumenti/Osnovni_podaci_agencije/Zakoni-propisi_ENG.pdf (3.10.2023.)

¹² <https://www.avors.org/index.php/en/> (4.10.2023.)

¹³ <https://www.enqa.eu/membership-database/countries/bosnia-and-herzegovina/> (10.10.2023)

2. Implementation of the ERA policy agenda

This report compiles data from different sources of information including the European Innovation Scoreboard¹⁴ (EIS) and the EC-OECD STIP Survey¹⁵.

2.1. ERA Priority 1: Deepening a truly functional internal market for knowledge

Despite facing various challenges, some progress in the implementation of ERA Priority Area 1 can be observed. These advancements refer to Open Access (OA), gender equality and the promotion of attractive research careers. Other Actions within Priority Area 1 have also produced some results.

The Directory of Open Access Journals¹⁶ counts 43 journals from BiH, out of which only four charge article processing fees covering different research areas. In 2021, according to data from Scimago¹⁷, BiH researchers have published 1,894 citable and 92 non-citable papers (a total of 1,986 papers). Out of this number, 1,199 papers (60.37%) were published in OA according to Scopus. In Scimago¹⁸ more than 61,493 citations were recorded with data as of April 2023. According to the data extracted from the Scopus database, BiH has 9,267 Open Access publications in total; in the past five years the number of publications in OA rose steadily, counting between 1,796 (in 2019) and 2,078 (in 2022), with almost equal proportion of publications in Gold OA (4,980) and Green OA (5,442).¹⁹ According to SciVal, improvement is observed in data relevant to the publications in Top Journal Percentiles (top 10% by CiteScore Percentile) growing from 8 (in 2019) to 11.5 (in 2022). This can be linked to the fact that the international cooperation in publications records grew from 48.4% (in 2019) to 58.8% (in 2022).²⁰

Universities, both public and private, maintain public repositories of PhD and Master's theses. The University of Banja Luka is participating in the project "National Initiatives for Open Science in Europe" (NI4OS Europe)²¹, serving as BiH's sole connection to the European Open Science Cloud (EOSC). The University of Banja Luka also established an Open Access repository for academic publications²². During 2020 and 2021, the University of Sarajevo²³ and the University of Banja Luka²⁴ have implemented and published on their respective websites the guideline "Policy of Open Access to Scientific Research Infrastructure".

EURAXESS Bosnia and Herzegovina (<https://www.euraxess.ba/>) was founded through an FP7 project in 2010 (BAMONET). As of November 2023, the network consists of seven service centres, five in the Republic of Srpska and two in the Federation of Bosnia and Herzegovina. In total, 14 institutions from BiH have signed the Charter and Code for

¹⁴ https://ec.europa.eu/assets/rtd/eis/2023/ec_rtd_eis-country-profile-ba.pdf (5.10.2023.)

¹⁵ <https://stip.oecd.org/stip/interactive-dashboards/countries/BosniaAndHerzegovina> (5.10.2023.)

¹⁶

https://doaj.org/search/journals?source=%7B%22query%22%3A%7B%22bool%22%3A%7B%22must%22%3A%5B%7B%22terms%22%3A%7B%22index.country.exact%22%3A%5B%22Bosnia%20and%20Herzegovina%22%5D%7D%7D%5D%7D%7D%2C%22size%22%3A50%2C%22sort%22%3A%5B%7B%22created_date%22%3A%7B%22order%22%3A%22desc%22%7D%7D%5D%2C%22track_total_hits%22%3Atrue%7D (5.10.2023)

¹⁷ <https://www.scimagojr.com/countrysearch.php?country=BA> (5.10.2023)

¹⁸ <https://www.scimagojr.com/countrysearch.php?country=BA> (5.10.2023.)

¹⁹ Scopus database, Dataset Open Access publications for Bosnia and Herzegovina, Export date: 7.11.2023.

²⁰ Source: SciVal Database, Dataset Overall research performance, Bosnia and Herzegovina 2018-2022, Export date: 7.11.2023.

²¹ <https://ni4os.eu/> (2.10.2023.)

²² <https://pub.unibl.org/s/eng/page/> (10.11.2023.)

²³ https://cir.unsa.ba/wp-content/uploads/2021/09/POLITIKA-OTVORENOG-PRISTUPA-II-UNSA_Senat_juni-2021-.pdf (8.10.2023)

²⁴ https://etf.unibl.org/images/akta/ostali/Politika_otvorenog_pristupa_NII_UNIBL-ETF.pdf (8.10.2023)

researchers. Three institutions continued with the process and were awarded by the European Commission “HR Excellence in Research” logo: the University of Banja Luka, the University of East Sarajevo and the University of Sarajevo²⁵.

The United Nations Development Program (UNDP) analysis²⁶ on the Gender Development Index (GDI) shows that for 2021, BiH was categorised in Group 3 (defined as having medium equality in Human Development Index (HDI) achievements between women and men) with a GDI value of 0.94. According to the HDI, BiH was ranked 74th worldwide out of 191 analysed countries. Another indicator, the Gender Inequality Index (GII), ranks BiH in the 38th position (GII value 0.136). Both analyses place BiH in the group of countries with High Human Development and very close to the highest-ranking group. These analyses show that participation in the labour force (percentage of all female citizens aged 15 and older) in BiH is 32.3% against 52.4% for males. In 2018, the Agency for Gender Equality of BiH published the “Gender Action Plan of Bosnia and Herzegovina (GAP BiH) for the period 2018-2022”²⁷. Since the Gender Equality Plan (GEP) is a mandatory document for public institutions to participate in Horizon Europe, numerous GEPs have already been prepared and published by BiH's institutions on their respective websites, as stipulated by the European Commission (EC). There is no official statistic on the number of institutions that have published GEPs, but based on information from the EU-funded Horizon 2020 project WBC-RRINET²⁸ and the University Gender Resource Centre at the University of Sarajevo²⁹, there is a total of eight public and four private universities in BiH which have published GEPs. Additionally, there are various other institutions, of which the numbers remain unknown (e.g., the University Clinical Centre of the Republic of Srpska and the PREDA Development Agency).

The only European Research Infrastructure Consortium (ERIC) listed at the European Strategic Forum on Research Infrastructures (ESFRI) where BiH institutions participate (11 institutions) is DARIAH ERIC³⁰, the Pan-European Digital Infrastructure for the Arts and Humanities in research. RESILIENCE entered the ESFRI Roadmap in 2021 and is currently in the preparation phase with operations expected to start in 2024.³¹ The University of Sarajevo is a prospective member of this research infrastructure.

Considering international cooperation, 25 participations (15 unique participations) with 21 signed grants amounting to 3.63 million euros of net EU contribution have been awarded to BiH in Horizon Europe³². The overall success rate of BiH in Horizon Europe is currently 13.33% which is far below the Horizon Europe average success rate of 21.76%. Although there are 265 active Actions³³ where BiH's researchers are involved, the number of main proposers from BiH is really low³⁴. BiH became a full member of the EUREKA Network in 2021³⁵. In July 2023, the University of Sarajevo became the coordinator of the Horizon Europe project “Stone monument ensembles and the climate change impact” (September 2023-August 2027). This makes it the first institution in BiH to coordinate a research and innovation action under the Horizon Europe programme. The aim of the project is to develop innovative and sustainable protection strategies for cultural heritage against the impact of climate change, natural hazards, environmental pollution and anthropogenic threats. An interdisciplinary approach is being used to assess the future of medieval tombstones and

²⁵ <https://euraxess.ec.europa.eu/jobs/hrs4r/awarded> (4.10.2023)

²⁶ <https://hdr.undp.org/data-center/specific-country-data#/countries/BIH> (12.10.2023.)

²⁷ https://arsbih.gov.ba/wp-content/uploads/2019/02/GAP-BIH-2018-2022_ENG.pdf (4.10.2023)

²⁸ <https://wbc-rrinet.net/gender-equality-plans-in-the-western-balkans/> (4.10.2023)

²⁹ <https://unigerc.unsa.ba/gender-akcioni-planovi/> (4.10.2023)

³⁰ <http://www.dariah.eu/> (1.10.2023.)

³¹ <https://roadmap2021.esfri.eu/projects-and-landmarks/browse-the-catalogue/resilience> (10.11.2023.)

³² https://dashboard.tech.ec.europa.eu/qs_digit_dashboard_mt/public/sense/app/1213b8cd-3ebe-4730-b0f5-fa4e326df2e2/sheet/0c8af38b-b73c-4da2-ba41-73ea34ab7ac4/state/analysis (14.10.2023.)

³³ https://www.cost.eu/cost-actions-event/browse-actions/?search=&start=&end=&approval_year=&country=BA&status=active&limit=10&sortBy=cso_approval_date&sort=DESC (11.11.2023.)

³⁴ <https://www.cost.eu/oc-2023-1-initial-analysis/> (11.11.2023.)

³⁵ <http://www.mcp.gov.ba/Content/Read/eureka-pocetna> (9.11.2023.)

similar stone monuments across Europe in the context of a changing climate, more precisely under two climate scenarios in three periods³⁶. The project involves nine institutions from three Western Balkan countries (BiH, Serbia and Montenegro) and six institutions from five EU countries (Malta, Austria, Germany, Croatia and France).

Furthermore, BiH universities are gradually joining different European university alliances, such as the European University for Justice, Peace and Inclusive Societies – EUPeace³⁷ in order to strengthen internationalisation efforts at various levels under the prefix of fostering a peaceful, just, and inclusive European landscape and with regard to ERA action number 4.

2.2. ERA Priority 2: Taking up together the challenges posed by the twin green and digital transition and increasing society’s participation in the ERA

There has been moderate progress in this priority area. Most important is that BiH is currently preparing a participation in the project funded under EU Mission Cancer. The capital of BiH, Sarajevo, was selected as one of 100 cities of the EU’s Mission “Climate-neutral and smart cities by 2030”³⁸.

The Environmental Strategy of the Republic of Srpska³⁹ was adopted on 17 November 2022 as an integral part of the Environmental Strategy of Bosnia and Herzegovina (BiH ESAP), which covers seven thematic areas: water management; waste management; biodiversity and nature protection; air quality, climate change and energy; chemical safety and noise; sustainable resources management; and environmental management. The Federal Ministry of Environment and Tourism also developed the strategic document "Federal Strategy of Environment 2022 – 2032"⁴⁰. Both documents are aligned with the UN’s Strategic Development Goals and developed within the project BiH ESAP 2030+⁴¹ led by the Stockholm Environment Institute (SEI) and financially supported by the Embassy of Sweden with the participation of all relevant stakeholders in BiH. The plans for implementing all strategies are currently under development and will start upon formal acceptance of the plans.

The latest document – still in force – entitled “Information Society Development Policy of Bosnia and Herzegovina for the Period 2017-2021”⁴² from 2017 created a vision as well as objectives and tasks to advance the development of ICT in line with the objectives of the EU’s “Digital Agenda” and supporting the creation of society-based knowledge.

The first project selected for funding under the call of Mission Cancer is an important step. The project is currently (as of October 2023) in the Grant Agreement preparation phase and is expected to start in January 2024.

During 2020, BiH recorded eight participations within the Capacity Building in Higher Education as part of the ERASMUS+ programme⁴³ providing means to strengthen capacities in HEIs. Relevant ministries, at all levels of authority, provide annual calls for funding through different grant schemes with the same purpose.

³⁶ <https://steccihorizontu.com/about/> (29.12.2023.)

³⁷ <https://www.eupeace.eu/en/network> (11.11.2023.)

³⁸ <https://eurocities.eu/latest/the-100-climate-neutral-and-smart-cities-by-2030/> (14.10.2023.)

³⁹ Environmental Strategy of Republika Srpska 2022-2032 adopted – BiH ESAP 2030+ (18.10.2023)

⁴⁰ <https://www.fmoit.gov.ba/upload/file/2020/Eday/Federalna%20strategija%20za%20za%C5%A1tite%20okoli%C5%A1a%202022-2032..pdf> (18.10.2023.)

⁴¹ <https://esap.ba/about-the-project/> (18.10.2023.)

⁴² <http://www.sluzbenilist.ba/page/akt/LhPPM81UcxE=> (18.10.2023.)

⁴³ https://erasmusbih.com/documents/projects/Call_EAC_A02_2019-selection_year_2020.pdf (6.10.2023.)

The UNDP signed a Memorandum of Understanding with the British Embassy in BiH in September 2020 to collaborate on digital transformation initiatives in the country. This cooperation has been further concretised through the launch of the Digital Transformation in the Public Sector project which aims to support authorities by shaping BiH's digital future. The project aims to promote new capabilities and leverage technology and innovation for more effective and inclusive governance and public service delivery.⁴⁴

There is a growing trend towards digitalisation of the SME sector, which is also reflected in the recent formation of Digital Innovation Hubs supported by the German Development Agency (GIZ) and the European Union. However, governments at all levels of government in cooperation with SMEs must provide additional financial and professional support for digitisation processes. In 2021, the Association for Digital Transformation in Bosnia and Herzegovina published a publication "Study on the Digital Transformation of Companies in Bosnia and Herzegovina", providing recommendations and a starting point for the establishment of a measuring instrument for research and monitoring of the state of digitalisation and digital transformation of business processes in BiH's companies.

BiH endorsed the Green Agenda for the Western Balkans (GAWB) at the Sofia Summit in 2020 and the Action Plan of the GAWB at the Brdo Summit in 2021. This regional strategy focuses on building a sustainable economy in line with the European Green Deal and aligns the region with the EU's ambition to make Europe carbon-neutral by 2050. The Action Plan includes 58 actions and seven roadmaps for implementation related to topics of climate policy, sustainable energy, sustainable mobility, circular economy, depollution, sustainable agriculture and food supply and protection of nature and biodiversity. The Regional Cooperation Council (RCC) has coordinated these processes of drafting the GAWB Declaration and Action Plan, based on intense consultations with all stakeholders.⁴⁵

2.3. ERA Priority 3: Enhancing access to research and innovation excellence and enhancing interconnections between innovation ecosystems across the EU

There is progress in the implementation of ERA Priority Area 3, which is relevant for the implementation of Digital Innovation Hubs (DIH). The development of the Smart Specialisation Strategy (S3) for BiH is progressing slowly. The participation in COST actions and EUREKA networks generates more international connections among researchers and innovation ecosystems.

The project "Innovation and digitalisation of small and medium-sized enterprises in Bosnia and Herzegovina", which includes the EU4DigitalSME project aims at creating an enabling environment for SMEs to successfully undertake digitalisation and innovation transformations. The EU4DigitalSME project is worth 6.1 million euros, of which the EU provides five million euros and the Federal Republic of Germany 1.1 million euros⁴⁶. Four hubs are funded through this project: Its4Health HUB Sarajevo (competitiveness and successful business), Idemo HUB Banja Luka (metalworking and woodworking), Digital Storm HUB Sarajevo (ecosystem of digital innovations) and Industrial HUB Tuzla (automation and robotics). In mid-2023, the INTERA Technology park published two calls for proposals⁴⁷

⁴⁴ <https://www.undp.org/bs/bosnia-herzegovina/projects/digitalna-transformacija-u-javnom-sektoru-u-bih> (10.11.2023.)

⁴⁵ <https://www.rcc.int/greenagenda> (11.11.2023.)

⁴⁶ <https://eu4digitalsme.ba/en/about-project/> (9.10.2023)

⁴⁷ <https://intera.ba/en/inovacijska-vaucer-shema-otvoren-javni-poziv-za-akademske-zajednice-i-istrazivacke-centre-za-pruzanje-usluga-malim-i-srednjim-poduzecima/> (10.11.2023.)

within the BOOST project funded by EU4Digital SME stimulating industry-academia collaboration in the form of an Innovation Voucher Scheme⁴⁸.

In 2009, BiH became a full member of COST. Due to easy access to the measures and a less stringent application system, which allows access to researchers with lower scientific visibility and achievements, this programme is of great interest to researchers in BiH. In 2021, researchers from BiH participated in 257 out of 289 actions (90%). The leadership positions were limited to 16 actions, and BiH researchers have participated in nine short-term scientific missions (STSMs)⁴⁹, while six STSMs were organised in BiH. The total budget received for these participations was 99,517 euros, keeping in mind that COST does not fund personnel costs (honoraria)⁵⁰.

2.4. ERA Priority 4: Advancing concerted research and innovation investments and reforms

BiH considers ERA priorities as important for the further development of its Science, Technology and Innovation (STI) sector. First developed in 2016, the ERA Roadmap for BiH⁵¹ laid out a scheme for the period 2017-2021 and is aligned with the ERA priorities of that period. It provides a very brief description of the lines of action as per the defined ERA priority.

However, concrete actions towards the implementation and an official reporting on this ERA Priority 4 are missing. At the level of the MoCA, there is a Subcommittee for Innovation, Information Society and Social Policy of the EU and BiH that discusses the progress in R&I.

3. Country-specific drivers and barriers

From the previously presented facts it becomes obvious that actions have been taken to follow the ERA Policy Agenda and to implement its principles in BiH. The readiness is significant on the side of researchers and HEIs, but the financial support by the relevant authorities is still limited and insufficient. There is an obvious lack of advanced and high-quality industrial capacities that prevents a full level cooperation of industry with research groups. As a result, investments in R&I are low, especially from the private sector.

However, there is an increasing interest of BiH researchers in international R&I cooperation through different EU R&I programmes such as Horizon Europe, COST, and EUREKA. Although a significant number of researchers have left the country, a positive trend can be observed in joint publications. Between 2017 and 2021, 53% of the scientific output was generated in collaboration with international partners, while 12.9% was the result of internal collaborations.

Each year, the MoCA releases a call for a grant scheme titled "Programs for the preparation of projects and potential candidates for funds from the HORIZON EUROPE programme". The scheme's objective is to provide additional funding to encourage participation in the programme. Ministries at both the entity and cantonal levels offer a variety of grant schemes to fund scientific publications, research projects and research infrastructure and capacity improvements.

⁴⁸ <https://intera.ba/en/inovacijska-vaucer-shema-otvoren-javni-poziv-za-podrsku-malim-i-srednjim-poduzecima/> (10.11.2023.)

⁴⁹ STSMs – Short-Term Scientific Missions (type of activity in COST action)

⁵⁰ https://www.cost.eu/uploads/2022/10/COST-Bosnia_and_Herzegovina-factsheet-2021.pdf (12.10.2023.)

⁵¹ https://era.gv.at/public/documents/2883/BiH_ERA_Roadmap.pdf (4.10.2023.)

4. Final remarks

In the case of BiH, moderate but steady progress towards the implementation of ERA Priority Areas/Actions and the implementation of the ERA Policy Agenda can be observed. Researchers from BiH participate in relevant initiatives and projects initiated by the EC, proving that they are adequate members of the European R&I community.

Some progress has been made in terms of participation in pan-European infrastructure initiatives (e.g., DARIAH ERIC and RESILIENT), but further efforts are needed by the relevant stakeholders to integrate BiH researchers in other ESFRI initiatives. Given the ongoing brain drain phenomenon in BiH, there is a shortage of qualified research personnel in the BiH labour market.

In July 2023, the University of Sarajevo signed a grant agreement for the project “Stone monument ensembles and the climate change impact” funded under the Horizon Europe programme. This makes the University of Sarajevo the first institution from BiH to coordinate a project under the Horizon Europe programme. Additionally, the University Clinical Centre of the Republic of Srpska became a partner in the Horizon Europe project funded under EU Mission Cancer.

There is clear progress in the area of gender equality: institutions willing to participate in Horizon Europe have already drafted and published more than eight GEPs, while others are in the preparatory phase and are expected to be published soon. The internationalisation of research is progressing slowly. It is crucial to provide further support to early-stage researchers to participate in COST actions in order to gain knowledge and visibility of research as a prerequisite for participation in EUREKA or Horizon Europe projects.

The relationship between academia and industry in BiH has been strengthened through the establishment of innovation centres. These centres serve as a hub for various training programs and support activities for industry partners. Additionally, they offer co-working spaces for those with limited resources and provide professional assistance. A noteworthy initiative that has proven successful in this regard is the EU4DigitalSME initiative, which is financially backed by the European Union and the Federal Republic of Germany.

The preparation of the S3 of BiH is crucial and needs to be carried out effectively. However, the process has been slow at the level of BiH, with only a few preparatory activities resulting in insignificant progress. Although relevant activities have been undertaken in the Republic of Srpska, progress has been slow due to a lack of efficiency in the consultation phase with stakeholders. To achieve results and move to the final phase of strategy formulation, collaboration between all relevant stakeholders is essential.

5. Bibliography

- A Framework for Research Infrastructure Roadmap of Bosnia and Herzegovina (Framework for RI Roadmap), Regional Cooperation Council, <https://www.rcc.int/download/docs/Framework%20for%20RI%20Roadmap%20BIH%20digital.pdf/41b22ea46441bd82bdeac746849563f7.pdf> (5.10.2023.)
- „Bosna i Hercegovina u brojkama 2021“, Agency for Statistics of Bosnia and Herzegovina, ISSN 1986-8561, Sarajevo 2021
- Bosnia and Herzegovina profile, SJR, Scimago Journal & Country Rank, <https://www.scimagojr.com/countrysearch.php?country=BA> (5.10.2023.)
- Bosnia and Herzegovina's profile at Horizon Europe Dashboard, https://dashboard.tech.ec.europa.eu/qs_digit_dashboard_mt/public/sense/app/1213b8cd-3ebe-4730-b0f5-fa4e326df2e2/sheet/0c8af38b-b73c-4da2-ba41-73ea34ab7ac4/state/analysis (12.10.2023.)
- Country dashboard Bosnia and Herzegovina, STIP Compass, <https://stip.oecd.org/stip/interactive-dashboards/countries/BosniaAndHerzegovina> (5.10.2023.)
- Country profile at COST, https://www.cost.eu/uploads/2022/10/COST-Bosnia_and_Herzegovina-factsheet-2021.pdf (12.10.2023.)
- Country Profile Bosnia and Herzegovina, European Innovation Scoreboard 2023, https://ec.europa.eu/assets/rtd/eis/2023/ec_rtd_eis-country-profile-ba.pdf (12.10.2023.)
- Country profile Bosnia and Herzegovina, Horizon Europe Dashboard, https://dashboard.tech.ec.europa.eu/qs_digit_dashboard_mt/public/sense/app/1213b8cd-3ebe-4730-b0f5-fa4e326df2e2/sheet/0c8af38b-b73c-4da2-ba41-73ea34ab7ac4/state/analysis (6.10.2023.)
- Country profile Bosnia and Herzegovina, Human Development Reports by UNDP, <https://hdr.undp.org/data-center/specific-country-data#/countries/BIH> (12.10.2023.)
- Development strategy of Federation of Bosnia and Herzegovina, <https://fzpzr.gov.ba/files/Strategije/Strategija%20razvoja%20BiH%202021.-2027..pdf> (3.10.2023.)
- Digital repository of Academic Archives from University of Banja Luka, <https://sova.unibl.org/en/homepage/> (4.10.2023.)
- ERA Priorities – Implementation Roadmap 2017-2021 BiH, https://era.gv.at/public/documents/2883/BiH_ERA_Roadmap.pdf (4.10.2023.)
- Erasmus+ Programme – Capacity Building in Higher Education, Call for proposals EAC/A02/2019, Selection Year 2020, https://erasmusbih.com/documents/projects/Call_EAC_A02_2019-selection_year_2020.pdf (6.10.2023.)
- Framework Law on Higher Education in Bosnia and Herzegovina, https://hea.gov.ba/data/Dokumenti/Osnovni_podaci_agencije/Zakoni-propisi_ENG.pdf (3.10.2023.)
- Gender Action Plan of Bosnia and Herzegovina 2018-2022, https://arsbih.gov.ba/wp-content/uploads/2019/02/GAP-BIH-2018-2022_ENG.pdf (10.10.2023.)
- Gender Centre of Federation of Bosnia and Herzegovina, <http://www.gcfbih.gov.ba/> (2.10.2023.)

- Gender Centre of the Republic of Srpska website, <https://www.vladars.net/eng/vlada/centers/centre/Pages/default.aspx> (2.10.2023.)
- Global Innovation Index 2023, Bosnia and Herzegovina, <https://www.wipo.int/edocs/pubdocs/en/wipo-pub-2000-2023-en-main-report-global-innovation-index-2023-16th-edition.pdf> (12.10.2023)
- Law on Higher Education in Republic of Srpska (Official Gazette RS, 67/20), 2020 (https://www.avors.org/images/propisi/the_law_oqaihers.pdf) (8.10.2023.)
- Law on quality assurance in Higher education of the Republic of Srpska, 2020 (https://www.avors.org/images/propisi/the_law_oqaihers.pdf) (8.10.2023.)
- List of institutions awarded with HRS4R logo, <https://euraxess.ec.europa.eu/jobs/hrs4r/awarded> (4.10.2023)
- List of institutions with GEPs published, <https://unigerc.unsa.ba/gender-akcioni-planovi/> (12.10.2023)
- List of institutions with GEPs published, <https://wbc-rri.net/gender-equality-plans-in-the-western-balkans/> (12.10.2023)
- List of journals from Bosnia and Herzegovina at DOAJ, https://doaj.org/search/journals?source=%7B%22query%22%3A%7B%22bool%22%3A%7B%22must%22%3A%5B%7B%22terms%22%3A%7B%22index.country_exact%22%3A%5B%22Bosnia%20and%20Herzegovina%22%5D%7D%7D%5D%7D%7D%2C%22size%22%3A50%2C%22sort%22%3A%5B%7B%22created_date%22%3A%7B%22order%22%3A%22desc%22%7D%7D%5D%2C%22track_total_hits%22%3Atrue%7D (5.10.2023)
- Ministry of Civil Affairs of Bosnia and Herzegovina, News page, <http://mcp.gov.ba/Publication/Category/sve-vijesti?page=1&category=2> (10.10.2023.)
- Policy of open access to scientific research infrastructure, University of Sarajevo, https://cir.unsa.ba/wp-content/uploads/2021/09/POLITIKA-OTVORENOG-PRISTUPA-II-UNSA_Senat_juni-2021-.pdf (8.10.2023)
- Policy of open access to scientific research infrastructure, University of Banja Luka https://etf.unibl.org/images/akta/ostali/Politika_otvorenog_pristupa_NII_UNIBL-ETF.pdf (8.10.2023)
- Public call for cofunding of research and artistic and development projects and programmes from Sarajevo Canton budget in 2022, https://mon.ks.gov.ba/sites/mon.ks.gov.ba/files/2022-05/Tekst%2520Javnog%2520poziva_2022_0.pdf (10.10.2023.)
- Recommendations for Implementing Quality Assurance in Higher Education in Bosnia and Herzegovina (<https://hea.gov.ba/Content/Open/444?n=Recommendations%20for%20Implementing%20Quality%20Assurance%20in%20Higher%20Education%20in%20Bosnia%20and%20Herzegovina>) (10.10.2023.)
- RING-20 project, CORDIS portal, <https://cordis.europa.eu/project/id/955424> (6.10.2023.)
- Roadmap of Research Infrastructures in the Republic of Srpska, <https://www.vladars.net/sr-SP-Cyrl/Vlada/Ministarstva/mnk/Documents/Roadmap%20of%20RI%20in%20the%20RS%20-%20FINAL.pdf> (7.10.2023)
- Sarajevo Canton Development Strategy 2021-2027, https://zpr.ks.gov.ba/sites/zpr.ks.gov.ba/files/sarajevo_canton_development_strategy_2021-2027.06.07.pdf (6.10.2023.)

- Science, technology and Digital Society First release 12.1.2023.
https://bhas.gov.ba/data/Publikacije/Saopštenja/2023/RDE_01_2021_Y1_1_BS.pdf (10.10.2023.)
- Standards and Guidelines for Quality Assurance in Higher Education in Bosnia and Herzegovina
(<https://hea.gov.ba/Content/Open/445?n=Standards%20and%20Guidelines%20for%20Quality%20Assurance%20in%20Higher%20Education%20in%20Bosnia%20and%20Herzegovina>) (8.10.2023.)
- Standards for accreditation of higher education institutions, 2022
(https://www.avors.org/images/propisi/Standards_for_accreditation_of_higher_education_institutions.pdf) (8.10.2023.)
- Standards for accreditation of study programmes first and second cycle of studies, 2022
(https://www.avors.org/images/propisi/Standards_for_accreditation_of_study_programs_first_and_second_cycle_of_studies.pdf) (8.10.2023.)
- Strategy for the development of science and technology, higher education and information society in Republic of Srpska for the period 2023-2029,
<https://www.vladars.net/sr-SP-Cyrl/Vlada/Ministarstva/mnk/Documents/%D0%A1%D1%82%D1%80%D0%B0%D1%82%D0%B5%D0> (2.10.2023.)
- Strategy of development of science in Bosnia and Herzegovina 2017-2022 (Revised framework document),
http://www.mcp.gov.ba/attachments/sr_Migrirani_dokumenti/%D0%A1%D0%B5%D0%BA%D1%82%D0%BE%D1%80%D0%B8/%D0%9D%D0%B0%D1%83%D0%BA%D0%B0_%D0%B8_%D0%BA%D1%83%D0%BB%D1%82%D1%83%D1%80%D0%B0/Nauka_i_kultura-dokumenti/NACRT_STR_ZA_NAUKU-lektorisana_strategija_sa_ugradjenim_kom_SR.doc (2.10.2023.)
- The Framework for Higher Education Qualifications in Bosnia and Herzegovina, 2007
(<https://hea.gov.ba/Content/Open/434?n=The%20Framework%20for%20Higher%20Education%20Qualifications%20in%20Bosnia%20and%20Herzegovina>) (8.10.2023.)
- The Gender Action Plan of Bosnia and Herzegovina (GAP BiH) for the period 2018-2022, Agency for Gender equality of Bosnia and Herzegovina,
https://arsbih.gov.ba/wp-content/uploads/2019/02/GAP-BIH-2018-2022_ENG.pdf (4.10.2023.)
- The Pan-European Digital Infrastructure for the Arts and Humanities in Research (DARIAH) website, <http://www.dariah.eu/> (1.10.2023.)
- The project “National Initiatives for Open Science in Europe” (NI4OS Europe),
<https://ni4os.eu/> (2.10.2023.)

6. Annexes

6.1. Annex 1: Graphs

There are currently no indicators for Bosnia and Herzegovina available in the 2023 ERA Scoreboard and Dashboard. The indicators presented in this annex are from Eurostat, UNESCO and the European Innovation Scoreboard 2023 and fit to the ERA Performance Indicators. Detailed information on the data sources, description of the indicators, time period for which the data is available, and the necessary calculations can be on the Eurostat and UNESCO websites and the European Innovation Scoreboard 2023 Methodology Report.

General Indicators

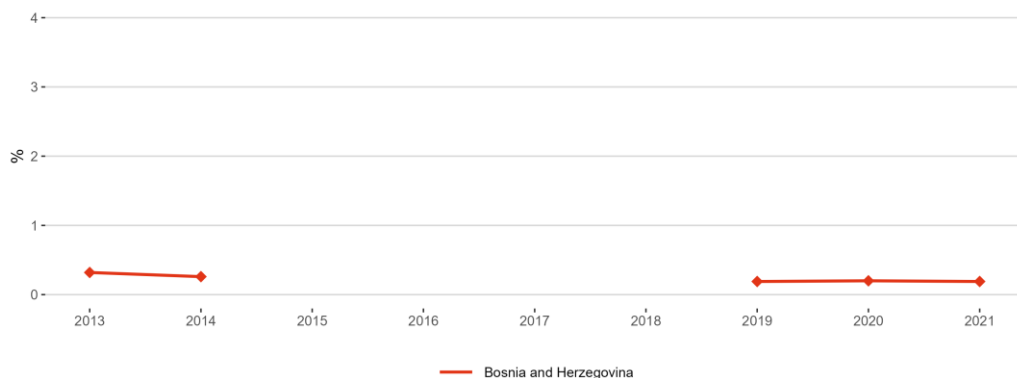


Figure 1: Gross Domestic Expenditure on R&D (GERD) as a percentage of GDP

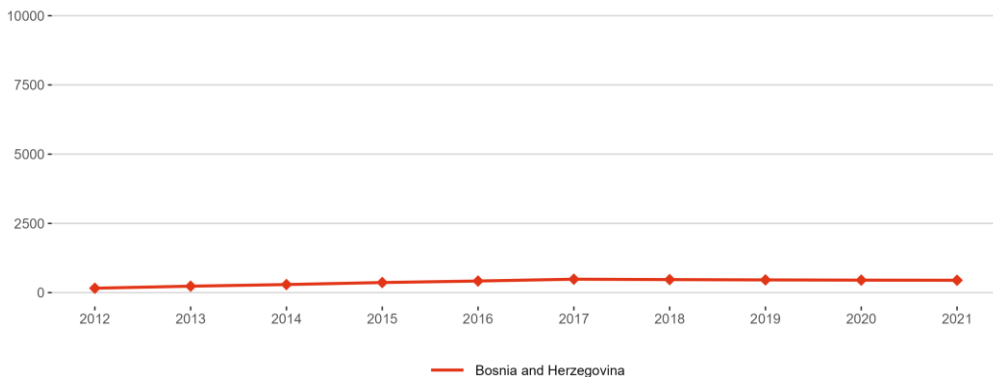


Figure 2: Researchers (in full-time equivalent) per million inhabitants

Priority 1: Deepening a truly functioning internal market for knowledge

Sub-priority 1.6: Scientific leadership

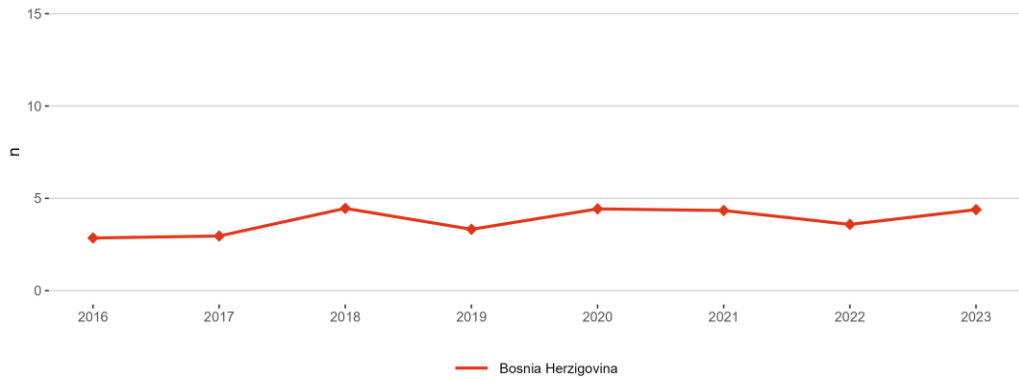


Figure 3: Number of scientific publications among the top-10% most cited publications worldwide as a percentage of all publications

Sub-priority 1.7: Global engagement

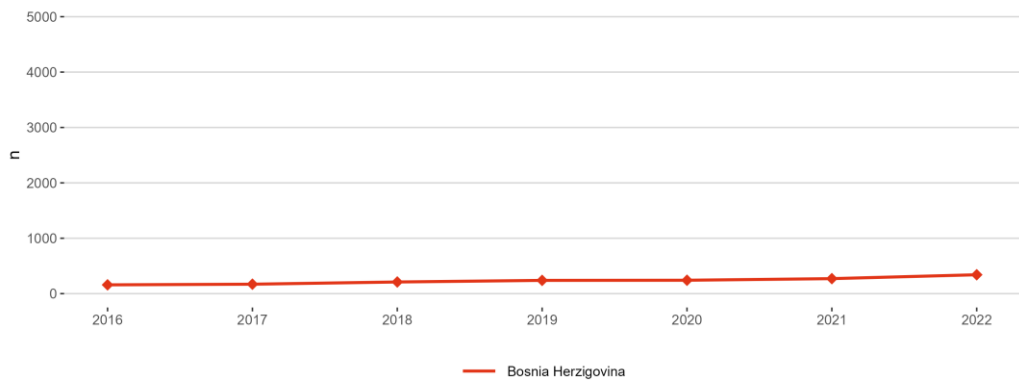


Figure 4: International co-publications with non-EU partners per 1,000 researchers in the public sector

Priority 2: Taking up together the challenges posed by the twin green and digital transition, and increasing society's participation in the ERA

Sub-priority 2.1: Challenge-based ERA actions

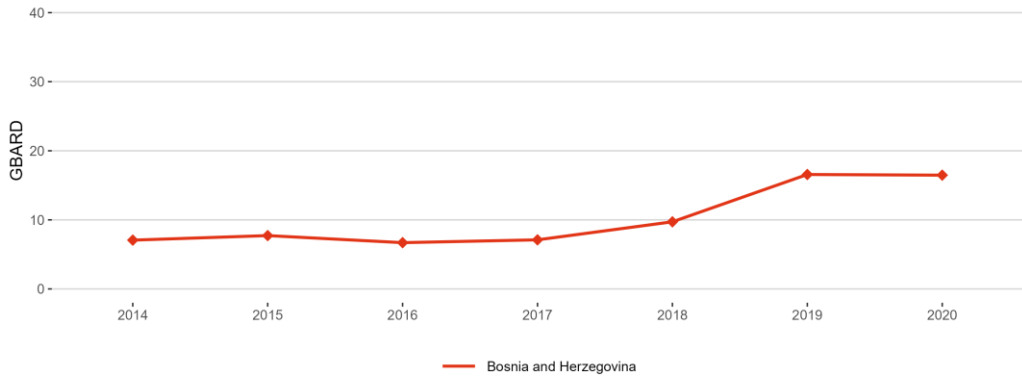


Figure 5: Government budget allocations for R&D (GBARD) according to NABS as share of total GBARD

Sub-priority 2.3: Synergies with sectorial policies and industrial policy, in order to boost innovation ecosystems

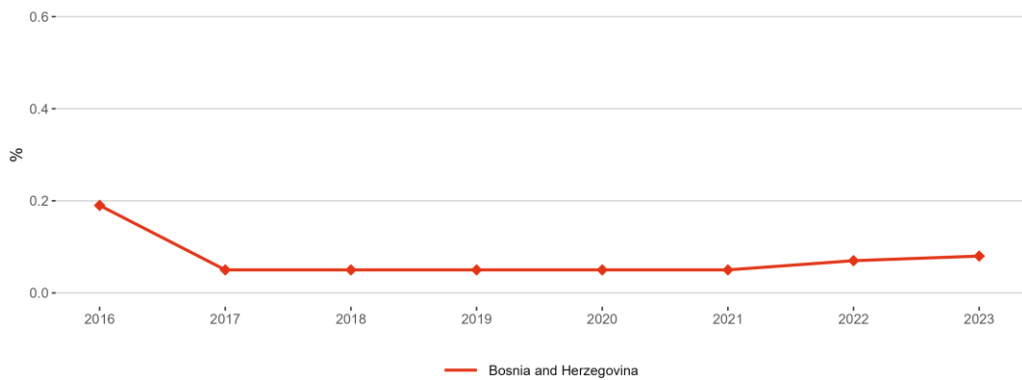


Figure 6: Direct government support and Indirect government support through R&D tax incentives as a percentage of GDP

ERA Priority 3 - Enhancing access to research and innovation excellence across the Union and enhancing interconnections between innovation ecosystems across the Union

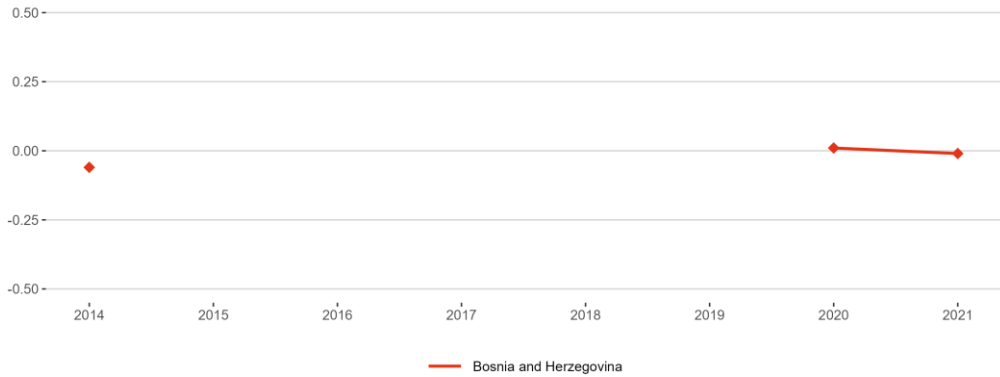


Figure 7: Increase in total R&D expenditure, expressed as a percentage of GDP

Priority 4: Advancing concerted research and innovation investments and reforms

Sub-priority 4.1: Coordination of R&I investments

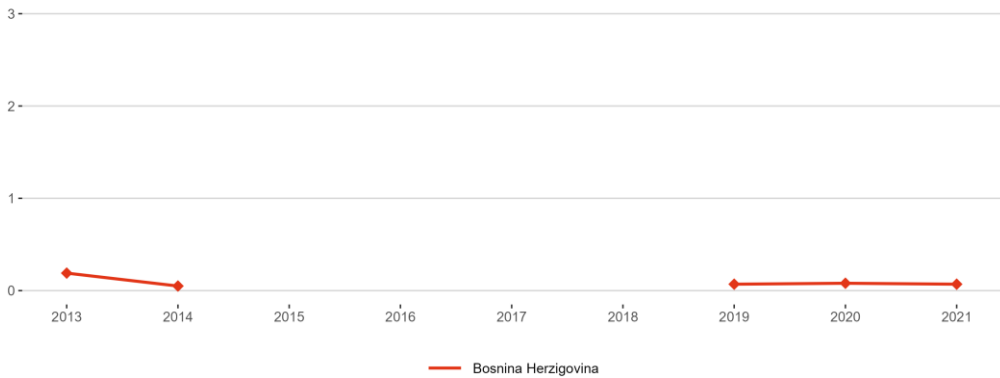


Figure 8: Share of public R&D expenditures financed by the private sector

GETTING IN TOUCH WITH THE EU

In person

All over the European Union there are hundreds of Europe Direct centres. You can find the address of the centre nearest you online (european-union.europa.eu/contact-eu/meet-us_en).

On the phone or in writing

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696,
- via the following form: european-union.europa.eu/contact-eu/write-us_en.

FINDING INFORMATION ABOUT THE EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website (european-union.europa.eu).

EU publications

You can view or order EU publications at op.europa.eu/en/publications. Multiple copies of free publications can be obtained by contacting Europe Direct or your local documentation centre (european-union.europa.eu/contact-eu/meet-us_en).

EU law and related documents

For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex (eur-lex.europa.eu).

EU open data

The portal data.europa.eu provides access to open datasets from the EU institutions, bodies and agencies. These can be downloaded and reused for free, for both commercial and non-commercial purposes. The portal also provides access to a wealth of datasets from European countries.

—
ERA Monitoring 2023: ERA Country Report Bosnia and Herzegovina.

Research and Innovation policy

