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ERA Country Report 2023

North Macedonia

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ERA Country Report 2023: North Macedonia

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ERA Country Report 2023

North Macedonia

Edited by Sasho Josimovski

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ERA COUNTRY REPORT 2023: NORTH MACEDONIA

Key takeaways:

- In September 2023, the working group of the Ministry of Education and Science proposed to commit to six ERA Actions under three Priority Areas of the ERA Policy Agenda.
- According to the European Innovation Scoreboard (EIS) 2023, in the period 2016-2023 the gap between North Macedonia's performance and the EU performance became smaller.
- In June 2023, the European Institute of Innovation & Technology (EIT) launched the first Innovation Hub in North Macedonia at the Centre for Technology Transfer and Innovation in Skopje (CTTIS).
- The development of the Smart Specialisation Strategy (S3) of North Macedonia is in its final stage.

1. National context

1.1. Overview of the ERA policy agenda implementation

According to the European Innovation Scoreboard (EIS) 2023, North Macedonia is an Emerging Innovator with its performance at 46.3% of the EU average. The performance is below the average of the group of Emerging Innovators (54.0%). There is, however, a slight increase compared to 2022 when it was 45.6%, but a substantial increase of about 14.5% when compared to 2016 (higher than that of the EU with 8.5%). Therefore, the gap between North Macedonia's performance and the EU performance is becoming smaller. Relative strengths of North Macedonia are documented by the indicators Foreign doctorate students, Environment-related technologies, Non-research and development innovation expenditures and Medium and high-tech goods exports, which have performances higher than the EU average. The weakest innovation dimension for North Macedonia is Intellectual assets with the performance index being at 14.4% of the EU average. Also, the performances of the indicators Design applications, research and development (R&D) expenditure in the business sector, Government support for business R&D and Lifelong learning are well below EU average (less than 10% of EU average).

In September 2023, the working group of the Ministry of Education and Science (MES) proposed to commit to six ERA Actions from the ERA Policy Agenda, out of which three actions belong to the Priority Area 'Deepening a truly functioning internal market for knowledge'. Two other ERA Actions belong to the Priority Area 'Taking up together the challenges posed by the twin green and digital transition, and increasing society's participation in the ERA'; and one ERA Action belongs to the Priority Area 'Amplifying access to research and innovation excellence across the Union'.

The key national strategies and policies that are dedicated to the implementation of the ERA Policy Agenda in the country are the Smart Specialisation Strategy (S3), the Law on Higher

Education (LHE) from 2018, the Law on Innovation Activity (LIA) from 2013, and the Law on Scientific and Research Activities (LSRA) from 2008 along with changes of the Law adopted in 2021. The Fund for Innovation and Technological Development (FITD) is a leading government institution supporting research and innovation (R&I) activities in the country. Therefore, it is expected to support the implementation of the ERA Policy Agenda.

1.2. Policy context

The R&I system of North Macedonia and its governance are highly centralised at state level. The Government of North Macedonia is the highest executive body responsible for preparing and implementing the national research policies. At the operational level, the main ministries involved in R&D and innovation policies are the MES and the Ministry of Economy (ME). The main advisory and expert body for higher education (HE), R&D and innovation, is the governmental National Council for Higher Education and Scientific and Research Activities (NCHESRA), envisioned in the LHE.

According to the latest available data from the State Statistical Office of North Macedonia (SSORNM), the Gross Expenditure on R&D (GERD) as a percentage of Gross Domestic Product (GDP) was 0.38% in 2021, slightly higher than in 2018, when it was 0.36%. In absolute numbers, the GERD increased by 13%, from 39.1 million euros in 2018 to 44.2 million euros in 2021. However, the structures of the Macedonian GERD by sector of performance and funding sources are unfavourable. The government sector is the main sector for funding R&D activities in North Macedonia with 47.55% of GERD in 2021; 73.92% of the R&D funding mainly comes from both public sources, the government sector and the public Higher Education Sector (HES). The private R&D funding was only 20.59% of the GERD in 2021, which is lower than it was in 2018 (24.05%). Another weakness of the R&D system is the share of Business Expenditures on R&D (BERD), which was 22.00% of the GERD in 2021 and also lower than in 2018 (30.57%). The leading performing sector in the country was the HES with a share of 58.00% of the GERD in 2018 and 66.40% of the GERD in 2021.

The S3 of North Macedonia is in the final stage of development and was submitted to the Government for adoption by November 2023. It is expected to emphasise selected vertical priority sectors (smart agriculture and food with higher added value; electro-mechanical industry - industry 4.0; ICT; and sustainable materials and smart buildings) and horizontal priority domains (energy for future; and tourism). The Action Plan covering the first two years of the implementation of the strategy is under preparation. It includes programmes, projects, measures and instruments, which will enable skills development, green and digital transformation, new initiatives and improvement of the links between academia and business sector. FITD remains the key institution for the implementation of the strategy's priorities and instruments.

2. Implementation of the ERA policy agenda

The MES is in the process of selecting ERA Actions from the ERA Policy Agenda, to which the country will commit. The proposal consists of the following six ERA Actions, grouped by Priority Areas:

Priority Area 'Deepening a truly functioning internal market for knowledge':

1. Enable the open sharing of knowledge and the re-use of research outputs, including through the development of the European Open Science Cloud (EOSC);

2. Promote gender equality and foster inclusiveness, taking note of the Ljubljana declaration;
3. Deepening the ERA through protecting academic freedom in Europe;

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

4. An ERA for green energy transformation;
5. Accelerate the green/digital transition of Europe's key industrial ecosystems;

Priority Area 'Amplifying access to research and innovation excellence across the Union':

6. Enhance the strategic capacity of Europe's public research performing organisations.

The main data sources are official internal and public governmental reports on the progress of the S3 and on the adoption of the ERA Actions from the ERA Policy Agenda, along with the publicly available data from FITD and the EIS.

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

There are several initiatives in North Macedonia relevant to ERA Actions, which are in the process of adoption, the country not having committed to them yet.

In 2021, the National Open Science Cloud initiative in North Macedonia (NOSCI.MK) was established, with the main objectives to participate in the European Open Science Cloud (EOSC) governance and of policy making representing the national views and Open Science (OS) development strategies. NOSCI.MK is a part of the National Initiatives for Open Science in Europe (NI4OS Europe). It aims at being a core contributor to the EOSC service portfolio.¹

In the period 2018-2022, based on SciVal, the total number of publications indexed in Scopus from North Macedonia was 5,974 from 4,564 authors. The share of Outputs in Top Citations Percentiles (top 10%, field-weighted) was 12.5% for 2022, or 11.1% for the period 2018 - 2022.²

Based on the search of the Scopus database, the number of all Open Access publications for the country was 6,415 as of 7 November 2023. Within that number 2,955 were tagged as Gold, 603 were tagged as Hybrid Gold, 1,693 were tagged as Bronze and 4,184 were tagged as Green. The number of Open Access publications for North Macedonia was 1,404 for 2022, which reflects a 34.7% increase from 2019.³

In North Macedonia, no R&D-specific action or measure is proposed by the national authorities regarding gender equality and gender dimension in the field of research. However, gender equality as a principle in all private and public sectors and decision-making bodies has been enshrined in the Constitution, the Law on Equal Opportunities of Women and Men (LEO) with its changes adopted in 2014 and the Strategy on Gender Equality 2022-2027 along with the Action Plan for the period 2022-2024.

¹ <https://ni4os.eu/15-national-osc-initiatives/north-macedonia/>

² The data was obtained on 7 November 2023

³ The data was obtained on 7 November 2023

Academic freedom, as stipulated in the LHE from 2018, belongs to all members of the academic community. Academic freedom includes freedom of expression, nurturing and encouraging critical thought and awareness among members of the academic community and freedom in scientific research work, in artistic creation and in the application and mediation of knowledge. Academic autonomy guarantees the intellectual freedom of members of the academic community and the creative nature of the research and educational process, as top values and abilities.

Institutions from North Macedonia are full or associated members of several large research infrastructures (RI) in Europe which is pertinent for the ERA Action 'Strengthening sustainability, accessibility and resilience of research infrastructures in the ERA'. The existing research potential of North Macedonia in terms of infrastructures is presented by the Research Infrastructure Roadmap of North Macedonia, published by the Regional Cooperation Council (RCC) in March 2022.

There is not much data available on the performance of the indicators related to the ERA Actions that are in the process of adoption.

The Global Gender Gap report of the World Economic Forum for 2023 indicates that gender equality in North Macedonia has decreased to 0.711 (compared to 0.716 in 2022), which ranks the country 29th out of 36 European countries⁴. North Macedonia published the second report on Gender Equality Index (GEI) for North Macedonia in 2022, based on the methodology of the European Institute for Gender Equality. According to the report, the GEI score for North Macedonia in 2022 was 64.5 points out of 100 and shows an increase of 2.5 points compared to the previous measurement in 2019.⁵ The country is still positioned behind the EU Member States' average (EU-27), with 3.5 points less. However, the gap has decreased compared to the previous measurement where it was even 4.2 points below the EU average.

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

Energy for the future is considered a horizontal priority; it is subject to further elaboration within the S3, since it has strong cross-sectoral relations with other proposed priority areas and is in line with the process of greening the industry and protection of the environment. This is in accordance with the Strategy for Energy Development of North Macedonia up to 2040⁶, adopted by the Government of North Macedonia in December 2019. The strategy provides the directions for development of the energy sector in North Macedonia, emphasizing an ambitious transition towards low-carbon economy, with renewable energy sources.

The implementation of the new S3 as a stimulus for innovation, research and growth through green and digital transition is recognised in the strategy's Action Plan, which is under preparation. Therefore, green and digital transitions are integral parts of the S3 concept. FITD is the key institution for the implementation of the strategy, along with the responsible Ministries and implementing institutions. The FITD, the MES and the ME are already planning a budget line for 2024 for the implementation of the measures, instruments and several pilot

⁴ https://www3.weforum.org/docs/WEF_GGGR_2023.pdf

⁵ https://mtsp.gov.mk/content/pdf/2023/Gender-Index-2022_EN-web.pdf

⁶ https://economy.gov.mk/Upload/Documents/Adopted%20Energy%20Development%20Strategy_EN.pdf

projects envisioned in the Action Plan. Also, financial support is expected by Instrument for Pre-Accession Assistance (IPA) funds and other donor projects.

The FITD supports certain measures related to social challenges such as climate change and the Green Agenda. The open calls of 2022 contain a budget line targeting the Challenge for Tackling Climate Change with 120,000 euros. Also, FITD opened a call for funding research projects called "Challenge for young researchers 5 - GREEN PROJECTS" at the end of 2022. A total of 16 projects were selected for funding and will be implemented in 2023.⁷

FITD supports the digitalisation of both the public and the private sector. The public sector was supported with specific projects in the fields of culture, health and education, selected through three public calls announced in 2021. The private sector was supported with a fund of 295,000 euros for 13 small and medium-sized enterprises (SMEs) from the agricultural, food and tourism sectors, selected within the call for Innovations through digital transformation, realised by FITD in 2023.⁸ These initiatives enable an increase of innovations and competitiveness of the enterprises through implementation of digital solutions.

The future plans of FITD for the period 2023-2025 include the Green Business Facility initiative which is supported by a budget of 27 million euros. This facility consists of two activities, namely the 'Establishment of greening business facility' (2 million euros), and 'Investing in green business' (18 million euros) from IPA III funds, as well as additional 7 million euros from the state budget. The initiatives will stimulate private companies to invest in areas such as industrial innovation, circular economy, green buildings, clean energy resources and sustainable mobility. The gender perspective will also be taken in consideration.⁹

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

The HES is the main R&I performing sector in the country with a share of 66.40% of GERD in 2021, comprising 80% of the total number of researchers. The R&I management capacity and guidance for researchers and innovators in the HES, as well as in other sectors, is low and there is a lack of institutional support for research and of sufficiently qualified and experienced management and administrative staff. At most of the institutions in the HES, despite the positions of vice deans and vice rectors for science and research, the institutional leadership does not have much influence on research and the individual researcher's autonomy is very high. In other words, the institutional governance system does not support strategic research development, effective and efficient management and further development of the research capacity.¹⁰ No specific initiative has been envisioned to mitigate this issue.

The Law on Administrative Servants and the Law on Public Sector Employees envision the professional development and improvement of the capacities of administrative officials as the foundation for successful public administration in all sectors, including the R&I sector. Training enables employees to acquire new knowledge and practical skills needed for work, leadership, management and organisational behaviour according to accepted rules,

⁷ <https://fitr.mk/%d0%bf%d1%80%d0%b5%d0%b4%d0%b8%d0%b7%d0%b2%d0%b8%d0%ba-%d0%b7%d0%b0-%d0%bc%d0%bb%d0%b0%d0%b4%d0%b8-%d0%b8%d1%81%d1%82%d1%80%d0%b0%d0%b6%d1%83%d0%b2%d0%b0%d1%87%d0%b8-5/>

⁸ <https://fitr.mk/wp-content/uploads/2023/07/Rezultati-Predizvik-DigitalnaTransformacija-MKD.pdf>

⁹ https://wbc-rti.info/object/document/24506/attach/11_Festim_Halili.pdf

¹⁰ https://eua.eu/downloads/content/western_balkan_report_final_-_2018_07_02.pdf

regulations, and standards, in order to successfully respond to the demands of the workplace, changes in the market and consumers.

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

North Macedonia has not selected any ERA Action from this ERA Priority Area to commit to. However, there is an initiative related to the ERA Action 'Establish an efficient and effective ERA monitoring mechanism' belonging to this Priority Area.

In 2021, the NCHESRA was established as an independent professional body that was commissioned to prepare a National Programme for Scientific and Research Activity of North Macedonia (NPSRA). This programme is under preparation and has an important role in defining indicators for the monitoring and the evaluation of the system.

3. Country-specific drivers and barriers

The commitment of the Government of North Macedonia to the priorities of the new S3 and the ERA Policy Agenda is expected to prioritise investments in R&I in order to facilitate the green and digital transitions and to improve researchers' access to excellent facilities and infrastructures across the EU. Furthermore, the FITD's initiatives to support the proposed priorities in the S3 will significantly strengthen its implementation, through transferring the results to the national economy, and increase competitiveness of domestic companies.

FITD is a leading governmental institution supporting the national R&I system according to the number and the scope of the realised projects, as well as the size of the funds at its disposal. As of October 2023, the Fund has co-financed 1,067 projects with a joint investment of 123 million euros through its financial instruments.¹¹ In 2022 and 2023, the financial support of the FITD amounts to 33 million euros. Additionally, in April 2023 the FITD submitted an application for accreditation at the Green Climate Fund, after it had been assigned for this role by the Government of North Macedonia. The accreditation is expected to be completed during 2024.

The score in the EIS enables North Macedonia to take part in the Regional Innovation Scheme (RIS) of the European Institute of Innovation and Technology (EIT) for the period 2021-2024. In June 2023, the EIT launched the first joint regional Innovation Hub in North Macedonia at the Centre for Technology Transfer and Innovation in Skopje (CTTIS). The Hub takes regional innovation to the next level and provides local entrepreneurs, innovators and learners with innovation support.

The specific national policies, priorities and measures are mainly well defined, but the existing inherited weaknesses such as unavailability of sufficient funding from both public and private sources had a negative influence on the overall effectiveness of the measures, which in turn slowed down their implementation and caused an absence of significant results.

¹¹ <https://fitr.mk/>

4. Final remarks

The S3, the ERA Actions to which the country commits and the NPSRA have a high priority in the work programme of the responsible governmental institutions. Their adoption is expected to take place at the beginning of 2024. Despite the improvement of the country's performance in Horizon Europe and the increased participation in the operations of several large European RI that are substantially important for the development of pan-European and regional research projects and environments (such as EOSC), delays in the adoption of the key strategies, programmes and priorities could reduce the effectiveness and efficiency of R&I funds.

Some progress in the R&I capacities is made through the newly joint regional Innovation Hub at the CTTIS, opened in June 2023. The Hub will represent all the EIT's Knowledge and Innovation Communities (KICs) and focus on attracting and engaging an increasing number of participants from North Macedonia to the EIT Community activities. Additionally, the hub will provide innovators with a centralised source of information on all services and opportunities provided by the entire EIT Community, both locally and more widely.

Well-developed science and technology parks are rare in North Macedonia and their potential is not adequately recognized by the business sector.

The declarative commitment of the government for supporting R&I activities does not coincide with the available R&I figures, which show that public funding is very low both in relative and in absolute terms. Under-funding of R&I by both the public and the private sectors, along with other weaknesses such as the low business share of the GERD, are serious threats for the leading role of R&I in the creation of a knowledge-based society through green and digital transition.

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6. Annexes

6.1. Annex 1: Graphs

There are currently no indicators for North Macedonia 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

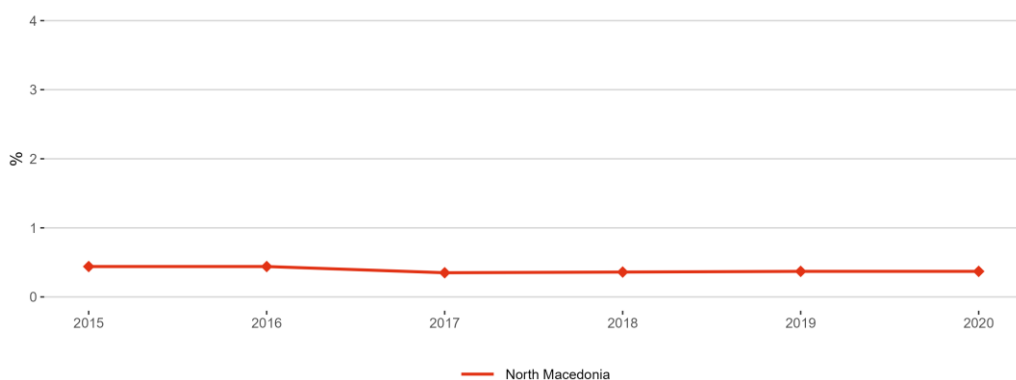


Figure 1: Gross Domestic Expenditure on R&D (GERD) as a percentage of GDP

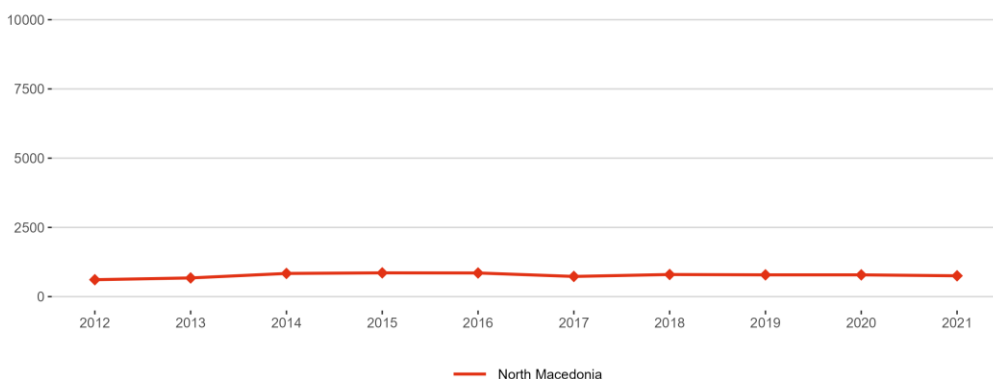


Figure 2: Researchers (in full-time equivalent) per million inhabitants

Priority 1: Deepening a truly functioning internal market for knowledge

Sub-priority 1.4: Researchers' careers and mobility and research assessment and reward systems

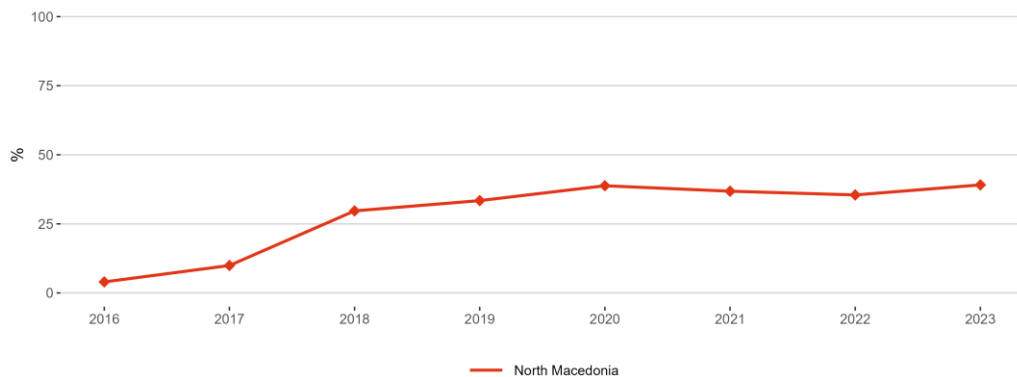


Figure 3: Share of foreign doctorate students as a percentage of all doctorate students

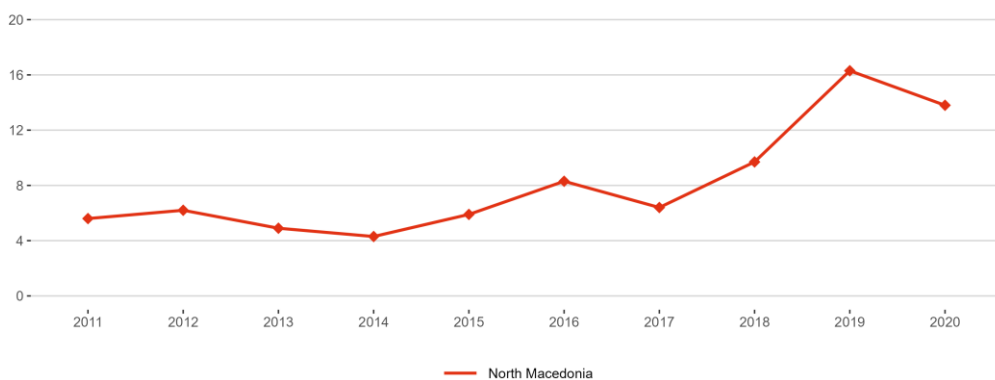


Figure 4: Job-to-job mobility of Human Resources in Science and Technology

Sub-priority 1.6: Scientific leadership

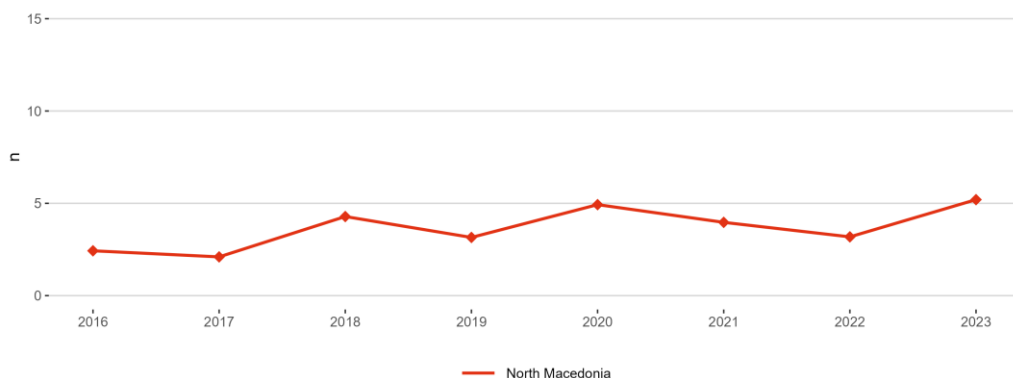


Figure 5: Number of scientific publications among the top-10% most cited publications worldwide as a percentage of all publications

Sub-priority 1.7: Global engagement

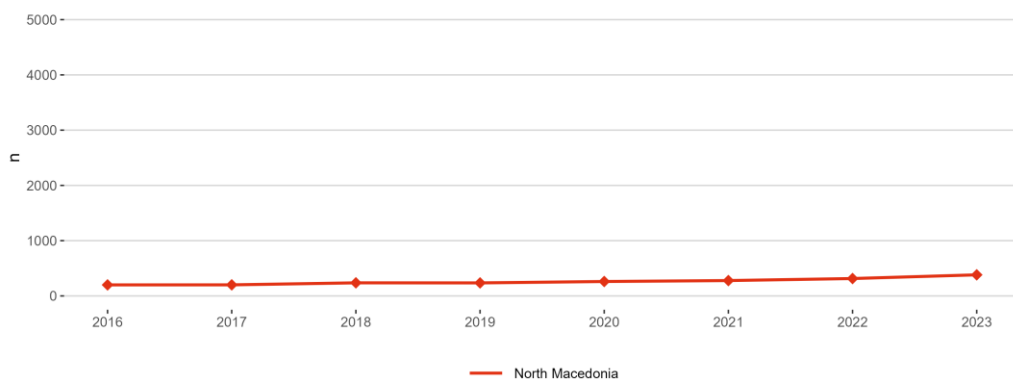


Figure 6: International co-publications with non-EU partners per 1,000 researchers in the public sector

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

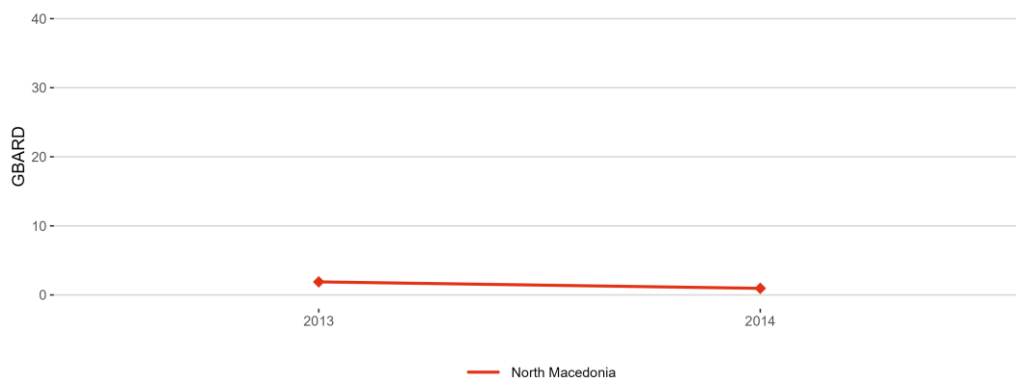


Figure 7: Government budget allocations for R&D (GBARD) according to NABS as share of total GBARD

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

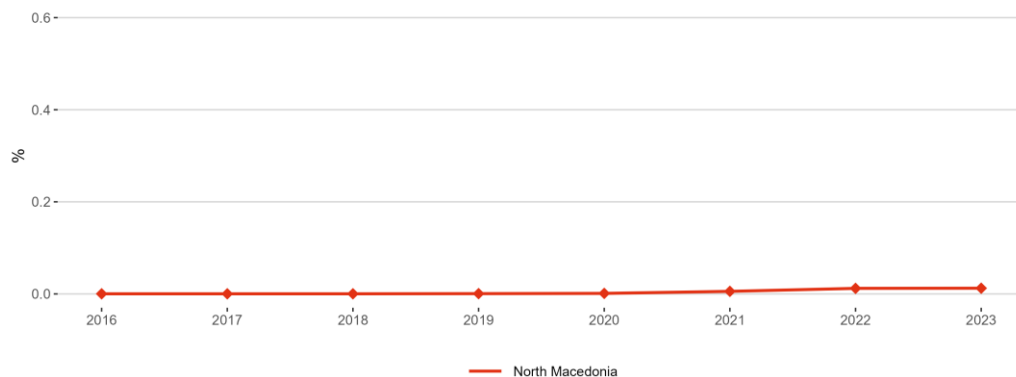
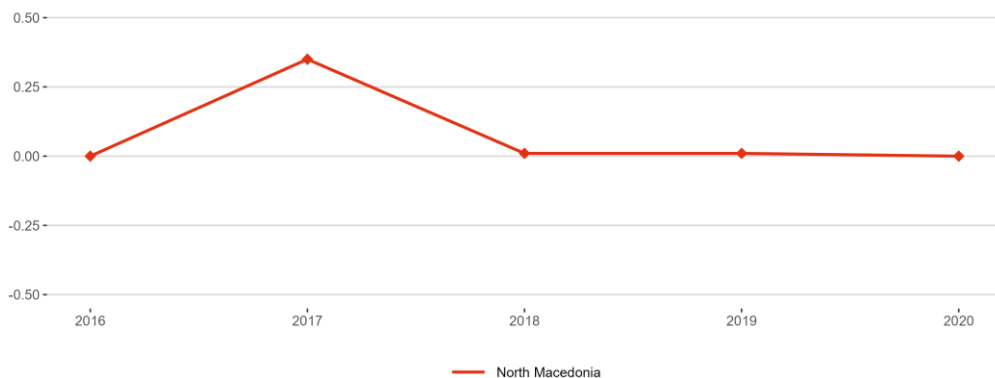


Figure 8: Direct government support and Indirect government support through R&D tax incentives as a percentage of GDP

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



Priority 4: Advancing concerted research and innovation investments and reforms

Sub-priority 4.1: Coordination of R&I investments

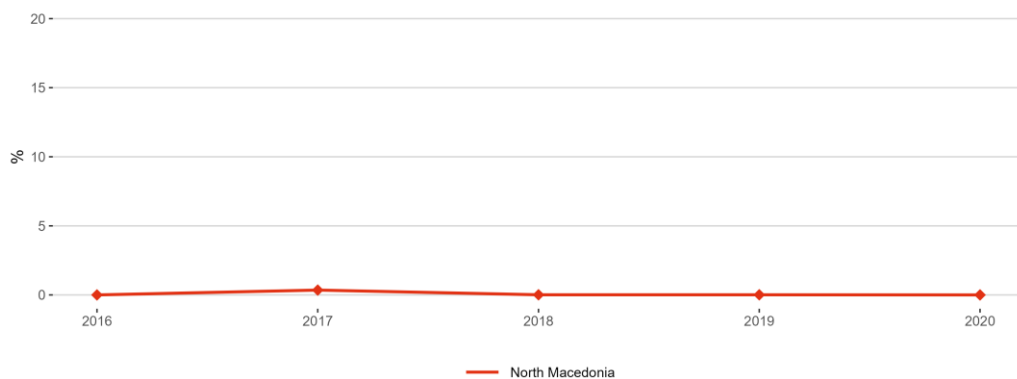


Figure 9: Share of public R&D expenditures financed by the private sector

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Research and Innovation policy

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