GREEN AGENDA MOLDOVA

SEI Stockholm Environment Institute

Sweden Sverige

Thematic Assessment on Research, Development, and Innovation (R&I) for the Republic of Moldova

Part of the Green Agenda for Armenia, Georgia, Moldova, and Ukraine project

June 2024

Authored by:
Sergiu Porcescu, National expert
Diana Russu, National expert
Kaidi Tamm, Team lead
Khatia Revazishvili, Thematic coordinator

Table of contents

Introduction

Research, development, and innovation cross-cutting thematic area is referred to as research and innovation (R&I) in the Green Agenda for Georgia, Ukraine, Moldova and Armenia project.[1] The key definitions in the field of R&I used in this report are aligned with those of the OECD Frascati Manual[2] and Eurostat-OECD Oslo Manual.[3]

Research and Development (R&D) refers to creative and systematic work undertaken to increase knowledge, including knowledge of humankind, culture, and society, and devise new applications, systems, services, processes, or products based on available knowledge.

Innovation is using new ideas and knowledge from R&D to implement new technologies, management processes, products or services to the market/society. An innovation is a new or improved product or process (or combination thereof) that differs significantly from previous products or processes and has been made available to potential users. Whereas R&D turns money into knowledge, innovation builds on R&D by creating a business out of this knowledge: finding the best, sustainably and commercially viable solutions, more effective products, processes, services, technologies, or business models to fit the market/meet the social needs.

Over the last decade, the European Union (EU) R&I policy has been redesigned to ensure that the results of public funding support, enable, and drive the green transition while ensuring that the EU remains competitive. Becoming the world's first climate-neutral continent by 2050 requires innovative solutions to modernise the EU's economy and society and reorient them towards a just and sustainable future.[4] R&I drives transformative change needed for tackling predictable as well as unexpected

[1] European Commission (n.d.). *Research and innovation for the European Green Deal*. https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/environment-and-climate/european-green-deal_en (February 2024).

[2] OECD (2015). *Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development, The Measurement of Scientific, Technological and Innovation Activities*, OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264239012-en (February 2024).

[3] OECD/Eurostat. (2018). *Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation* (4th ed.). Paris: OECD Publishing / Eurostat. https://doi.org/10.1787/9789264304604-en (February 2024).

[4] European Commission, DG Research and Innovation. (2022). *Science, research and innovation performance of the EU 2022 – Building a sustainable future in uncertain times*. Luxembourg: Publications Office of the European Union. https://data.europa.eu/doi/10.2777/78826 (February 2024).

events, accelerating the necessary transitions, deploying and demonstrating solutions, and engaging citizens in social innovations.[5]

The diffusion of R&I results across economic sectors and EU borders and their transformation into innovative and marketable products and services are key to realising the European Green Deal (EGD) and developing an economy that works for people.

This report maps Republic of Moldova's (hereinafter Moldova) extent and success in aligning R&I policy and capacity with that of the EU in light of the EGD (European Green Deal). This will help drive and navigate long-term changes and develop a cleaner, greener, and fairer society.

1. Current state and trends

1.1 The profile of the cross-sectoral area

Overall, the R&I system of the Republic of Moldova faces a precarious situation with limited connection to the national economy. In terms of human potential, the number of scientists is diminishing, and the outflow of researchers is higher than the inflow[6] (3900 employees in 2022[7], including 2809 researchers, 6.4% less than the previous year).

In terms of funding, gross domestic expenditure on R&D (GERD) was only 0.23% of GDP in 2022 (approx. EUR 32.6 mln), with a R&D spending per capita in Moldova of about EUR 13 in the same year, compared to €244[8] at the EU level in 2021. The current R&D expenditures were mainly directed to natural sciences (35.2%), followed by medical sciences (17.6%), agricultural sciences (17.3%) and engineering and technology (14.6%).

---

[5] European Commission. (n.d.). *Research and innovation for the European Green Deal*. https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/environment-and-climate/european-green-deal_en (March 2024).

[6] Directorate-General for Neighbourhood and Enlargement Negotiations (2023). *Moldova Report 2023*. https://neighbourhood-enlargement.ec.europa.eu/system/files/2023-11/Moldova%20Report%202023.pdf (March 2024); European Commission, Directorate-General for Research and Innovation, Porcescu, S. (2022). *Support to Moldova on reforms in the public R&D sector – Background report*. Luxembourg: Publications Office of the EU. https://data.europa.eu/doi/10.2777/78646 (March 2024).

[7] National Bureau of Statistics of the Republic of Moldova (n.d.). *Latest statistical data on R&D*. https://statistica.gov.md/ (February 2024).

[8] Eurostat (2022). *How much money does your government allocate for R&D?* https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20220803-1 (March 2024).

The Ministry of Education and Research oversees government R&I policy, while the National Agency for R&D serves as the primary funding agency. The Academy of Sciences of Moldova acts as the government's autonomous strategic advisory body. In 2022, the research landscape comprised 67 research-performing entities (75% public institutions), encompassing 39 research institutes and centres, 18 universities, and 10 other establishments.[9]

The National Programme for R&I for the 2024-2027 period serves as the strategic mid-term document that states R&I strategic priorities over a four-year timeframe.[10] However, the document predominantly covers public research initiatives and does not provide a comprehensive, strategic vision with a holistic, whole-of-the-society approach. Several topics relevant for the green transition are among the scientific directions of the five strategic priorities adopted for the next four years, based on which the sector will be funded (h*ealth, sustainable agriculture, food security, biotechnology and environmental protection, societal challenges, innovative technologies, sustainable energy, digitalisation*). The national smart specialisation strategy (S3) is expected to be approved in the coming months, and the green agenda is present in the specialisation domains *Energy, Agriculture and Food processing*. Concerning other policy documents, the *Digital Transformation Strategy for the Years 2023-2030*[11] (approved in September 2023) and the set objectives for increasing the role of R&I for the transition towards, respectively, a digital and green economy.

R&D intensity in the private sector is low in terms of performance and funding. According to the latest national statistics, 11.4% of firms conducted innovative activity during 2021-2022. This is significantly lower than the EU average of approximately 53% in 2020.[12] Insufficient absorptive capacity within firms is a primary challenge to improving productive capacities and enhancing innovative activities in the private sector.[13] Regarding digital innovations, Moldovan business entities are lagging in Information and Communications Technologies (ICT) skills - in 2020, less than 17% of SMEs in non-IT sectors reported having successfully integrated digital tools into their

[9] Government of Moldova (2022). *Decision on absorption of research institutes into universities.* In July 2022, GoM approved the absorption of 19 research institutes previously under the aegis of MER by universities. 3 other universities were absorbed as a part of the same process.

[10] Government of Moldova (2023). *Hotărâre Nr. HG1049 din 21.12.2023 pentru aprobarea Programului național în domeniile cercetării și inovării pentru anii 2024–2027*. https://mecc.gov.md/sites/default/files/pnci_merged.pdf (March 2024).

[11] Ministry of Economic Development and Digitalization (2023). *Digital Transformation Strategy of the Republic of Moldova for the Year 2023–2030*. https://mded.gov.md/transparenta/64373-2/ (March 2024).

[12] Eurostat (2022). *More than half of EU businesses innovate*. https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20221118-2 (March 2024).

[13] UNECE (2022). *Innovation for Sustainable Development Review of Moldova*. https://unece.org/sites/default/files/2022-01/I4SDR_MOLDOVA_2021_web_full%2Bcover.pdf (March 2024).

business.[14] Despite the above-mentioned, Moldova is an innovation leader in Eastern Europe and the South Caucasus region, since it produces more innovation outputs relative to its level of innovation investments.[15] In 2022, the country increased its Global Innovation Index ranking to 56th, from 64th in 2021.[16]

Aligning R&I policy with the EGD presents a series of challenges, such as ensuring adequate funding for R&I and innovation initiatives focused on green technologies and climate solutions, ensuring coherence and alignment between national R&I priorities and the EGD objectives, and ensuring a sufficient pool of researchers dealing with EGD-related research topics. At the same time, there are gaps such as obsolete research infrastructure dedicated to green innovation and climate research, limited science-business collaborations and lack of technology transfer competencies within R&I organisations, a nascent innovation ecosystem in the area of green economy, shortage of researchers (especially young ones) with expertise in climate science, renewable energy and sustainable development. An opportunity lies in the access to international partnerships and collaboration avenues, facilitating the acquisition of funding, expertise, and exchange of knowledge (the success rate of Moldovan entities within the EU Horizon Europe Programme was 31.68% as of May 2023, which is above the EU average of 21.47%).[17]

[14] OECD (2023). *Promovarea competențelor digitale de afaceri în Republica Moldova*. https://www.oecd.org/publications/promovarea-competentelor-digitale-de-business-in-moldova-e31fc713-ro.htm (March 2024).
[15] UNECE (2023). *Interim Sub-regional Innovation Policy Outlook 2022: Eastern Europe and the South Caucasus*. https://unece.org/sites/default/files/2022-12/UNECE_Interim_Sub-Regional_Innovation_Policy_Outlook_2022_web.pdf (March 2024).
[16] WIPO (2022). *Global Innovation Index 2022: What is the future of innovation-driven growth?* https://www.wipo.int/edocs/pubdocs/en/wipo-pub-2000-2022-en-main-report-global-innovation-index-2022-15th-edition.pdf (March 2024).
[17] Directorate-General for Neighbourhood and Enlargement Negotiations (2023). *Moldova Report 2023* (can't find the link).

Table 1. Key statistics and trends of the R&I thematic area

Relevant statistics/indicators	2010	2015	2020-22	Comments/trends
R&I governance and policy				
Global innovation score index	N/I (39-2011) [18]	44[19]	59-2020[20] 64-2021[21] 56-2022[22]	The Republic of Moldova performs better in innovation outputs than in innovation inputs.
Yearly investment into the R&I sector by the state (euro)[23]	17957714[24]	19331499[25]	19813884-2020[26] 22658731-2021[27] 26002002-2022[28]	Several universities and colleges in the country received funding within the "Higher education project in Moldova", implemented by the Ministry of Education and Research with the support of the World Bank. The programme's total value is 24.7 million euros, and it is used to modernise and equip laboratories and research centres.

[18] World Intellectual Property Organization (WIPO). (2011). *Global Innovation Index 2011*. https://www.wipo.int/edocs/pubdocs/en/economics/gii/gii_2011.pdf (March 2024).
[19] World Intellectual Property Organization (WIPO). (2015). *Global Innovation Index 2015 – Chapter 1*. https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2015-chapter1.pdf (March 2024).
[20] World Intellectual Property Organization (WIPO). (2022). *Global Innovation Index 2022: Moldova Country Profile*. https://www.wipo.int/edocs/pubdocs/en/wipo_pub_2000_2022/md.pdf (March 2024).
[21] World Intellectual Property Organization (WIPO). (2022). *Global Innovation Index 2022: Moldova Country Profile*. https://www.wipo.int/edocs/pubdocs/en/wipo_pub_2000_2022/md.pdf (March 2024).
[22] World Intellectual Property Organization (WIPO). (2022). *Global Innovation Index 2022: Moldova Country Profile*. https://www.wipo.int/edocs/pubdocs/en/wipo_pub_2000_2022/md.pdf (March 2024).
[23] National Bureau of Statistics of Moldova (n.d.). *Exchange rates (Exchange rate of the National Bank of Moldova)*. https://www.bnm.md/ro/content/ratele-de-schimb (March 2024).
[24] National Bureau of Statistics of Moldova (2010). *R&D Activity in 2010*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2010-9454_2022.html (March 2024).
[25] National Bureau of Statistics of Moldova (2015). *R&D Activity in 2015*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2015-9454_2718.html (March 2024).
[26] Academy of Sciences of Moldova (2021). *Raport asupra stării științei în 2020*; National Bureau of Statistics. (2020). *R&D Activity in 2020*. https://statistica.gov.md/index.php/ro/activitatea-de-cercetare-dezvoltare-in-anul-2020-9454_49925.html (March 2024).
[27] Academy of Sciences of Moldova (2022). *Raport asupra stării științei din Republica Moldova în 2021*; National Bureau of Statistics. (2021). *R&D Activity in 2021*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2021-9454_59408.html (March 2024).
[28] Academy of Sciences of Moldova (2023). *Raport asupra stării științei din Republica Moldova în 2022*; National Bureau of Statistics. (2022). *R&D Activity in 2022.* https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2022-9454_60396.html (March 2024).

Relevant statistics/indicators	2010	2015	2020-22	Comments/trends
Yearly gross R&I expenditure[29]	19634264[30]	20998329[31]	22227902-2020[32] 27894176-2021[33] 30923687-2022[34]	According to the provisions of the National Development Strategy" European Moldova" (NDS) funding for R&D will be gradually increased by 0.1 per cent of GDP each year.
R&D expenditure (% of GDP)	0.50[35]	0.29[36]	0.235-2020[37] 0.231-2021 0.230-2022	This indicator seems to be more relevant.
	17957714[38]	19331499[39]	19813884-2020[40]	Exchange rates (exchange rate) of the National Bank of Moldova https://www.bnm.md/ro/content/ratele-de-schimb

[29] National Bureau of Statistics of Moldova. (n.d.). *Education and Science – Statistical Indicators*. https://statistica.gov.md/ro/statistic_indicator_details/5 (March 2024).
[30] National Bureau of Statistics of Moldova. (2010). *R&D Activity in 2010*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2010-9454_2022.html (March 2024).
[31] National Bureau of Statistics of Moldova. (2015). *R&D Activity in 2015*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2015-9454_2718.html (March 2024).
[32] National Bureau of Statistics of Moldova. (2020). *R&D Activity in 2020*. https://statistica.gov.md/index.php/ro/activitatea-de-cercetare-dezvoltare-in-anul-2020-9454_49925.html (March 2024).
[33] National Bureau of Statistics of Moldova. (2021). *R&D Activity in 2021*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2021-9454_59408.html (March 2024).
[34] National Bureau of Statistics of Moldova. (2022). *R&D Activity in 2022*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2022-9454_60396.html (March 2024).
[35] Academy of Sciences of Moldova. (n.d.). *Raport privind starea științei în Republica Moldova*, p. 8, 14. https://old.asm.md/administrator/fisiere/rapoarte/f168.pdf (March 2024).
[36] Academy of Sciences of Moldova. (n.d.). *Raport privind starea științei în Republica Moldova*, p. 21. https://old.asm.md/administrator/fisiere/rapoarte/f168.pdf (March 2024).
[37] World Bank. (n.d.). *Research and development expenditure (% of GDP) – Moldova*. https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS?locations=MD (March 2024).
[38] National Bureau of Statistics of Moldova. (2010). *R&D Activity in 2010*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2010-9454_2022.html (March 2024).
[39] National Bureau of Statistics of Moldova. (2015). *R&D Activity in 2015*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2015-9454_2718.html (March 2024).
[40] Academy of Sciences of Moldova. (2021). *Raport asupra stării științei în 2020*; National Bureau of Statistics. (2020). *R&D Activity in 2020*. https://statistica.gov.md/index.php/ro/activitatea-de-cercetare-dezvoltare-in-anul-2020-9454_49925.html (March 2024).

Relevant statistics/indicators	2010	2015	2020-22	Comments/trends
Yearly final total government budget allocations for R&D (GBARD) (EURO)			22658731-2021[41] 26002002-2022[42]	
Governments' environmental and energy R&D appropriations and outlays as a proportion of GDP (%)	5.7[43]	5.7[44]	N/I	With the reorganization of the Academy of Sciences of Moldova in the period 2017-2018, such detailed reports are not developed by any competent authority in the field.
R&I agenda is included in the main policy documents (Y/N)	Y	Y	Y	Throughout the period under scrutiny, the national development strategies (NDS) integrated provisions related to R&I. NDS "Moldova 2020[45]" (adopted in 2012), stated that the new economic development paradigm will involve attracting investment, developing export-oriented industries, promoting the knowledge-based society, including by strengthening research and development, innovation and technology transfer geared towards efficiency and competitiveness. The NDS in place –"European Moldova"[46] (adopted in 2022) foresees establishing a support platform for the circular economy, which will include a research system and support for technology transfer and innovation, as well as financial support measures.

[41] Academy of Sciences of Moldova. (2022). *Raport asupra stării științei în 2021*; National Bureau of Statistics. (2021). *R&D Activity in 2021*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2021-9454_59408.html (March 2024).
[42] Academy of Sciences of Moldova. (2023). *Raport asupra stării științei în 2022*; National Bureau of Statistics. (2022). *R&D Activity in 2022*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2022-9454_60396.html (March 2024).
[43] Academy of Sciences of Moldova. (n.d.). *Raport privind starea științei în Republica Moldova*, p. 11. https://old.asm.md/administrator/fisiere/rapoarte/f168.pdf (March 2024).
[44] Academy of Sciences of Moldova. (n.d.). *Raport privind starea științei în Republica Moldova*, p. 26. https://old.asm.md/administrator/fisiere/rapoarte/f173.pdf (March 2024).
[45] Government of Moldova (2012). *Law Nr. 166 of 11.07.2012 for approving the National Development Strategy "Moldova 2020"*. https://lex.justice.md/index.php?action=view&view=doc&id=345635 (March 2024).
[46] Government of Moldova (2022). *Law Nr. 315 of 17.11.2022 for approving the National Development Strategy "European Moldova 2030".* https://www.legis.md/cautare/getResults?doc_id=134582&lang=ro (March 2024).

Relevant statistics/indicators	2010	2015	2020-22	Comments/trends
Green transition is considered in national R&I strategies (Y/N)	Y	Y	Y	The Innovations for Competitiveness Strategy 2013-2020 and the R&D Strategy until 2020 (adopted in 2014), as well as later documents - National R&I Programme 2020-2023, and National R&I Programme 2024-2027 foresee R&I priorities related to green transition.
Is the green agenda included in smart specialisation (S3) strategies? (Y/N)	N/I	N/I	Y	The current draft of the national smart specialisation strategy contains green agenda topics, especially within the specialisation domains *Energy, Agriculture and food processing*.
Employment in R&I sector (%)	0.86[47]	0.70[48]	0.55-2020[49] 0.56-2021[50] 0.53-2022[51]	It shows the share in total employment in the national economy. The National Bureau of Statistics data on R&D activity and data on employment were used.
Research capacity (including potential to develop green R&D capacity)				
Relevant statistics/indicators	**2010**	**2015**	**2020-22**	**Comments/trends**
Total research personnel as a proportion of total employment (%)	63.9[52]	66.9[53]	71.7-2020[54] 70.2-2021[55]	It shows the share of the total R&D employment.

[47] National Bureau of Statistics of Moldova (2010). *R&D Activity in 2010.* https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2010-9454_2022.html (March 2024).
[48] National Bureau of Statistics of Moldova (2015). *R&D Activity in 2015*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2015-9454_2718.html (March 2024).
[49] National Bureau of Statistics of Moldova (2020). *R&D Activity in 2020*. https://statistica.gov.md/index.php/ro/activitatea-de-cercetare-dezvoltare-in-anul-2020-9454_49925.html (March 2024).
[50] National Bureau of Statistics of Moldova (2021). *R&D Activity in 2021*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2021-9454_59408.html (March 2024).
[51] National Bureau of Statistics of Moldova (2022). *R&D Activity in 2022*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2022-9454_60396.html (March 2024).
[52] National Bureau of Statistics of Moldova (2010). *R&D Activity in 2010*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2010-9454_2022.html (March 2024).
[53] National Bureau of Statistics of Moldova (2015). *R&D Activity in 2015*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2015-9454_2718.html (March 2024).
[54] National Bureau of Statistics of Moldova (2020). *R&D Activity in 2020*. https://statistica.gov.md/index.php/ro/activitatea-de-cercetare-dezvoltare-in-anul-2020-9454_49925.html (March 2024).
[55] National Bureau of Statistics of Moldova (2021). *R&D Activity in 2021*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2021-9454_59408.html (March 2024).

Relevant statistics/indicators	2010	2015	2020-22	Comments/trends
	0.55	0.47	72.2-2022[56] 0.39-2020 0.39-2021 0.38-2022	It shows the share of the total national economy's employment.
Yearly national research funding (EURO)	17957714[57]	19331499[58]	19813884-2020[59] 22658731-2021[60] 26002002-2022[61]	Exchange rates (exchange rate) of the National Bank of Moldova https://www.bnm.md/ro/content/ratele-de-schimb
Number of research units/centres	62	65	67-2022	The number will diminish in 2023 due to a recent reform that merged several research institutes and universities.
Number of research units/ centres operating in areas related to the green agenda	23	25	25	
Number of master's/doctoral students	M:12855 D:1550	M:14486 D:1751	M:10093 (2022-23) D:1601(2022)	

[56] National Bureau of Statistics of Moldova (2022). *R&D Activity in 2022*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2022-9454_60396.html (March 2024).
[57] National Bureau of Statistics of Moldova (2010). *R&D Activity in 2010*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2010-9454_2022.html (March 2024).
[58] National Bureau of Statistics of Moldova (2015). *R&D Activity in 2015*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2015-9454_2718.html (March 2024).
[59] Academy of Sciences of Moldova (2021). *Raport asupra stării științei în 2020*; National Bureau of Statistics. (2020). *R&D Activity in 2020*. https://statistica.gov.md/index.php/ro/activitatea-de-cercetare-dezvoltare-in-anul-2020-9454_49925.html (March 2024).
[60] Academy of Sciences of Moldova (2022). *Raport asupra stării științei în 2021*; National Bureau of Statistics. (2021). *R&D Activity in 2021*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2021-9454_59408.html (March 2024).
[61] Academy of Sciences of Moldova (2023). *Raport asupra stării științei în 2022*; National Bureau of Statistics. (2022). *R&D Activity in 2022*. https://statistica.gov.md/ro/activitatea-de-cercetare-dezvoltare-in-anul-2022-9454_60396.html (March 2024).

Relevant statistics/indicators	2010	2015	2020-22	Comments/trends
Share of master's/doctoral students in EGD-related study fields (%)	M:19% D:14.8%	M: 18.9% D:14.8%	M:16.5% D:16%	
Yearly participation in Horizon (2020) Europe projects (number)	3[62] (FP7) 279:2007-2013 (FP6-FP7)	7 (H2020) 550:2014-2020 (H2020)	13 207:2021-2023 (HE)	https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/horizon-dashboard
Share of participation in EGD-related Horizon projects (number/%)	N/I	N/I	N/I	There is only information about the total number of projects per Programme. In FP7, Md participants participated in 12 EGD-topics related projects. In H2020, there were 16 such projects[63].
Number of green R&D programmes/ projects (incl donor-funded)	N/I	N/I	State budget: 81[64]	In 2020, out of 98 COST Actions with Moldovan participants, 47 were in the area of natural sciences and agriculture[65]. Also, a Moldovan entity is chairing the COST Action EU Circular Economy Network for All: Consumer Protection through reducing, reusing, repairing (ECO4ALL).
Number of academic publications with any English keywords in the title or abstract related to GUMA thematic areas or eco-innovation, social innovation, green transition, climate neutrality, carbon reduction, energy efficiency/productivity, material efficiency/productivity,	672	1641	1874	The data of the National Bibliographic Instrument[66] are based on scientific disciplines – we selected the most relevant ones: agricultural sciences, technology, chemistry, biology, geology, geography, and architecture.

[62] The number of contracts signed in the respective year. Below are the total applications per programme
[63] Romanciuc, L. (2022). *Ex-Post Evaluation of the Republic of Moldova Participation in the EU Framework Programme for Research and Innovation HORIZON 2020 (2014–2020).* https://www.ancd.gov.md/sites/default/files/Ex-POST%20H2020%20EVALUATION%20REPORT%2028%20Nov%202022%20FINAL.pdf (March 2024).
[64] National Agency for Research and Development (n.d.). *Official website*. https://www.ancd.gov.md (March 2024).
[65] COST (2020). *Moldova Factsheet*. https://www.cost.eu/uploads/2022/08/COST_H2020_Factsheet_Moldova.pdf (March 2024).
[66] National Bibliometric Instrument. (2024). *Indicatori bibliometrici: articole pe domenii*. https://ibn.idsi.md/ro/Graph_Stacked?type=nrArticoleDomenii (March 2024).

Relevant statistics/indicators	2010	2015	2020-22	Comments/trends
resource efficiency/productivity.				
Skills forecasts per sector (Y/N)	N	N	Y	Moldova benefits from a labour market forecasting system run by the Labour Market Observatory (LMO), which was created in 2018 to improve analysis and forecasting. The LMO produces annual short-term labour market forecasts to anticipate labour market requirements and bridge the gap between the training offered by educational institutions and other service providers and the real needs of economic agents. However, the forecasting system focuses more on occupations/professions and does not provide insights into specific skills needed in the future[67].
Number of vocational programmes related to EGD topics	N/I	N/I	62[68]	As total numbers, during the 2022/23 school year, within upper secondary VET, from the total of 14 357 students, 10 991 followed Engineering, manufacturing and construction specialization and 199 - Agriculture, forestry, fisheries and veterinary care. In the post-secondary VET programmes, from the total of 31 574 students, 24.3% were enrolled in the field of engineering, manufacturing and construction, 3 517 in Communication technologies, and 615 in Agriculture, forestry, fisheries and veterinary care.
Higher-education programmes building capacity for green R&I (number of students/number of courses)	N/I	N/I	N/I	
Number of study programmes for reskilling in EGD areas	N/I	N/I	N/I	

[68] OECD. (2023). *Promovarea competențelor digitale de afaceri în Republica Moldova*. https://www.oecd-ilibrary.org/science-and-technology/promovarea-competentelor-digitale-de-business-in-moldova_e31fc713-ro (March 2024).
[69] Ministry of Education and Research. (n.d.). *Portalul educației VET în Moldova*. https://www.ipt.md (March 2024).

Relevant statistics/indicators	2010	2015	2020-22	Comments/trends
The share of public/private/foreign funding for green skills and reskilling programmes	N/I	N/I	N/I	
Participation of adults in lifelong learning (%)	N/I	N/I	N/I	According to a 2019 study[69], the training among working-age Moldovans is not widespread, especially among non-employed, lower-educated and older people. According to the Moldova Skills Measurement Survey, about 11% of the population reported participating in training courses, such as work-related or private skills training that lasted at least 5 days or 30 hours in the past 12 months. The lowest incidence of training is among inactive non-students and individuals with lower than upper secondary education. The most recent report of the Ministry of Education and Research (for 2023), referring to LLL, shows that 466 persons certified their professional competences (compared to 39 in 2019). Another relevant figure - the data from the National Employment Agency shows that only 1062 job seekers graduated from the professional training courses in 2022[70].
Investment in training for green jobs (euro)	N/I	N/I	N/I	A recent ETF regional review mentions that in Moldova, there are insufficient investments in the green transition, particularly in the education sector[71].
Companies committing to reskilling or upskilling workers (% or number)	N/I	38%[72]	41.9%	NBS data reveal that 92236 employees were involved in professional training in 2015, 102745 in 2020, and 123441 in 2022.

[70] World Bank (2019). *Supply of Skills in Moldova: Findings from the Moldova Skills Measurement Survey (MSMS)*. https://documents1.worldbank.org/curated/en/846611564728508093/pdf/Supply-of-skills-in-Moldova-Findings-from-the-Moldova-Skills-Measurement-Survey-MSMS.pdf (March 2024).
[72] National Employment Agency (2023). *Annual Report 2023*. https://anofm.md/view_document?nid=20342 (March 2024).
[73] European Training Foundation (2023). *Skills for the Green Transition: Evidence from the EU Neighbourhood*. https://www.etf.europa.eu/sites/default/files/2024-02/Green%20paper_2023%20-%20edited.pdf (March 2024).
[74] National Bureau of Statistics of Moldova (2023). *Share of Units Providing Continuing Vocational Training*. https://statbank.statistica.md/PxWeb/pxweb/en/30%20Statistica%20sociala/30%20Statistica%20sociala__03%20FM__SAL060/SAL060100.px/table/tableViewLayout2/?rxid=b2ff27d7-0b96-43c9-934b-42e1a2a9a774 (March 2024).

Relevant statistics/indicators	2010	2015	2020-22	Comments/trends
Innovation linked to the green agenda				
Relevant statistics/indicators	**2010**	**2015**	**2020-22**	**Comments/trends**
Number of companies supported by the state for green R&I	2	3	5	The National Agency for R&D (NARD) provides data on request. The companies applied to the Innovation and TT programme.
Investments from the private sector into green R&I measures (euro)	N/I	N/I	350000 - 2020[73] 1566700-2021[74] 3180000-2022[75]	Exchange rates (exchange rate) of the National Bank of Moldova https://www.bnm.md/ro/content/ratele-de-schimb
Number of incubators/accelerators supporting green start-ups/scale-ups	0	1	6	Moldova Power Accelerator, Upcelerator, GreenTech Rangers, SDG Accelerator, XY Accelerator, and AgTech Accelerator.
Share of environment-related inventions – patents (%)	10.8/2.5 5.5/1.6	12.5/10.2 10/10.3	12.1/8.4 130/245	National patent applications/short-term patent applications (CBI/CBISD) filed in the field of environment (eco): 2010: 15/5; 2015: 8/17; 2020-22: 24/31. National environmental (eco) invention patents/short-term invention patents issued (BI/BISD issued) 2010: 7/3; 2015: 5/13; 2020-22: 10/21. Data are provided by the State Agency on Intellectual Property of Moldova on request.
Number of ISO 14001 certificates/ population in millions	-	1	47-2020 68-2021 45-2022	The Business Support Centre provides data for Standardization of the Institute for Standardization of Moldova on request. At the same time,

[76] National Agency for Research and Development (2020). *Ordin 8-PC/2020*. https://ancd.gov.md/sites/default/files/document/attachments/Ordin%208-PC%202020.pdf (March 2024).
[77] National Agency for Research and Development (2020). *Extras din Ordin 16-PC din 07.07.2020*. https://ancd.gov.md/sites/default/files/document/attachments/Extras%20din%20Ordin%2016-PC%20din%2007.07.2020.pdf (March 2024).
[78] National Agency for Research and Development (2021). *Ordin nr. 28-PC din 29.12.21*. https://ancd.gov.md/sites/default/files/document/attachments/Ordin%20nr.28-PC%20din%2029.12.21.pdf (March 2024).

Relevant statistics/indicators	2010	2015	2020-22	Comments/trends
				according to the ISO survey, the figures related to ISO 14001 in Moldova[76] are the following: 2012-7, 2015-18, 2022- 11.
Investment in the development of green technology (euro/year)	N/I	N/I	N/I	Moldova ranks the lowest among European countries in terms of investment in environmental protection. The government and businesses spent too little on these purposes compared with most European countries. In recent years, Moldova allocated only 0.5% of its GDP for environmental protection, while the EU average is 1.9%[77]
Greenhouse gas emission productivity (GDP/GHGs)	2.75	3.46	3.58-2020 3.69-2021	Production-based CO2 productivity, GDP per unit of energy-related CO2 emissions (US dollars per kilogram). Data for 2022 is not available yet. It shows a steady annual growth trend of 0.11-0.12 US dollars per kilogram.[78]
Material productivity (GDP/domestic material consumption)	0.90	1.02	N/I	Non-energy material productivity, GDP per unit of DMC (US dollars per kilogram)[79]
Water productivity (GDP/total freshwater abstraction);	7.63	9.28	9.93-2020	Water productivity, total (constant 2015 US$ GDP per cubic meter of total freshwater withdrawal). Water productivity is calculated as GDP in constant prices divided by annual total water withdrawal.[80] Data for 2022 is not available yet.
Energy productivity (GDP/gross available energy for a given year)	5,862.02	7,072.09	7,355.91 - 2020	GDP per unit of Total primary energy supply (TPES) (US Dollar) Data for 2022 are not available yet. [81]

[79] ISO (2024). *The ISO Survey*. https://www.iso.org/the-iso-survey.html (March 2024).
[80] EU4Environment (2021). *Towards Green Transformation of the Republic of Moldova: State of Play in 2021*. https://www.eu4environment.org/app/uploads/2022/03/Report-Green-Growth-Indicators-in-Moldova-ENG-1.pdf (March 2024).
[81] OECD (n.d.). *Green Growth Indicators – OECD Data Bank*. https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH (March 2024).
[82] OECD (n.d.). *Green Growth Indicators – OECD Data Bank*. https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH (March 2024).
[83] World Bank (n.d.). *Freshwater Withdrawals as % of GDP – Moldova*. https://data.worldbank.org/indicator/ER.GDP.FWTL.M3.KD?locations=MD (March 2024).
[84] OECD (n.d.). *Green Growth Indicators – OECD Data Bank*. https://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH (March 2024).

Relevant statistics/indicators	2010	2015	2020-22	Comments/trends
Human capital investment in eco-innovation activities (year/euro)	N/I	N/I	N/I	There are no disaggregated statistical data separately specifying the greening aspect in the Republic of Moldova, and the studies carried out so far do not contain the necessary data.
Are there any innovation-stimulating mechanisms, e.g. tax reduction/ exemption, state co-financing through environmental funds/loans/ budget allocations for green areas? (Y/N)	N	N	Y	The Small and Medium Enterprises Greening Programme (approved by Government Decision no.592/2019) is implemented by the Entrepreneurship Development Organization to create favourable conditions and support the business environment for the transition from the consumer model of economic development to a model that uses the application of greening principles and the integration of "green" economy measures in the production processes of the various branches of the national economy.[82]
Value added in the environmental goods and services sector/GDP	N/I	N/I	N/I	Regarding the statistical data related to the green agenda, the Ministry of the Environment for the years 2025-2026, with reference to the environmental economic accounts, intends to transpose the EU regulations in this field and to include the greening indicators in the statistical data bank.
Export of goods and services in the field of environmental protection and resource management activities/total exports	N/I	N/I	N/I	Regarding the statistical data related to the green agenda, the Ministry of the Environment for the years 2025-2026, with reference to the environmental economic accounts, intends to transpose the EU regulations in this field and to include the greening indicators in the statistical data bank.
Number of national campaign groups working to implement fair socio-environmental solutions in EGD areas (Y/N)	N	N	N	
Is creating collaborative R&I projects/networks/partnerships between private and public	Y	Y	Y	This is done through the Innovation and Technology Transfer project, which calls for proposals and is currently managed by the National Agency for Research and Development. However, the project is limited in scale, and the programme is underfunded.

[85] Organisation for Entrepreneurship Development (n.d.). *Greening Support Page*. https://www.oda.md/en/greening (March 2024).

Relevant statistics/indicators	2010	2015	2020-22	Comments/trends
entities supported or funded? (Y/N)				

2. R&I cross-cutting area stakeholder mapping

This section presents an overview of key stakeholders involved in the R&I sector, describing their roles and responsibilities in R&I policy. Additionally, it assesses their potential impact on promoting green R&I. **Due to GDPR considerations, we cannot publicly disclose the full mapping results and include a summary table instead.**

Table 2. Stakeholder mapping

Stakeholder	R&I-related mandates	Influence and engagement on green R&I promotion
Public organisations at the National level		
Ministry of Education and Research	MER is responsible for R&I policy at the national level. Also, it covers all levels of the education cycle, which is important for skills development in the green economy. Active on S3	High - bilateral meeting with the leadership of MER to push the topic on MER's agenda
Ministry of Economic Development and Digitisation	MEDD contributes to integrating green economy measures and principles into policy documents and production processes in branches of the national economy. These measures and principles are relevant for promoting green innovations and technologies in the private sector.	Medium - sharing the project's findings, discussion with representatives of the division dealing with the green economy
Ministry of Environment	ME could be instrumental in lobbying EGD-related research topics within the national planning documents. It could facilitate knowledge and tech transfer from labs to society.	High - consultation workshop attended by ME, MER and relevant research organizations.
Ministry of Agriculture and Food Industry	Promoter of sustainable food systems, food security, and resilience of farming. Founder of research institutions	Medium - in-depth interview with the state secretary covering sectoral R&I
Ministry of Finance	Instrumental regarding funding of EGD-related R&I activities. Important for increasing the % of GDP allocated to R&I in general	High - bilateral meeting, invitation to join project events

Stakeholder	R&I-related mandates	Influence and engagement on green R&I promotion
Ministry of Infrastructure and Regional Development	It is relevant because its mandate covers transport, building, water and sanitation and regional and local development, sectors that are heavy users of green innovations.	Medium - sharing the project's findings
National Agency for Research and Development	Funder and manager of the competitive programmes in the area of R&I	Medium - bilateral meeting with NARD director, workshop with RPO representatives on R&I for green transition
Entrepreneurship Development Organization	ODA is a public institution with the mission to support the development of entrepreneurship in the Republic of Moldova from business start-up to internationalization, including the Greening programme for businesses	Medium - meeting with ODA staff dealing with the Greening SMEs programme
Economic Council under the aegis of the Prime Minister	The Economic Council is established as an advisory body to the Prime Minister, which is quite influential in agenda setting for the GoM.	High - meeting with the head of the Council, invitation to project events, sharing findings
National Centre for Sustainable Energy	It is the public institution under the authority of the Ministry of Energy, which coordinates and organizes activities aimed at ensuring the implementation of state policy in the fields of energy efficiency and renewable energy utilization, including by attracting and managing financial resources for the financing and promotion of projects and programmes in these areas in a sustainable manner from the environmental perspective, climate change, and contributing to increasing the country's energy security.	Low - invitation to events, bilateral discussions on funds available for R&I projects
The National Office for Regional and Local Development	It is a self-governing public institution under the jurisdiction of the Ministry of Infrastructure and Regional Development, responsible for managing the Fund for regional and local development.	Low - invitation to events

Stakeholder	R&I-related mandates	Influence and engagement on green R&I promotion
Agency for interventions and payments in agriculture	AIPA is an administrative authority under the Ministry of Agriculture and Food Industry that manages financial resources to support agricultural producers. Could be instrumental for transferring knowledge and green technologies into practice	Medium - sharing results of the projects. A workshop with AIPA beneficiaries on green transition, attended also by academia representatives.
Public organisations at the regional level		
Regional Development Agencies (North, Centre, South and ATU Gagauzia)	The RDA assists local public authorities in the balanced and sustainable development of localities in the north of the country by identifying opportunities and implementing regional development programmes and projects. Could facilitate the dialogue between local public administration, business and academia on green transition, transfer of knowledge and technologies	Medium - Sharing results of the projects. A workshop with Quadruple Helix actors from the region on green transition, attended also by academia representatives
State University of Moldova	SUM is an important institution for skills development in the green transition. It also hosts the following research institutes: the Institute of Chemistry, the Institute of Ecology and Geography, the Institute of Geology and Seismology, the Institute of Zoology, and the Institute of Genetics, Physiology, and Plant Protection.	Low - Sharing project results, inviting to events
Technical University of Moldova	The only engineering university in the country hosts the labs of the former Agrarian University, the Power Engineering Institute and the Microbiology and Biotechnology Institute.	Medium - Sharing project results, inviting to events
Academy of Sciences of Moldova	According to the law, it acts as a strategic consultant for the GoM in identifying research priorities and evaluating the results of scientific projects funded from the state budget.	Low - Interviewing the head of the section responsible for natural sciences. Invitation to the project events.
Academy of Economic Studies	It hosts the National Institute for Economic Research, which has recognized potential in the green economy and sustainable development.	Low - Sharing project results, inviting to events

Stakeholder	R&I-related mandates	Influence and engagement on green R&I promotion
Balti State University	A regional university in the North of the country, it has chairs on agro-ecological sciences and economics.	Medium - Sharing project results, inviting to events
IFAD	IFAD Country Strategic Opportunities Programme (COSOP 2019-2024) has two strategic objectives: improve the adaptive capacity of smallholders and agribusinesses through market-driven investments. This is done by enhancing farmers' resilience through investments in productive rural infrastructure and agri-systems. Promote inclusive market linkages through enhanced access to financial services and markets in order to foster rural transformation.	Medium - Bilateral meeting, sharing project results, awareness raising events with their beneficiaries in Moldova
UNDP Moldova	The Green Transition Project implemented by UNDP intends to put in place the enabling conditions for a green transformation in Moldova through a combination of cross-sectorial decision-making in joint stakeholder platforms, capacity building measures, general education and awareness raising, dissemination of best policy practices, information sharing and networking, as well as pilot-testing green-transition related solutions and other activities, to ensure that the green transition concept is well understood and implemented.	High - Bilateral meeting, sharing project results, invitation to events
Delegation of the EU to the Republic of Moldova	Strong promoters of the EGD agenda in Moldova	High - Bilateral meeting with the policy officer dealing with EGD-related subjects
World Bank	The overall objective of the WB Country Partnership Framework 2023-27 is to support green, resilient, and inclusive development and competitiveness in Moldova. The framework is based on three high-level objectives: (i) increased formal employment; (ii) improved human capital; and (iii) increased green and	High - Bilateral meeting, invitation to the project's events

Stakeholder	R&I-related mandates	Influence and engagement on green R&I promotion
	resilient investments. The objectives of the CPF focus on key areas, including enterprise competitiveness, decreased regulatory burden, key aspects of health and education services, increased energy security and efficiency, and green investments, particularly in infrastructure and agriculture. A critical feature of the CPF is the capacity-building and digitization efforts to strengthen systems and institutions across a broad swath of government and private sector actors at national and local levels.	
GIZ	For our context, the Strong Businesses and Communities for Moldova project implemented by GIZ is relevant. The project supports the reform efforts in five fields of action: Citizen-oriented basic services: For basic services such as waste management and water supply, the project is developing action plans with municipalities, operating companies, and regional development agencies. Integrated urban development: the project supports integrated urban development in two partner cities. It involves citizens and business stakeholders in the planning of infrastructure projects. Regional economic development: local administration, the business community, and civil society jointly seek measures to promote the local economy. These measures are also designed to reach women and marginalised groups. Vocational education and training: To gear vocational training to the labour market's requirements, the project identifies the demand for skilled workers and promotes modern dual vocational training. Economic promotion: The project collaborates with economic promotion institutions to encourage direct	High - Bilateral meeting, sharing project results, invitation to events

Stakeholder	R&I-related mandates	Influence and engagement on green R&I promotion
	investments and facilitate Moldovan companies' access to international markets.	
UNECE	UNECE provides expertise to Moldovan authorities in areas such as innovation policy, energy and environment.	High - Sharing project results
UNIDO	According to the Country Programme, UNIDO help Moldova increase its industrial productivity, stimulate entrepreneurship and encourage knowledge and innovation.	Medium - Sharing project results
Civil society		
Expert Grup	Among their research topics are Investment climate, Macroeconomic analysis and forecasts. Human development and poverty eradication, Economic analysis at sector level, Economic, regional and local development, Energy and environmental economics, Labour market and consumer behaviour. Strong supporters of the green economy, authors of the Towards Green Transformation of the Republic of Moldova. Monitoring progress based on the OECD green growth indicators study.	Medium - Bilateral meeting, sharing project results, and inviting to the project events
IDIS Viitorul	IDIS "Viitorul" is an independent think tank established in 1993. It combines social, political, and economic research with strong advocacy components. The institution conducts applied research in several areas: economics, social policy, EU politics, regional development, and security and foreign policy risks.	Medium – Organizing project events
Private sector		

Stakeholder	R&I-related mandates	Influence and engagement on green R&I promotion
Chamber of Commerce and Industry	The chamber is an institution intended to support and represent the interests of its members and the business communities in the Republic of Moldova's relations with government bodies, foreign business circles and international bodies. It is the largest business association in Moldova, representing over 1200 companies from various industries. It promotes entrepreneurship, international trade, and economic development in Moldova and provides its members with various business services.	Medium - Workshop on green transition with the chamber and its members
European Business Association	EBA is a non-profit business association representing the interests of European and Moldovan companies operating in Moldova. It promotes a favourable business climate in Moldova, supports EU-Moldova trade and investment, and provides business services to its members.	High - Bilateral meeting, invitation to project events
American Chamber of Commerce	AmCham is a non-profit business association that represents the interests of American and Moldovan companies operating in Moldova. It promotes trade and investment between the United States and Moldova and supports business development in the country.	High - Bilateral meeting, invitation to project events
Alliance of Small and Medium-sized Enterprises from Moldova	AIM is a small and medium-sized business community working together toward common goals to develop a clear and understandable business-legal environment to promote economic growth and investment in the Republic of Moldova.	Medium - Bilateral meeting, invitation to project events
The Association of Women Entrepreneurs in Moldova	The Association of Women Entrepreneurs in Moldova (AFAM) is an NGO created in 2013 by nine founding members. Its mission is to support the growth of women's potential in entrepreneurship and management in the Republic of Moldova.	Medium - Bilateral meeting, invitation to project events

3. R&I policy framework and capacity assessment

3.1 Policy and Legal Framework

R&I play an important role within the EGD, catalyzing significant shifts towards sustainability and climate neutrality. Through R&I, green technologies are developed and advanced across various sectors, promoting renewable energy, sustainable transportation, and circular economy practices. Additionally, R&I efforts identify and advocate for sustainable practices, fostering resilience to climate change impacts and informing evidence-based policy development. It is acknowledged that investment in R&I stimulates economic growth, creates green jobs, and enhances the competitiveness of industries. Moreover, collaboration among stakeholders facilitated by R&I ensures comprehensive approaches to addressing sustainability challenges. Ultimately, R&I supports the transition towards a climate-neutral and circular economy, ensuring a fair and equitable path towards a greener future. Thus, for the Moldovan R&I system, the adherence to the EGD framework provides opportunities for increasing the role of R&I within various sectors and policy areas, going beyond the current "in silo" approach. Consequently, this necessitates heightened horizontal coordination among government portfolios and a re-evaluation of the role of R&I, entailing increased allocation of public (and private) resources to the system, enhanced collaboration among multiple stakeholders, alignment of agendas, promotion of interdisciplinary and transdisciplinary research, and implementation of novel measures to bolster the innovation ecosystem within the country.

3.1.1 Strategic and planning documents, goals and targets

In September 2015, the Republic of Moldova and the 192 United Nations' member states committed to implementing the **2030 Agenda for Sustainable Development** and the 17 Sustainable Development Goals (SDGs).[83] Two years later, an evaluation determined that the national policy agenda was only partially aligned with the SDGs, with approximately one-third of SDG targets absent from national policy documents. Most national targets pertain to the environment sector, while most misaligned targets

[86] State Chancellery of the Republic of Moldova (n.d.). *Agenda de Dezvoltare Durabilă 2030*. https://cancelaria.gov.md/ro/apc/agenda-de-dezvoltare-durabila-2030#:~:text=AGENDA%20DE%20DEZVOLTARE%20DURABIL%C4%82%202030%20%C3%8En%20septembrie%202015%2C,pun%C4%83%20%C3%AEn%20aplicare%20Agenda%202030%20pentru%20Dezvoltare%20Durabil%C4%83 (April 2024).

relate to the 'governance and human rights' domain.[84] The subsequent NDS document aimed to synchronise the country's short, medium and long-term strategic development vision with priorities, objectives, indicators and targets of international commitments, including those of the 2030 Agenda. The most recent progress report on the 2030 Agenda implementation[85] highlighted that R&D investments remain below the EU average, and the sector needs greater investment and involvement to drive innovation and technological upgrading. This concerns the lack of any positive change for indicator *9.5. Enhance scientific research, upgrade the technological capabilities of industrial sectors and encourage innovation to increase competitiveness of the national economy and the level of wellbeing of the population*. In the context of SDG 13 (*Take urgent action to combat climate change and its impacts*), the report concluded that it is a priority to support R&I in the field of adaptation to climate change, including promoting green and sustainable technologies and solutions.

Concerning (bilateral) agreements with provisions related to R&I, the **EU-Moldova Association Agreement**, signed in June 2014 and effective since July 2016, is the legal framework for relations between the Republic of Moldova and the EU.[86] According to the agreement, cooperation in R&I includes a policy dialogue and an exchange of scientific and technological information, facilitating access to the respective programmes of the parties, increasing research capacity and the participation of research entities of the Republic of Moldova in the EU's research framework programmes and promotion of joint projects for research in all R&I areas. Moreover, the parties agreed to cooperate in areas such as research, development, demonstration, deployment and diffusion of safe and sustainable low-carbon and adaptation technologies (Art.93) and to implement joint research activities and exchange of information on cleaner technologies (Art.94). The Republic of Moldova is **associated to the Horizon Europe programme** (and was previously associated to the 7th Framework Programme and Horizon 2020).[87]

In recent years, the National Agency for Research and Development has concluded bilateral agreements with partner institutions from Romania, Turkey, and Belarus to

[87] State Chancellery of the Republic of Moldova (2017). *Adapting the 2030 Agenda on Sustainable Development to the Context of the Republic of Moldova*. https://cancelaria.gov.md/sites/default/files/adaptarea_agendei_2030_eng.pdf (April 2024).
[88] UNFPA Moldova (2023). *Progress Report on the Implementation of the 2030 Agenda for Sustainable Development in the Republic of Moldova*. https://moldova.unfpa.org/sites/default/files/pub-pdf/raport_de_progres_odd_2023_vf_07_08_2023_en_final.pdf (April 2024).
[89] European Union & Republic of Moldova (2014). *Association Agreement between the European Union and the European Atomic Energy Community and their Member States, of the One Part, and the Republic of Moldova, of the Other Part*. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22014A0830(01) (April 2024).
[90] European Union & Republic of Moldova (2022). *Agreement on the Participation of the Republic of Moldova in the Union Programme Horizon Europe – The Framework Programme for Research and Innovation*. https://www.europa.eu (April 2024).

launch joint calls for proposals. In 2023, a Joint Declaration of Intent on Science, Research, and Innovation Cooperation was signed between the Federal German Ministry of Education and Research and the Ministry of Education and Research of the Republic of Moldova, subsequently initiating a joint call for bilateral mobility. Moldova has been a COST member state since 2019.

The **National Development Strategy "European Moldova 2030"** presents the strategic vision for Moldova's development over the next seven years.[88] Regarding R&I, the strategy outlines a progressive increase in R&I funds allocated by 0.1% of GDP annually, alongside efforts to cultivate and fortify connections between research and business entities. In environmental policy and management, the document articulates the aim of integrating environmental standards across economic sectors (such as energy, agriculture, transport, industry, construction, and trade) while affirming Moldova's alignment with the objectives of the EGD. More specifically, plans entail the establishment of a support platform for the circular economy, incorporating research initiatives and bolstering systems for technology transfer and innovation, alongside implementing financial support measures.

At the operational level, the strategic mid-term document that states the Government of Moldova´´s (GoM) strategic R&I priorities over a four-year timeframe is the **National Programme for R&I for the 2024-2027**[89] OBJ Among the priorities and strategic directions adopted for the current planning cycle and based on which public funding will be allocated, the following could be considered as being EGD-relevant:

1. Health: relevant scientific direction: *comprehensive study of the impact of environmental and social factors on the health status of the population and the development of methods for mitigation*;

2. Sustainable agriculture, food security: *food safety and food security, sustainable management of agricultural ecosystems, new technologies for processing agricultural raw materials, technologies for the recovery of agri-food waste*;

3. **Biotechnology and Environmental Protection:** *environmental security: the impact of biotic and abiotic factors on environment and society, waste, plastics and pollutants, biodiversity conservation, green transport and smart urban mobility, energy efficient*

[91] Government of Moldova (2022). *National Development Strategy "European Moldova 2030"*. https://cancelaria.gov.md/sites/default/files/l_315_2022_snd_moldova_europeana_2030_adoptat_publicata.pdf (April 2024).
[92] Government of Moldova (2023). *Hotărâre Nr. HG1049 din 21.12.2023 pentru aprobarea Programului național în domeniile cercetării și inovării pentru anii 2024–2027*. https://mecc.gov.md/sites/default/files/pnci_merged.pdf (March 2024).

infrastructure and buildings, emission-free agricultural and industrial technologies, aquatic and terrestrial ecosystem monitoring, biodiversity protection and conservation, sectoral resilience to climate change, biotechnologies for various application areas;

4. **Societal challenges:** *social innovations, sustainable development of rural areas*;

5. **Innovative technologies, sustainable energy, digitalisation:** *innovative technologies and products, secure energy and energy efficient technologies, ICT and Digital Development, energy and cyber security, energy storage and the transition to clean energy, environmental and product competitiveness by industry, technological and product competitiveness by branch*). The programme's objective includes increasing the share of GDP allocated to R&D to 0.63% by 2027, increasing the number of full-time equivalent researchers per 100,000 population from 79 to 100, and improving the Global Innovation Index (GII) rank of Moldova from 56th to 43rd.

A series of other sectoral strategies and programmes,[90] in force or in the process of adoption, address R&I topics related to the respective fields, nevertheless a 'whole-of the-government' approach on the role of R&I in the national development process is still missing.

3.1.2 National legal framework compliance to international obligations and EU approximation

Recent evaluations[91] conducted by the European Commission reveal that Moldova continues to face challenges in integrating environmental and climate policies, as well as the EGD, across all policy domains. Moreover, there are obstacles to effectively implementing and enforcing legislation in this regard. Moldova is encouraged to demonstrate greater ambition and enhance its coordinated efforts towards green transition, particularly by prioritising the integration of the EGD into all policy sectors.

Simultaneously, the European Commission concludes that Moldova's legal, policy, and funding frameworks about R&I policy, addressed by the Code of Science and Innovation, as well as the National Programme for R&I and its associated action plan, are broadly aligned with the EU's sectoral research strategies and framework programmes. Moldova is deemed moderately prepared for the R&I chapter negotiations, with no requirement for the transposition of EU acquis in this area. Moving forward, the country should notably focus on adopting a smart specialisation

[90] See Annex 1

[94] European Commission (2023). *Commission Staff Working Document. Analytical Report on the Republic of Moldova's Application for EU Membership.* https://neighbourhood-enlargement.ec.europa.eu/document/download/5713754d-f638-48ac-ab64-305e3d50b09d_en?filename=SWD_2023_32_%20Moldova.pdf (April 2024).

strategy (S3) and formulating a multiannual action plan with implementation measures. It should also ensure adequate financing for fields covered under the National R&I Programme and implement measures to foster innovation in accordance with the new European innovation agenda.[92]

The acquis in Chapter 25 - Science and Research - as laid down in Title XIX of *the Treaty on the Functioning of the EU*, as well as the Euratom acquis concerning research, do not require the transposition of EU rules into the national legal order.[93] However, the EU, Euratom Community, and the member states coordinate their research and technological development activities to ensure that national and Union policies are mutually consistent to achieve the European Research Area (ERA) (Art. 181, TFEU). The EU acquis mandates member states to establish the requisite operational capabilities for advancing EU objectives and endeavours in R&I. Implementation capacity encompasses the presence of prerequisites conducive to effective engagement in the Union's R&I programmes, including robust administrative capabilities. It also requires good R&I capacity at the national level to contribute to Europe's scientific excellence, competitiveness, and growth, which are in line with the targets and actions identified.[94] Equally important are measures to strengthen human capital building, modernise the infrastructure and create the right framework conditions to facilitate integration into the ERA.

The new ERA Policy Agenda 2022-2024 is the key EU framework for action by EU member states and Associated Countries. Moldova committed to nine out of 18 actions from the ERA policy agenda for 2022-2024. The overarching goal of the new National Programme for R&I for the years 2024-2027 is the integration into the European Research Area. In November 2018, the Government of Moldova (GoM) adopted a National Roadmap for integrating the Republic of Moldova into the ERA (2019-2021).[95] The declared goal of the actions foreseen in the document is to take over and transpose EU requirements and standards into national practice in the fields of R&I.

Table 3. Summary of gaps/bottlenecks and needs

[95] European Commission (2023). *Commission Staff Working Document: Republic of Moldova 2023 Report.* https://neighbourhood-enlargement.ec.europa.eu/system/files/2023-11/SWD_2023_698%20Moldova%20report.pdf (April 2024).
[96] Government of Moldova (2022). *Questionnaire Part II: Chapter 25 – Science and Research*. https://gov.md/sites/default/files/document/attachments/chapter_25_science_and_research.pdf (April 2024).
[97] European Commission (2015). *Screening Report: Republic of Serbia Chapter 25 – Science and Research*. https://neighbourhood-enlargement.ec.europa.eu/system/files/2018-12/screening_report_ch_25_serbia.pdf (April 2024).
[98] Government of Moldova (2018). *Roadmap for the Integration of the Republic of Moldova into the European Research Area, GD no. 1081/2018*. https://www.legis.md/cautare/getResults?doc_id=111352&lang=ro (April 2024).

Areas of assessment	Summary of gaps
Have the R&I-related international agreements been honoured? What are the main issues?	1. The GoM concluded that limited R&I-related international/bilateral agreements. 2. The National Agency for Research and Development implements bilateral agreements with Romania, Germany, Turkey, and Belarus by organising joint calls for proposals. 3. The authorities allocate inadequate resources to fulfil obligations stemming from international agreements related to R&I.
Are the current strategic objectives and targets in the R&I area aligned with those of the EGD? How much do they differ?	1. The national strategic R&I priorities align with the EGD objectives. 2. The EDG targets are not transposed into the national R&I planning documents. 3. The national strategic R&I priorities predominantly mirror the country's current scientific capabilities, overlooking the economy's requirements. 4. R&I remains relatively constrained within sectoral policy documents. An integrated 'whole of government approach' is still missing.

3.2 Instruments for policy implementation

3.2.1 Regulatory and economic instruments

Moldova's strategic involvement in R&I is closely linked with its association to EU frameworks, notably through Horizon Europe, the EU's key funding programme for R&I. Moldova became the first Eastern Partnership (EaP) country to associate with Horizon 2020 in 2014 and continued this partnership into Horizon Europe (the

Framework Programme for R&I 2021-2027)[96], which allows Moldovan research entities to participate on an equal footing with entities from EU member states, fostering significant international cooperation in R&I.

One of the key regulatory instruments impacting the R&I area in Moldova is the Code of Science and Innovation of the Republic of Moldova 259/2004,[97] which provides a legal framework for developing the national science and innovation system. The code outlines the roles and responsibilities of various stakeholders in the R&I ecosystem, including government bodies, research institutions, and private sector organizations. According to the provisions of the Code, the main goal of state policy in the fields of R&I is the development of a knowledge society in Moldova by stimulating and maximising the scientific, technical-scientific and technological potential, oriented towards the creation of modern, environmentally friendly, competitive products, services and processes.

Another regulatory instrument that regulates the procedure for organising and conducting the competition for funding R&I projects from the state budget is the Methodology of Funding Projects in the field of R&I,[98] that stipulates that the state budget shall finance projects in the fields of R&I that correspond to the strategic priorities set out in the National Programme for R&I approved by the government for 2024-2027.[99] Several priorities and strategic directions for 2024-2027 in the fields of green R&I have been set.

A specific regulatory instrument is Law 226/2018 on science and technology (S&T) parks and innovation incubators (chapter IV)[100] in Moldova that provides that companies' residents in a S&T park or innovation incubator, are able to receive free use of public real estate offered for the creation and development of the park or incubator. At the same time, there will be discounts for residents on rent/lease payments. Furthermore, resident companies will be exempt from this payment during the first two years of operation. Support will be given to businesses implementing research results and new technologies.

---

[99] European Union & Republic of Moldova (2022). *Agreement on the Participation of the Republic of Moldova in the Horizon Europe Programme*. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2022.095.01.0018.01.ENG&toc=OJ%3AL%3A2022%3A095%3ATOC (April 2024).
[100] Government of Moldova (2004). *Code of Science and Innovation of the Republic of Moldova No. 259/2004*. https://www.legis.md/cautare/getResults?doc_id=142484&lang=ro (April 2024).
[101] Government of Moldova (2019). *Government Decision 382/2019 on the Approval of the Methodology for Financing Projects in the Fields of Research and Innovation*. https://www.legis.md/cautare/getResults?doc_id=128339&lang=ro (April 2024).
[102] Government of Moldova (2023). *Government Decision 1049/2023 on the Approval of the National Programme for Research and Innovation for 2024–2027*. https://www.legis.md/cautare/getResults?doc_id=141296&lang=ro (April 2024).
[103] Government of Moldova (2018). *Law 226/2018 on Science and Technology Parks and Innovation Incubators*. https://www.legis.md/cautare/getResults?doc_id=132668&lang=ro (April 2024).

While in Moldova there are no regulatory or economic instruments directly dedicated to green R&I, a significant step in this direction was taken in 2018 with the approval of the Programme for the Promotion of the Green Economy in the Republic of Moldova for the period 2018-2020[101] - the first policy document that supported the implementation of green economy principles. As a result of its implementation, several notable achievements have been recorded, including the development of training programmes in the field of green economy and organic farming in educational institutions, including the implementation of research projects for R&I organisations as well as the approval and effective implementation of the programme for supporting digital innovations and technological start-ups[102] which is an instrument for providing non-reimbursable financing to innovative SMEs and start-ups for products and services in the field of information and communication technologies, new technologies, to stimulate R&D in the field of ICT, prototyping and innovation of sustainable industrial production and green technologies.

Moldova's alignment with EU standards and initiatives, especially in its recent EU candidate status, suggests that it may be influenced by or adopt similar regulatory measures as those outlined in the EGD and other EU policies.[103] In this context, the new Programme for the Promotion of Green and Circular Economy in the Republic of Moldova for the period 2024 – 2028 was developed and is currently under consultation. One of the programme's objectives refers to green innovation (2.3. Stimulating eco-innovation and digitisation for developing and implementing green technologies in the economy). As a result of its implementation, the rate of environmental innovations/technologies applied in practice by economic agents in 2027 is expected to increase to 5% from 3% in 2022. The programme will encourage and support green and circular economy innovation initiatives in collaboration with key actors such as universities, research organisations, development partners, industry and SMEs, as well as initiatives for the uptake of best practice, transfer and adaptation of new technologies; significant investment in R&D, for which it will initiate urgent changes in cross-cutting policy areas, in particular, in the fields of education, research, development and innovation.

Regarding financial instruments, Moldova has implemented some mechanisms to support R&I activities. For instance, Moldova's approach to tax incentives for R&D and

[104] Government of Moldova (2018). *Government Decision 160/2018 on the Promotion Programme for the Green Economy 2018–2020 and the Action Plan for its Implementation*. https://www.legis.md/cautare/getResults?doc_id=102127&lang=ro (April 2024).
[105] Government of Moldova (2022). *Government Decision 243/2022 on the Programme to Support Digital Innovations and Technology Start-ups*. https://www.legis.md/cautare/getResults?doc_id=135254&lang=ro (April 2024).
[106] European Commission (n.d.). *The European Green Deal*. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en (April 2024).

innovation aligns with global practices by emphasising the importance of stimulating business R&D activities. Concerning the use of fiscal incentives to bolster private R&D activities, the Tax Code of the Republic of Moldova (No. 1163/1997)[104] delineates the following fiscal advantages for private R&D activities:

- Legal entities' revenues derived from leveraging external financial sources within projects and international grants to enhance education and research are recognised as non-taxable income (Art. 20, p.z^{12}).
- Services provided by organisations from the R&I sector, which are accredited by the National Agency for Quality Assurance in Education and Research, are granted a VAT exemption without the option for VAT deduction, as per paragraph 27 of subsection (1) of Article. 103.
- Article 104 (c^1) exempts from VAT, with eligibility for VAT deduction, imports and/or domestic deliveries of goods and services designated for technical assistance projects conducted within the Republic of Moldova by international organisations and donor countries under existing treaties, and investment assistance projects financed through grants to the government or budget-financed institutions. This decision applies fiscal and customs benefits to the execution of ongoing technical and investment assistance projects covered by international treaties in which the Republic of Moldova is a part.
- According to paragraphs b) & c) of subsection (4) of Article 283, land and plots utilized by scientific organizations and research institutions specializing in agriculture and forestry for scientific and educational purposes are exempt from the real estate tax, benefiting both owners and users of such lands.

In Moldova, the commitment to fostering an innovative business environment can also be seen through the extensive tax incentives for entities in free economic zones (FEZs) and IT parks, which are R&I oriented. These incentives include reduced corporate income tax rates, exemptions from certain taxes, and simplified tax compliance procedures. FEZs are a strategic instrument for developing R&I by offering a conducive environment for entities engaged in scientific and technological advancements. A key aspect of the Law 440/2001 on FEZ[105] is the inclusion of a wide array of subjects within the FEZ framework, notably allowing not just natural and legal persons registered for entrepreneurial activity but also scientific research and technology transfer centres to become residents of the zone. This inclusivity directly supports the R&I ecosystem by offering the following incentives:

[107] Government of Moldova (1997). *Tax Code of the Republic of Moldova No. 1163/1997*. https://www.legis.md/cautare/getResults?doc_id=142710&lang=ro (April 2024).
[108] Government of Moldova (2001). *Law 440/2001 on Free Economic Zones*. https://www.legis.md/cautare/getResults?doc_id=79565&lang=ro (April 2024).

- Entities operating within FEZs can benefit from reduced corporate income tax (CIT) rates. Specifically, for exporting goods and services from the FEZ outside Moldova's customs territory, or to other FEZ residents for export, a reduced rate of 50% of the applicable CIT applies on such gains. For other cases, the CIT rate is 75% of the standard rate. Additional exemptions apply based on the level of investment in fixed assets or FEZ infrastructure, ranging from a one-year CIT exemption for investments of at least USD 1 million to a five-year exemption for investments of at least USD 5 million.
- Transactions within FEZs are generally VAT-exempt, with rights to deduction, and goods introduced into FEZs are free from VAT or customs duties.[106]
- Investors in FEZs are offered protection from legislative changes for up to ten years, which is extendable under certain conditions.[107]

The activity of information and technology (IT) parks is regulated by Law 77/2016 on IT parks[108] that aims to create the basis for boosting the development of the IT industry, research, and innovation based on IT in various fields. Importantly, it includes activities to be carried out within IT parks, related to R&D in other natural sciences and engineering, based on the use of specialized high-performance computing equipment, limited to services in mathematics, computer science, physics, nanotechnology, and other engineering and technology services excluding biotechnology. The main incentives offered are:

- Residents of IT parks are subject to a single tax that includes CIT, personal income tax (PIT), social security contributions, health insurance contributions, local taxes, tax on immovable property, and road tax. The single tax rate is 7% of sales revenue, which simplifies tax compliance and minimizes the risk of errors and penalties.[109] This regime simplifies tax compliance and offers additional benefits, like the IT Visa for simplified work and residence permits. The single tax must be at least the minimum amount due per employee, promoting fair contributions to the state budget.[110]
- From February 2024, new activities provided exclusively for export became eligible for IT park incentives.

Related to voluntary economic instruments, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH implemented in Moldova the SDG

[109] Government of Moldova (1997). *Tax Code of the Republic of Moldova No. 1163/1997*. https://www.legis.md/cautare/getResults?doc_id=142710&lang=ro (April 2024).
[110] PwC (n.d.). *Moldova Corporate – Tax Credits and Incentives*. https://taxsummaries.pwc.com/Moldova/Corporate/Tax-credits-and-incentives (April 2024).
[111] Government of Moldova (2016). *Law 77/2016 on Information Technology Parks*. https://www.legis.md/cautare/getResults?doc_id=121327&lang=ro (April 2024).
[112] Government of Moldova (1997). *Tax Code of the Republic of Moldova No. 1163/1997*. https://www.legis.md/cautare/getResults?doc_id=142710&lang=ro (April 2024).
[113] PwC (n.d.). *Moldova Corporate – Tax Credits and Incentives*. https://taxsummaries.pwc.com/Moldova/Corporate/Tax-credits-and-incentives (April 2024).

Innovation Fund, on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) as a part of the project 'Support to the Moldovan Government in the Implementation of the 2030 Agenda'.[111] It was created to support implementing at least six cross-sectoral small-scale projects to foster the advancement of the SDGs in Moldova. These small-scale projects bring together joint actions of at least two different stakeholder groups (e.g. public authorities, civil society, private sector, academia) to promote multi-stakeholder partnerships in line with the principles of the 2030 Agenda. The SDG Innovation Fund selected six projects for the award of grants of between 50,000 and 70,000 EUR, two of which are related to both greening and innovation ('Acceleration: greener, more energy-efficient and sustainable school environments' and 'SMART water management planning').

While Moldova has made significant strides in integrating R&I considerations into its policy frameworks and aligning its initiatives with European standards, several gaps and bottlenecks that could hinder the full realisation of Moldova's R&I potential were identified. There remains a clear need for targeted improvements, including enhancing regulatory and financial instruments to more directly support green R&I, ensuring the measurability and efficiency of these instruments. The instruments should address identified gaps crucial for Moldova to leverage its R&I capabilities to pursue sustainable economic development fully. A strategic focus on R&I, especially within the realms of the green and circular economy, would position Moldova to not only advance its own knowledge society but also contribute meaningfully to global environmental sustainability efforts.

Table 4. Financial instruments addressing green R&I

Type of instrument	Name of the instrument and brief description	Statutory requirement	Responsible party/target group	Level of its application
Regulatory	**The Code of Science and Innovation of the Republic of Moldova provides** a legal framework for the development of the national science and innovation system, defining roles and responsibilities, with the	Moldovan Law (Code 259/2004)	Government bodies, research institutions, and private sector organizations	National

[114] SDG Innovation Fund Moldova (n.d.). *Official Website*. https://www.sdgfundmoldova.com/ (April 2024).

Type of instrument	Name of the instrument and brief description	Statutory requirement	Responsible party/target group	Level of its application
	aim of developing a knowledge society.			
Regulatory	**The methodology of Funding Projects in the Field of Research and Innovation** outlines the procedure for organising and funding R&I projects from the state budget, emphasising alignment with strategic priorities.	Government Decision 382/2019	Research institutions and enterprises engaged in R&I	National
Regulatory	**Law on Science and Technology Parks and Innovation Incubators** (Law 226/2018). Provides economic incentives for resident companies, including free use of public property and discounts on rent/lease payments.	Moldovan Law (Law 226/2018)	Companies in Science & Technology Parks and Innovation Incubators	National
Economic	**National Programme for Research and Innovation for 2024-2027**. Sets priorities and strategic directions in fields of R&I, including green R&I emphasizing biotechnologies, environmental protection, societal challenges, and sustainable energy.	National Programme (Government Decision 1049/2023)	Government bodies, R&I institutions, organizations, and the private sector	National
Economic	**Programme for the Promotion of the Green Economy 2018-2020.** It aimed to promote the implementation of green economy principles in Moldova in harmony with economic development and social wellbeing,	National Programme (Government Decision 160/2018)	Government bodies, private sector organizations	National

Type of instrument	Name of the instrument and brief description	Statutory requirement	Responsible party/target group	Level of its application
	ensuring the development of necessary capacities for all stakeholders.			
Economic	**Programme for supporting digital innovations and technological start-ups.** It aimed to integrate green economy principles, supporting digital innovations and technological startups through non-reimbursable financing. It seeks to stimulate R&I in ICT and support the development of solutions addressing societal challenges and promoting sustainability.	National Programme (Government Decision 243/2022)	SMEs, startups in ICT, sustainable industrial production, and green technologies	National
Economic	**Fiscal incentives to R&D&I.** The Tax Code of the Republic of Moldova offers fiscal advantages for R&D activities, including non-taxable income from international projects and grants, VAT exemptions for accredited science and innovation organizations, and tax benefits for technical assistance projects.	Moldovan Law (No. 1163/1997).	Government bodies, research institutions, and private sector organizations	National
Economic	**The FEZ Law provides incentives in Free Economic Zones (FEZs)**. Entities operating within FEZs benefit from reduced corporate income tax (CIT) rates, VAT exemptions, and relief	Moldovan Law (No. 440/2001)	Entities operating within FEZs	National

Type of instrument	Name of the instrument and brief description	Statutory requirement	Responsible party/target group	Level of its application
	from customs duties. Also, investments of significant size can result in CIT exemptions for up to five years, and entities are offered legislative stability guarantees.			
Economic	**The Law on Information Technology Parks provides incentives for IT parks**. IT Park residents are subject to a single tax regime that simplifies tax compliance and includes benefits such as reduced tax rates and simplified procedures for work and residence permits.	Moldovan Law (No. 77/2016)	Entities operating within IT Parks	National
Voluntary	**The SDG Innovation Fund –** as a part of the "Support to the Moldovan Government in the Implementation of the 2030 Agenda" project- was established to support the implementation of at least six cross-sectoral small-scale projects to foster the advancement of the SDGs in Moldova.	N/A (Voluntary)	Local Public authorities, civil society, private sector entities, and academic institutions.	National/ Regional

3.2.2 Funding and financing

The R&D sector operates in a 'survival mode', necessitating a substantial overhaul, as evidenced by persistently low private sector investments and a decline in foreign funding to only 5% in 2019 from approximately 10% between 2009 and 2015.[112] The

[115] UNECE (2022). *Innovation for Sustainable Development Review of Moldova*. https://unece.org/sites/default/files/2022-02/I4SDR_MOLDOVA_2021_web_full%2Bcover.pdf (April 2024).

most recent assessments of the Moldovan R&I system concluded that increasing levels of investment in R&I is an absolute necessity and a precondition for a range of positive effects on the national research capacity.[113]

Currently, public funding is allocated to R&D institutions via two channels: (1)institutional funding - for the maintenance and development of public infrastructure in the fields of R&I and staff expenditure, research infrastructure and institutional performance[114] and (2) project-based funding, through public competitions organised by the NARD, based on the Methodology of financing projects in the fields of R&I, approved by the Government Decision No. 382/2019. From this year, the proportion between the two is 80:20. In September 2019, NARD launched the biggest competition for basic and/or applied research projects, based on the strategic scientific directions identified in the National R&I Programme for the 2020-2023 period, entitled '*State Programme 2020-2023*'. As a result, 166 projects were funded under the following strategic priorities: 1. Health - 40 projects; 2. Sustainable agriculture, food security and food safety - 25 projects; 3. Environment and climate change - 27 projects; 4. Societal challenges - 45 projects; 5. Economic competitiveness and innovative technologies - 29 projects. The total budget allocated for financing the State Programme projects was 983 435,1 thousand MDL for 4 years (those related to priority 2 and 3 receiving 187160,0 thousand MDL and, respectively, 211 307,4 thousand MDL).[115]

In 2022, NARD launched a call for proposals on research-based solutions to address issues of pressing concern entitled "*Resilience of the Republic of Moldova to crisis situations*". The call provides funding for scientific research to support the GoM's efforts to tackle crises. Thirty-one project proposals were submitted and 12 projects were selected for the financing, with a total amount of funding for projects of 11290,6 thousand MDL addressing two strategic priorities: (1) Food Security Potential of the Republic of Moldova and identification of support measures for food safety; (2) Energy Security Potential of the Republic of Moldova and identifying measures towards

[116] Porcescu, S. (2022). *Support to Moldova on the Reforms in the Public R&D Sector – Background Report*. Luxembourg: Publications Office of the European Union. https://data.europa.eu/doi/10.2777/78646 (April 2024);
Curaj, A., Angelis, J., Galan-Muros, V. et al. (2023). *With Ambition for Transformation – Revisiting Research Funding, Research Infrastructures and Science-Industry Links in the Republic of Moldova – Final Report – PSF Country*. Publications Office of the European Union. https://data.europa.eu/doi/10.2777/138215 (April 2024);
Heijs, F., Gulda, K., Funeriu, D. et al. (2016). *Peer Review of the Moldovan Research and Innovation System – Horizon 2020 Policy Support Facility*. Publications Office of the European Union. https://data.europa.eu/doi/10.2777/967415 (April 2024).
[117] Government of Moldova (2023). *Decision No. 864 of 08.11.2023 on the Methodology for Institutional Funding of Public R&I Institutions*. https://www.legis.md/cautare/getResults?doc_id=139987&lang=ro (April 2024).
[118] National Agency for Research and Development (2023). *Annual Report 2023*. https://ancd.gov.md/sites/default/files/document/attachments/Raport%20anual%20ANCD%20pentru%20anul%202023.pdf (April 2024).

fostering energy security. The NARD also implements bilateral grant programmes with Belarus, Turkey and Romania.

Another relevant instrument is the innovation and technology transfer projects in the NARD portfolio, which are the only dedicated national instrument for facilitating science-business collaboration. Unfortunately, the scheme is reduced in terms of funding and number of projects (in 2023, five innovation projects and one tech-transfer project were awarded a total of 4.6 mil. MDL in State contribution.[116] Five of them could be considered relevant for the green transition. In 2021, the GoM introduced new types of R&I projects, such as innovation vouchers and smart specialisation projects, to strengthen science-business collaboration.[117]

R&I institutions interested in environment-related applied research can also apply to the National Environment Fund calls for proposals. For example, among the beneficiaries of NEF-funded projects for the 2024-2026 period, four are R&I organisations.[118]

Potential funding sources for R&I activities are the Interreg programmes, where Republic of Moldova is eligible: Interreg Danube (total budget of 225 mil. EUR, Priority 2: A Greener, Low-Carbon Danube Region more relevant); Interreg NEXT RomaniaUrbact programme, which builds the skills of local stakeholders in the design and implementation of integrated and participatory policies.[119]

Moldova has been a member country of COST since 2018, and Moldovan participants have received 135 145 EUR to date, participating in 56% of all COST Actions.[120]

The Digital Innovations and Technology Startups Support Programme implemented by the Entrepreneurial Development Organization is related to the digital green transition and relevant for promoting business sector innovations. A maximum of 80% of the investment is provided in non-reimbursable funding, up to a ceiling of not more than

[119] National Agency for Research and Development (2023). *Annual Report 2023*. https://ancd.gov.md/sites/default/files/document/attachments/Raport%20anual%20ANCD%20pentru%20anul%202023.pdf (April 2024).
[120] Ministry of Education and Research (2021). *Government Modifies Methodology for Financing Research and Innovation Projects*. https://mec.gov.md/ro/content/guvernul-modificat-metodologia-de-finantare-proiectelor-din-domeniile-cercetarii-si-inovarii (April 2024).
[121] National Office for Environmental Projects Implementation (n.d.). *Official Web Page*. https://gov.md (April 2024).
[122] European Commission (2023). *Solidarity in Action: Interreg Programmes Amended to Increase Funding and Scope for Cooperation with Ukraine and Moldova*. https://ec.europa.eu/regional_policy/whats-new/newsroom/18-12-2023-solidarity-in-action-interreg-programmes-amended-to-increase-funding-and-scope-for-cooperation-with-ukraine-and-moldova_en (April 2024).
[123] COST (2023). *Moldova Factsheet 2023*. https://www.cost.eu/uploads/2024/03/COST_Moldova_Factsheet_2023.pdf (April 2024).

500.000 MDL. With four thematic fields (digital innovation, technological innovation, green technology, and sustainable production), the objectives of the programme are the following:

- Promote the development of high value-added industries within a broad innovation ecosystem of cooperating stakeholders representing government, SMEs, civil society, academia, financial institutions and local and international development partners;
- Accelerating the implementation of the digital, circular and green economy through technological progress, to create attractive jobs, enhance economic competitiveness and protect natural ecosystems;
- Attracting investments for start-ups with scalable growth potential in the targeted sectors and industries;
- Establishing an alternative innovation and business development funding mechanism for high-potential start-ups in digital innovation, ICT, green technologies and sustainable production.[121] In 2023, the programme had 14 beneficiaries who received a total grant funding of 5654.597 MDL.[122]

Overall, it should be mentioned that there is limited funding for R&I. Insufficient involvement of the private sector in funding R&I activities leads to a heavy reliance on public funding, which covers the current expenditures of the sector and offers limited growth opportunities. Moreover, support for R&I is not at the top of the development partners' agenda. In this situation, participation within international R&I funding programmes (such as the EU Framework Programme, COST, etc) represents an alternative means of conducting high-quality research and retaining talents within the system.

Enhancement of financial instruments is needed, both by consolidating the existing ones (following a thorough evaluation of their effectiveness) and by developing and implementing financial instruments such as loans, grants, and tax incentives tailored to support R&I activities, thereby attracting more investments in the sector from both domestic and international sources.

Table 5. Summary of gaps/bottlenecks and needs

Areas of assessment	Summary of gaps

[124] Organisation for Entrepreneurship Development (2024). *Technology Start-Up Grants – ODA Page*. https://www.oda.md/ro/granturi/start-uri-tehnologice (April 2024).
[125] Organisation for Entrepreneurship Development (2023). *Statistical Report on ODA Programmes 2023*. https://www.oda.md/files/rapoarte/2023/Informa%C8%9Bia%20statistic%C4%83%20privind%20Programele%20IP%20ODA,%20anul%202023.pdf (April 2024).

Are R&I-related policy and legal areas covered with appropriate regulatory and economic instruments to ensure compliance with EGD?	1. The existing legal framework supports R&I broadly but needs further refinement to address the nuances and requirements of green R&I specifically. 2. While an ongoing effort to align with EU standards is underway, more targeted and comprehensive measures are needed to ensure full compliance with the EGD. 3. Moldova has instruments in place but lacks specific regulations and incentives directly targeting green R&I, indicating partial coverage and a clear area for development.
Are the regulatory and economic instruments sufficient to ensure they lead to real and measurable R&I improvements?	1. The direct correlation between current instruments and tangible R&I improvements is unclear, indicating a significant gap in policy effectiveness and execution. 2. Mechanisms for effectively measuring the impact of R&I policies are lacking, highlighting the need for better tools and methodologies to assess outcomes and their direct impact on R&I advancements. 3. Current policies emphasize creating a supportive environment rather than focusing on specific outcomes, necessitating a shift towards more result-oriented strategies.
Are the regulatory and economic instruments efficient, considering their ability to support green R&I in the country?	1. While initiatives exist, the absence of a centralized and comprehensive strategy for green R&I impacts the efficiency of these efforts. 2. The dispersion of efforts across various instruments without a centralized strategy or clear benchmarks for green R&I reduces the overall efficiency of the instruments in place. 3. Economic incentives do not sufficiently target green R&I activities, highlighting a need for more focused financial support and regulatory measures to enhance efficiency.
Are the cross-sectoral funding and financing instruments realistic to achieve	1. The amount of public funding allocated to the sectors is limited and insufficient for producing a significant impact on the alignment of the EGD path

the R&I goals related to the EGD?	2. There is an insufficient level of cross-sectoral coordination in terms of developing and implementing funding instruments relevant to R&I 3. Limited funding opportunities for science-business collaboration.
Is funding the green R&I goals important to the national government, or does most funding come from outside donors?	1. International research programmes are important for developing research infrastructure in the country and offering access to transnational knowledge networks 2. Funding R&I goals is not a major priority within the donor's assistance.

3.3 Institutional/governance capacity

3.3.1 Existing institutional set-up

With respect to R&I, the Parliament of the Republic of Moldova is tasked with enacting legislation governing activities in these domains, endorsing designated funding allocations within the annual budget law, and ratifying international treaties pertaining to R&I collaboration. The Parliament oversees R&I affairs through the Standing Committee on Culture, Education, Research, Youth, Sports, and Mass-Media.

According to the existing legal framework (Art.59 of the Code on Science and Innovation[123]), the Government of the Republic of Moldova has the following competences related to R&I: approves the national R&I programme, sectoral strategies and action plans for their implementation; adopts regulatory documents in the fields of R&I; supports the establishment and optimisation of the infrastructure in the fields of R&I; concludes intergovernmental cooperation agreements; creates, reorganises or liquidates public law organisations in the fields of R&I among others.

[126] Government of Moldova (2004). *Code on Science and Innovation No. 259/2004*. https://www.legis.md/cautare/getResults?doc_id=110232&lang=ro (April 2024).

The main legal act governing the sector – the Code on Science and Innovation, in force from 2004, was modified by the Law no. 190 adopted in 2017, whereby the Ministry of Education and Research (MER) became the body responsible for elaborating the state policy in the fields of R&I and ensuring its implementation (Government Decision no.146/2021[124]). According to Art. 60 of the Code, the MER has the following tasks:

- elaborates, via a broad consultation exercise with the interested parties, and promotes the national R&I programme, sectoral strategies, and the implementation of action plans;
- proposes to the Government, within the framework of the approved annual budget, the revision of the action plans for the National Programme's implementation and of the sectoral strategies;
- elaborates, according to its competencies, normative acts for establishing stimulating instruments and promoting activities in the R&I fields;
- approves the budgets for the institutional funding;
- examines the scientific reports related to R&I activities;
- proposes to the Government the creation, reorganisation or closure of public law organizations in the fields of R&I;
- elaborates the draft of the medium-term budgetary framework in the fields of research and innovation, including for institutional funding;
- coordinates, monitors and promotes R&I activities of the subordinated organisations;
- promotes bilateral and multilateral R&I programmes, launched within the framework of cooperation agreements with international organizations and foundations;
- monitors the implementation of policy documents and projects in the fields of R&I and submits an annual report to the government on their implementation, etc.

In addition, the Ministry of Health, the Ministry of Culture, the Ministry of Agriculture and Food Industry, the Ministry of Internal Affairs and the Ministry of Defence fund R&I, thus having the following attributions according to the current legal framework:

- approve the structure of legal entities in the fields of R&I, developed in accordance with the R&I strategic priorities,
- organise, on a competitive basis, the selection of the management for the R&I organisation under their aegis, and approve the KPIs for the selected leadership,

[127] Government of Moldova (2021). *Government Decision No. 146/2021 on the Organization and Functioning of MER*. https://www.legis.md/cautare/getResults?doc_id=127622&lang=ro (April 2024).

- approve the number of scientific and auxiliary personnel from the respective organisations, and determine their structure and functions.[125]

According to the Law, the local public authorities are also involved in elaborating and promoting the state policy in the fields of R&I at the local and regional level, as well as in funding from the local budget, regional programmes and projects in the fields of R&I. However, this is rarely applied, except for the involvement of local and regional authorities in supporting the creation of local innovation centres, such as NORTEK, hosted by Alecu Russo State University from Balti, which is a joint venture of regional and central authorities, donors and private companies. According to Art. 62 of the Code the local public administration authorities can promote the implementation of advanced technologies and the establishment of cooperation with/between structures in R&I, organizations, institutions, and innovative enterprises from the respective region.

As stated in the Government Decision No.196/2018[126] on the NARD's organisation and functioning, it is a central administrative authority subordinated directly to the Government, which *implements* the state R&I policy in accordance with the R&I National Programme and sectoral strategies and manages the approved budget for project-based funding. The agency also delegates representatives within the bilateral and multilateral programmes launched in accordance with the cooperation agreements with international organisations and foundations, organises and carries out calls of project proposals, involving independent expertise and evaluation of proposals submitted to competitions, selects for funding, within the limits of the approved budget and according to the action plan approved by the Government, the projects submitted to the competition, following the evaluation carried out by local and/or foreign researchers, according to the methodology regarding project-based funding approved by the Government. The NARD creates, maintains and ensures access for the general public to research, innovation and development databases, organises administrators' selection process for the science & technology parks and innovation incubators, and monitors their activity.

The National Agency for Quality Assurance in Education and Research oversees the assessment of entities operating within the R&I sectors, including scientific personnel. This administrative body, which is under the Ministry of Education and Research's

[128] Ministry of Education and Research (2022). *Questionnaire Part II – Chapter 25: Science and Research*. https://gov.md/sites/default/files/document/attachments/chapter_25_science_and_research.pdf (April 2024).
[129] Government of Moldova (2018). *Government Decision No. 196/2018 on the Organization and Functioning of the National Agency for Research and Development*. https://www.legis.md/cautare/getResults?doc_id=102154&lang=ro (April 2024).

purview, appraises the capabilities of research entities and validates scientific and scientific-educational titles and degrees.

The Academy of Sciences of Moldova is a nationally significant public institution, characterised by its autonomy, independence from governmental authorities, and apolitical stance. Constituted indefinitely by law, it serves as a gathering point for distinguished figures renowned for their contributions to research and innovation. The Academy assumes the crucial function of advising the government on strategic matters, particularly in delineating basic and applied research priorities. It also consults, upon request, on draft legislation in the fields of research, innovation and culture, draws up forecasts on the development of research and innovation, prepares and submits an annual report to the government on the state of science, reflecting the policies developed and their implementation at national level, consults the government on the creation and development of public R&I infrastructure, organizes public hearings on issues of national interest, develops and carries out national and international scientific research projects, independently or in partnership with national institutions or those from abroad, contributes to the internationalisation of research and the promotion of integration into the European Research Area among others.

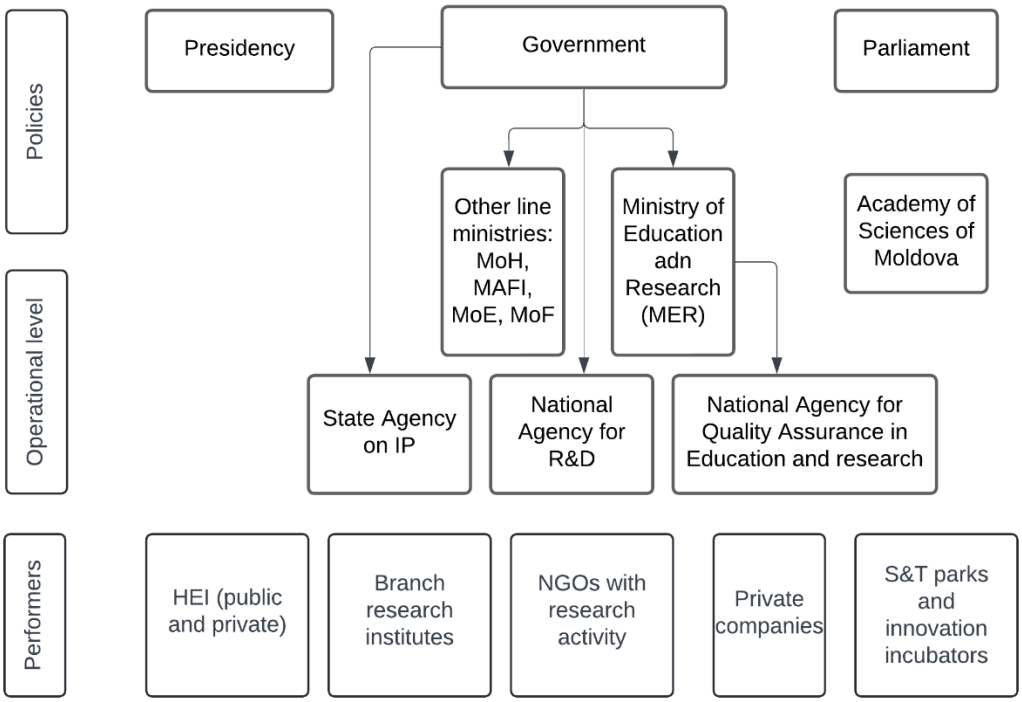

Figure 1. Existing institutional set-up

Table 6. Capacity assessment of the existing institutional set-up

Elements/capacities	Assessment
Long-Term Planning - review the capacity for long-term planning and continuity in implementing relevant policies.	The 2024-2027 R&I National Programme covers the fields at the operational level. According to the National Development Strategy "European Moldova," an R&I Strategy until 2030 is to be developed. On the other hand, the sector underwent a series of institutional reforms in the last decade (MER took over the policymaking role and NARD the funding role from ASM; research institutes previously part of ASM went to MER and later were included in universities), with limited ex ante evaluation of their effects. It is premature to evaluate the outcomes of the respective reforms.
The **extent of the mandates and authority** - assess whether the relevant/key authorities have the necessary legal and administrative powers to enforce and implement relevant policies.	The mandates are reasonably allocated, with policy development distinct from funding and research performance, an aspect highlighted as a weakness in the past by international reviews. However, the primary organizations, namely MER and NARD, face constraints in terms of human resources, placing considerable strain on existing personnel and impeding comprehensive coverage of the tasks outlined for them within the existing legal framework.

Resource allocation - evaluate financial and human resources allocation to institutions responsible for R&I (are adequate resources available for effective implementation).	There are limited financial and human resources at the disposal of R&I-relevant institutions. Due to a high degree of fluctuation among the personnel, there is reduced institutional memory and policy consistency.
Interagency coordination - assess the mechanisms in place for interagency coordination and collaboration. Effective implementation requires multiple government agencies to work together.	Requires strengthening. Discussions regarding establishing an Interministerial R&I council occurred, yet it did not materialize. Interagency consultations remain limited, with occasional discussions occurring between ministries that are founders of R&I institutions and the Ministry of Education and Research (MER) concerning institutional funding. However, these discussions have a narrow focus and occur infrequently.
Compliance and Enforcement - examine the capacity for enforcing compliance with R&I policies, principles and regulations.	This is mainly done by periodical reports requested by MER and by evaluations conducted by the National Agency for Quality Assurance in Education and Research. No independent or international assessments of research-performing organizations were conducted. Since 2012, the Republic of Moldova is part of the network of states who joined the EU Strategy on Human Resources for Researchers (HRS4R), a forum for the exchange of experience in the implementation of the principles of the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers in the EU member states and associated countries. Seven Moldovan organizations in the fields of R&I hold the logo "Excellence in research".
Data collection, Monitoring and Reporting - assess the capacity of institutions to collect, manage, and disseminate relevant R&I data and information and review the capacity to monitor and report on progress towards R&I goals.	Requires strengthening. M&E is one of the major weaknesses. The previous documents governing the fields - the Innovations for Competitiveness Strategy 2013-2020 (developed at that time by the Ministry of Economy and Infrastructure) and the R&D Strategy until 2020 (developed by ASM), as well as the National R&I Programme 2019-2023 and their implementation plans, were not evaluated at the end of the implementation period. At the national level, Moldova is still not part of the European Innovation Scoreboard but will be included in the 2024 edition in preparation for DG RTD.
Capacity Building: Evaluate ongoing efforts to build institutions' capacity, such as providing training and support for staff in R&I areas.	There is no systematic approach, and no training needs are identified regularly. International or EU-funded projects usually support capacity-building measures. An example is the participation of Moldovan representatives within the COST BESTPRAC Action (TN1302—The voice of research administrators - building a network of administrative excellence).
Stakeholder Engagement, Awareness and Communication - assess	Requires strengthening. Usually, the interested parties are consulted within the mandatory public consultation process while drafting policy documents. A recent good practice is the entrepreneurial discovery process organized by MER as part of the process for elaborating the draft of the S3. Another example is the presence of civil

the institutional capacity/level of engagement with civil society, businesses, and other relevant stakeholders in the development and implementation of R&I-related EGD policies, as well as communication of R&I objectives and progress to the public, creating awareness and support for sustainability initiatives.	society and business representatives on the governing board of NARD. To communicate R&I priorities and results to the general public, various events, such as Science Day, Europe Day, International Day of Women and Girls in Science, Open Days, and European Researchers Night, are organised.
Transparency and Accountability - assess the transparency and accountability mechanisms in place to ensure that institutions are held responsible for their performance in implementing the R&I principles.	The Academy of Sciences of Moldova organises public hearings on reports on the implementation of research projects funded from the state budget. Research performers publish annual reports on their webpages, but their dissemination is limited, and there are no in-house science communicators who could 'translate' the information for the general public.

Table 7. Summary of gaps/bottlenecks and needs

Areas of assessment	Summary of gaps
Are the roles and responsibilities regarding R&I set up in institutions clear?	1. The legal framework distinguishes between the roles of the institutions involved in policy design, implementation, and evaluation. 2. After a series of reforms in the sector, aspects of the interaction between main institutions still need to be fine-tuned.
Have the proper institutions been given a clear and sufficient mandate to reach the EGD-related goals for R&I?	1. EGD-related scientific directions are covered within the primary documents governing R&I fields, among others. 2. Inter-agency collaboration, EGD-related R&I activities are more of an exception than a rule.

	3. No specific vision on the role of R&I for reaching EGD targets has been agreed on among the main stakeholders.
Do the relevant institutions have enough (human) resources to handle the requirements for R&I?	1. Human resources are a significant constraint for the main institutions governing R&I fields. 2. Continuous training programmes in the area of research management are needed.
Do the relevant institutions have transparent and sufficient data collection, monitoring and reporting systems for R&I?	1. Data collection is conducted via traditional means, such as reporting and public hearings. 2. Not enough data are gathered as evidence for new policy development. There is no adaptive management mechanism in place that allows for adjustments during project implementation based on learning from M&E data. 3. M&E is one of the weaknesses at the R&I system level.
Do the relevant institutions have sufficient and meaningful stakeholder engagement and communication activities for R&I issues?	1. The interested parties are consulted while working on primary sectoral documents. 2. Interested stakeholders are consulted while working on new research-funding instruments. 3. Enough capacities for science communication are present in-house within research-performing organisations.

3.4 Non-governmental R&I capacity

3.4.1 Technical and infrastructure capacity – current capacities and future needs

Although the non-governmental R&I sector in Moldova has limited resources, it shows potential for promoting environmental knowledge and technologies. Despite a challenging environment marked by low investment in research and development, notable efforts are aimed at strengthening these capacities to align with the objectives of the EGD. In Moldova, the legislative framework for supporting R&D and innovation is set by specific laws to establish specialized infrastructure environments. Two laws, the Law 226/2018 on science and technology parks and innovation incubators[127] and the Law 77/2016 on information technology parks,[128] play pivotal roles in Moldova's strategic focus on enhancing its technological and innovative capacities. They provide crucial infrastructure, financial incentives, and regulatory support to transform Moldova into a regional hub for technology and innovation. The Code on Science and Innovation of the Republic of Moldova[129] establishes that scientific researchers can form groups, public organizations (associations), and associations in R&I with any type of ownership and legal form of organization.

The landscape of non-governmental R&I capacity in Moldova, particularly in the context of technical and infrastructure capabilities, presents a mixed scenario of potential and significant challenges. As of 2022, Moldova's R&I system comprises a network of 67 research entities, predominantly public institutions.[130] This includes 39 research institutes and centers and 18 universities, highlighting a framework primarily supported by governmental structures rather than private or non-governmental entities.

The development of Moldova's national research and educational electronic infrastructure, as well as its regional connectivity, is overseen by the National Research and Educational Network of Moldova (RENAM).[131] This public association (non-governmental, non-commercial, and non-profit network) is tasked with promoting and supporting national information and communication infrastructures and e-infrastructure resources for the scientific and educational community of the Republic of

[130] Government of Moldova. (2018). *Law 226/2018 on Science and Technology Parks and Innovation Incubators*. https://www.legis.md/cautare/getResults?doc_id=132668&lang=ro (April 2024).
[131] Government of Moldova. (2016). *Law 77/2016 on Information Technology Parks*. https://www.legis.md/cautare/getResults?doc_id=121327&lang=ro (April 2024).
[132] Government of Moldova. (2004). *Code on Science and Innovation of the Republic of Moldova*. https://www.legis.md/cautare/getResults?doc_id=142484&lang=ro (April 2024).
[130] In July 2022, GoM approved the absorption of 19 research institutes previously under the aegis of MER by universities. 3 other universities were absorbed as a part of the same process.
[134] RENAM – National Research and Educational Network of Moldova. (n.d.). *Official Website*. https://renam.md/ (April 2024).

Moldova. RENAM manages the MD-GRID NGI (National GRID Initiative), encompassing all major research and educational entities and providing them access to both national and international computational infrastructures, scientific databases, open data repositories, and educational content.

Additionally, the Eduroam service,[132] an international Wi-Fi internet access roaming service for research and higher education users has expanded significantly in Moldova. By March 2020, Eduroam was available in 20 locations across the country, up from just five in 2015, and saw 44,400 national and 12,141 international successful authentications.

Also, the Moldovan National Open Science Cloud Initiative (NOSCI)[133] is currently being established. Through the European Open Science Cloud (EOSC) framework, universities and research institutes will implement Open Science (OS) practices and adhere to FAIR (Findable, Accessible, Interoperable, Reusable) principles. This initiative will enable researchers and innovators to utilise e-Infrastructures and services related to OS. Ultimately, the Moldavian NOSCI will be instrumental in transforming the research culture by fostering national synergies and strengthening connections with the EOSC.

At the same time, the available R&D infrastructure, while diverse in its disciplinary focus, is not optimally equipped for the burgeoning demands of green technologies and sustainable innovation. The existing facilities need urgent upgrades to incorporate advanced research tools critical for pioneering studies in renewable energy, sustainable agriculture, and ecological technologies.

The integration of cutting-edge technologies and the modernisation of research facilities are crucial steps that require increased funding, strategic partnerships, and international collaboration. In this regard, discussions about transitioning to greener technologies are already underway, facilitated by several platforms, including governmental bodies, NGOs, and international agencies. At the same time, the investment trends reveal a cautious, albeit consistent, increase in R&D funding, with an annual governmental pledge to augment this by 0.1% of GDP. Although positive, incremental funding increases might not suffice to meet the escalating needs of a robust green transition.

[135] EDUROAM (n.d.). *More Universities in Moldova Choose EDUROAM*. https://eduroam.org/more-universities-in-moldova-choose-eduroam/ (April 2024).
[136] NI4OS (n.d.). *National Open Science Cloud Initiative (NOSCI) – Moldova*. https://ni4os.eu/15-national-osc-initiatives/moldova/ (April 2024).

One of the major gaps in Moldova's R&I infrastructure is the insufficient laboratories and analytical capacities necessary for the certification and standardisation of green technologies and practices, particularly those related to energy efficiency or renewable energy technologies. As the demand for technology increases, it becomes crucial to establish national laboratories equipped to verify and attest to the performance of green technologies. Despite that, Moldova's economy shows emerging specialisation patterns in the green business sector, notably in agriculture, energy, and natural resource management.

Looking forward, Moldova should prioritise the development of a resilient and innovative R&D infrastructure that can support the ambitious targets of the EGD and other related environmental initiatives, specifically: upgrading existing laboratories and research centres with state-of-the-art equipment to facilitate advanced research in green technologies; fostering public-private partnerships by encouraging collaboration between universities, private companies, and international entities to leverage additional resources and expertise; investing in high-performance computing which is critical for research areas requiring complex data analysis and simulations, such as climate modelling and energy efficiency studies.

3.4.2 Green skills and awareness

In Moldova, the **general awareness** of the nature of green R&I within society remains nascent, confined mainly to academic, governmental, and certain industrial sectors. While there are structured efforts within the academic and policymaking realms to foster a greener economy, broader societal understanding lags behind. The development of green skills in Moldova is primarily facilitated through its educational institutions and targeted training programmes. In 2022, approximately 16.5% of master's students and 16% of doctoral students were enrolled in EGD-related study fields. This represents a critical pool of future professionals who can contribute to the country's green R&I objectives. However, the overall share of research personnel in green R&D remains low, highlighting a significant gap in the specialised skills needed for a robust green transition.

The public awareness of green R&I has gradually improved, and it has been influenced by government policies and non-governmental efforts to promote sustainable development and environmental responsibility. The building and construction sector shows a practical understanding by applying energy efficiency measures and renewable energy technologies. Nonetheless, a considerable gap in broader public understanding and support for the green transition remains, which is critical for achieving nationwide sustainability goals. The NGO sector, pivotal in advocating for environmental issues, has been active in integrating green skills into various sectors of the economy. However, while there are successful examples of implementation in areas

like building EE/RE, broader societal understanding remains limited, with a need for more extensive and impactful awareness programs to educate the wider population on the benefits and necessity of the green transition.

The transition to a green economy requires diverse skills across multiple sectors. Currently, the country lacks adequately trained personnel to drive this transition effectively.

Moldova possesses a foundational capability in planning and applying **energy** efficiency measures, especially in the construction sector. This is supported by institutions like the Centre of Excellence in Construction and the Technical University, which provide knowledge and training in EE/RE technologies. Despite these capabilities, there is a significant gap in advanced green skills, particularly in nearly Zero Energy Buildings (nZEB) technologies, which are critical for deep renovation and sustainable building practices. The current workforce is not adequately equipped with these high-level green skills, and no substantial training is available for designers, installers, and energy auditors in nZEB technologies. Skills required in this sector are developing and managing renewable energy projects, auditing energy efficiency, managing energy systems, storing energy solutions, and developing smart grid technologies.

There is a moderate availability of specialists in the industry sector, but not at the scale required for widespread industrial transformation, and some foundational skills exist, primarily in larger industrial enterprises that have adopted international standards. Technical science institutions and vocational schools offer courses related to sustainable manufacturing, but the focus on green skills needs expansion. In this sector, the skills in advanced manufacturing techniques that reduce environmental impact, waste management, sustainable production processes, process optimization for energy and material efficiency, sustainable product design, and lifecycle analysis are required.

Skills are present in agriculture, especially in small-scale farming communities and among NGOs promoting sustainable agriculture. However, there is a shortage of specialists with advanced skills in sustainable agricultural practices, necessitating significant educational and policy interventions. Skills in organic farming, sustainable land management, integrated pest management, agroecological practices, precision agriculture, and sustainable water management are crucial for minimizing environmental impact and are strictly required in this sector.

The IT sector has a strong base in Moldova, is rapidly growing, and is adept at adopting new technologies. However, it is less focused on specific green ICT innovations. While

general ICT skills are adequate, specialized green ICT applications are lacking, which is necessary for supporting broader sectoral green transitions.

Moldova's new National Mobility Strategy outlines plans to adopt advanced technologies and innovations that reduce environmental impacts in the mobility sector. Yet, the country lacks specific MA/PhD programs or substantial R&D projects in smart mobility, indicating a gap in academic and professional training.

Funding for reskilling and upskilling in green technologies is currently limited, impacting the workforce's ability to prepare for the green transition adequately. While some international and national programmes provide support, a more structured and substantial investment strategy is required. Notable reskilling initiatives include UNDP-supported workshops and training programmes aimed at enhancing the capabilities of local entrepreneurs and engineers in adopting green technologies. Also, **NGOs** in Moldova play a critical role in bridging the gap between governmental policies and actual on-the-ground implementation of green practices. They are involved in projects ranging from enhancing civil security to promoting green governance and intelligent societies. Initiatives by organizations like EcoContact and the Public Association Reteaua de Transfer Tehnologic a Moldovei, Chamber of Commerce and Industry of RM focus on raising awareness and supporting market uptake of renewable energy sources, which are essential for the green transition.

Looking ahead, the Republic of Moldova must significantly enhance its focus on developing green skills by introducing new courses and programmes at educational institutions and ensuring that these initiatives are well-supported by national and international funding.

3.4.3 Stakeholder capacity

The roles and resources of key stakeholders identified in sections 2 and 3.2 significantly influence the Republic of Moldova's capacity to support a green transition.

Apart from **government bodies** (Ministry of Education and Research and National Agency for Research and Development, Ministry of Environment and Ministry of Energy) and **research entities** (67 research-performing entities), the effectiveness of which is hindered by outdated infrastructure and a lack of sufficient investment in sector-specific research, especially in areas like organic agriculture and sustainable energy solutions, a pivotal role in Moldova's transition to a green economy play the **international donors and collaborative projects**. They provide financial backing, technical expertise, and access to global networks, which are crucial for developing and implementing innovative green technologies. For instance, the EU is a significant contributor through various funding mechanisms, including Horizon Europe, which

offers opportunities for Moldovan researchers to participate in cutting-edge research projects. The EU4Digital and EU4Environment initiatives also support Moldova's efforts to integrate digital technologies and environmental governance. The United Nations Development Programme (UNDP) supports multiple projects in Moldova focusing on sustainable development and environmental protection. The World Bank has been upgrading Moldova's infrastructure to improve energy efficiency and reduce greenhouse gas emissions. This includes modernizing heating systems in public buildings and enhancing the energy efficiency of residential buildings, thus aligning with the goals of the EGD. The European Bank for Reconstruction and Development (EBRD) has funded projects to modernise public transportation systems, such as providing loans for acquiring modern buses that operate on clean fuels, thereby contributing to reducing urban air pollution and promoting cleaner transportation methods.

The **private sector's** engagement in R&I related to green technologies is emerging but still requires significant enhancement. While there are initiatives to foster innovation, such as the Intelligent Transport and Mobility Strategy developed with UNDP support, broader engagement and investment in R&I remain limited. Also, engagement in R&D activities is relatively low, with only 11.4% of firms conducting innovative activities, which is much lower than the EU average.[134] The sector faces limited absorptive capacity for innovation and a lack of deep integration of ICT skills and green technologies, which are essential for transitioning to green technologies.

Moldova's **non-governmental organisations (NGOs)** are vital in advocating for and supporting the green transition, particularly through education, capacity building, and public awareness campaigns. These organisations actively participate in projects that promote sustainable practices across various sectors and facilitate the implementation of community-level projects that align with green objectives.

As mentioned in section 3.4.1 above, the development of Moldova's national research and educational electronic infrastructure and regional connectivity is overseen by the non-governmental public association National Research and Educational Network of Moldova (RENAM).[135] The primary objective of RENAM's activities is the continual development of the communication and information infrastructure for the scientific and educational community in the Republic of Moldova. Since 2018, RENAM has also been engaged in activities to implement the European Open Science Cloud Initiative in

[137] Eurostat (2022). *More than Half of EU Businesses Innovate*. https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20221118-2 (March 2024).
[138] RENAM – National Research and Educational Network of Moldova (n.d.). *Official Website*. https://renam.md/ (April 2024).

Moldova, offering computational resources, infrastructure, and thematic services to facilitate open access to national research data repositories. RENAM provides access to the pan-European academic network GEANT, primarily through the EU-funded Eastern Partnership Connect project.

Another nongovernmental organization that promotes innovation and technology transfer in Moldova by creating and fostering a platform for interaction between the main stakeholders and organizations involved in these processes is the Moldovan Technology Transfer Network (RTTM).[136] RTTM aims to set up a bridge between research and business, which will lead to the creation of innovative SMEs that provide relevant support.

Also, the Chamber of Commerce and Industry of the Republic of Moldova (CCI RM) is implementing the EUREM training programme – European Energy Manager, conducted in 30 countries. Under the auspices of EUREM, carried out by the CCI RM, over 153 European Energy Managers have been certified from 2011 to 2023[137]. Also, CCI RM The CCI of the Republic of Moldova supports state authorities and donors in informing the private sector about the tools and support offered to domestic entrepreneurs to implement energy efficiency instruments.[138]

There are other public associations actively implementing various projects in Green R&I (see Annex NGOs in R&I), of which the most active are Public Association ECOCONTACT,[139] which is engaged in cultivating networks of influence across isolated communities to accelerate a just transition, focusing on enhancing the adoption of renewable energy sources and promoting sustainable practices in local development, Public Association VEM - Green Is Moldova, that contributes to the involvement of civil society in the problems faced by the state of the Republic of Moldova and aims to solve global environmental problems by adopting essential green solutions,[140] Eco-TIRAS International Association of River Keepers, the association of more than 50 environmental NGOs of Moldova, including the Transdniester region, and Ukraine,

[139] Moldovan Technology Transfer Network (n.d.). *About RTTM Moldova*. https://rttm.md/en/about-rttm (April 2024).
[140] Chamber of Commerce and Industry of the Republic of Moldova (2024). *EUREM 2024 – European Energy Manager Training*. https://training.chamber.md/eurem-2024-european-energy-manager/ (April 2024).
[141] Chamber of Commerce and Industry of the Republic of Moldova. (n.d.). *Support for Energy Efficiency and Entrepreneurs – CCI RM*. https://chamber.md/cci-a-rm-sustine-alianta-pentru-eficienta-energetica-si-regenerabile-si-proiectul-usaid-securitatea-energetica-a-republicii-moldova-in-sprijinul-oferit-antreprenorilor-autohtoni/; https://chamber.md/eficienta-energetica-subiect-de-interes-major-pentru-antreprenorii-autohtoni/ (April 2024).

[142] ECOCONTACT (n.d.). *Official Website.* https://www.ecocontact.md/ (April 2024).
[143] VEM – Green Is Moldova (n.d.). *Official Website.* https://vem.md/ (April 2024).

concerned with the safety and sustainability of the transboundary Dniester River basin and is registered under Moldovan legislation,[141] etc.

The key stakeholders generally possess the mandate to support green R&I initiatives; however, there are significant gaps in human resources and funding. Further strengthening collaborations between the government, private sector entities, and NGOs will enhance Moldova's capacity to support the necessary changes in its R&I landscape and effectively meet its sustainability goals.

Table 8. Summary of gaps/bottlenecks and needs

Areas of assessment	Summary of gaps
Does the country have sufficient technical and infrastructure capabilities to reach national and EGD goals related to just transition?	1. Moldova's current technical and infrastructural resources are insufficient to meet the ambitious goals of the EGD and the national objectives for a just transition. 2. Current expenditure on R&D (0.23% of GDP) is significantly lower than needed to drive a comprehensive green transition, indicating a gap in the commitment to sustainable R&I funding. 3. There is a lack of laboratories equipped for testing and certification, which is essential for supporting the development and standardization of green technologies.
Are the discussions related to the technical and infrastructure development focusing on making changes required for a just green transition?	1. While discussions on transitioning to greener technologies are underway, facilitated by various platforms, including government bodies, NGOs, and international agencies, they are not sufficiently widespread or deep enough to drive substantial technological changes. 2. There is an ongoing need to integrate cutting-edge technologies and modernize research facilities. However, progress in adopting these technologies across sectors is slow and lacks comprehensive support.
Are there enough skilled workers to support the green transition of the R&I area, and does the government have plans and measures	1. There is a critical shortage of professionals trained in green technologies and sustainable practices across key sectors. 2. Integrating green skills in educational and vocational training programmes is insufficient and not widely implemented. 3. While some initiatives for skill development exist, comprehensive government plans and measures for widespread skill enhancement are lacking.

[144] Eco-TIRAS International Association of River Keepers (n.d.). *Official Website.* https://www.eco-tiras.org/ (April 2024).

to support the development of green skills?	
Are the relevant sectors aware of the changes they need to take to reach green transition-related goals and overcome the challenges?	1. Awareness of the need for a green transition exists within academic and policy circles but is not yet pervasive across all relevant sectors. 2. Engagement in green practices is evident in some sectors, particularly in energy and agriculture, but many industries still lack the knowledge and tools to implement sustainable practices effectively. 3. While some industries adapt, many are unaware of the steps needed to align with green transition goals.
Do the sector's key stakeholders have the capacity and resources to implement and support green R&I transition?	1. Key stakeholders, including governmental bodies, NGOs, and research institutions, possess the mandate but often lack the necessary resources, particularly funding and human capital, to support and implement the green R&I transition effectively. 2. While some collaborative efforts among stakeholders aim to foster green R&I, these need to be significantly strengthened and better coordinated to achieve the desired impact. 3. International partnerships and funding support Moldova's green R&I initiatives. However, greater local capacity building and investment are required to sustain these efforts.

4. R&I in other thematic areas

This section presents an overview of the most important developments in the EGD-related sectors in the Republic of Moldova, with a particular focus on their relation to the R&I sector. It aims to explore to what extent the R&I policy can facilitate Moldova's green transition across key areas energy and climate, building and renovation, farm to fork, industry and circularity, smart mobility, biodiversity, zero pollution, just transition, transitional finance, and digitalisation.

R&I is pivotal to the successful implementation of the EGD objectives. In Moldova, R&I policies are still to be tailored to address the unique challenges and opportunities presented by the green and digital transitions. Some general trends of the relation between R&I and EGD key areas could be identified:

- Some areas are using readily available technologies instead of investing in R&I to build internal capabilities for the long-term transformation of the economy,

- In the energy and climate sector, R&I initiatives are focused on developing renewable energy sources, thereby reducing dependence on fossil fuels and lowering greenhouse gas emissions.
- R&I efforts in the building and renovation sector are still nascent in the country. Adopting energy-efficient materials and smart building technologies to reduce energy consumption and enhance living standards requires investments in skill development and proper research infrastructure.
- In the farm-to-fork area, R&I activities seek to contribute to sustainable agricultural practices, improve food security, and reduce the environmental impact of food production.
- In the industrial sector, circularity, focusing on waste reduction and resource efficiency, still lacks proper collaboration with research actors that would generate solutions for the shift towards sustainable manufacturing processes, aligning with circular economy principles.
- In the area of digitalisation, there is a need to develop inter-sector opportunities, which directly and indirectly will increase the innovation level and will boost the entire society's digitalization.

Ready for the transition?

In Moldova, the **general awareness** of the nature of green R&I within society remains nascent, confined mainly to academic, governmental, and certain industrial sectors. Even if there are structured efforts within the academic and policymaking realms to foster a greener economy, broader societal understanding lags behind. While Moldova is innovating above its investment level on the Global Innovation Index,[142] The disconnect between R&I activities and broader economic and societal engagement continues to pose challenges. This situation underscores a significant need for widespread educational and outreach programmes to enhance public understanding of green R&I's implications and benefits. For instance, the Moldovan government has been integrating EGD targets into national policy frameworks. Still, public awareness and engagement with these initiatives are not yet widespread, as evidenced by the limited public discourse and media coverage on green issues.

While the country has made some advancements in aligning with national targets for a green economy over the past decade, the transition from linear to circular economic models is still in its early stages. Administrative and technical challenges persist as obstacles, exacerbated by regional tensions and conflicts, significantly affecting economic, political, and institutional developments. Additionally, low public awareness

[145] World Intellectual Property Organization (WIPO) (2022). *Global Innovation Index 2022: Moldova Country Profile*. https://www.wipo.int/edocs/pubdocs/en/wipo_pub_2000_2022/md.pdf (April 2024).

of climate change remains a challenge, necessitating ongoing efforts to address it. The shift towards a green and circular economy necessitates systemic transformation, particularly within industrial processes and economic practices, aimed at minimizing resource consumption and maximizing the value retention of materials within the economy. This transition presents an opportunity for the Moldovan business sector to leverage environmental challenges into developmental prospects. To realize this transformation, immediate adjustments are imperative across various policy domains, including education and training, research and development, innovation, digitization, entrepreneurship, infrastructure, and public procurement. Through R&I, green technologies are developed and advanced across various sectors, such as renewable energy, sustainable transportation, and circular economy practices. Thus, these sectors can potentially drive transformative changes towards sustainability and climate neutrality in Moldova.

In 2018, the Programme for the Promotion of the Green Economy in the Republic of Moldova for 2018-2020 was approved by the GoM, being the first policy document that supported the implementation of green economy principles in the country. As a result of the programme's implementation, several achievements have been recorded, including the development of training programmes in the green economy and organic farming within educational institutions, as well as the implementation of research projects in the field by research-performing organizations. However, the final evaluation report on the implementation of the Programme identified significant challenges concerning the promotion of the green economy, persisting at the institutional, managerial, and implementation levels:

- weak coordination and information exchange among public authorities at both national and local levels, - the absence of provisions pertaining to the green economy in sectoral strategic documents,
- limited short-term actions with clear indicators and anticipated financial sources,
- inadequate structures within ministries responsible for dealing with the green economy, and
- constrained human and financial capacities to address current requirements and challenges in this domain.

Moreover, delineating responsibilities for developing, implementing, and monitoring green economy policies among state institutions lacks clarity. Furthermore, the escalating impact of transport emissions on the environment and public health, coupled with the under-realization and application of economic benefits stemming from resource and energy efficiency, particularly among small and medium-sized enterprises, pose additional challenges. Lastly, only a minority of the population and environmental NGOs demonstrate an understanding of and support for the principles

of the green economy. Adding to this, as mentioned in previous chapters, the potential of R&I in supporting green and digital transitions is far from being fully exploited.

The buy-in of the business sector

By developing and adopting environmentally friendly technologies, products, and processes that reduce resource consumption, minimize pollution, and mitigate environmental impact, the business sector's active participation and commitment to promoting sustainability are essential for achieving a successful green transition and building a more resilient and environmentally sustainable economy. Still, the Moldovan business sector has modest achievements in producing and adopting innovative products and services. The statistical survey conducted by the National Bureau of Statistics on the innovation activity of Moldovan enterprises for the years 2021-2022 reveals that the proportion of innovative enterprises among the total number of enterprises stood at 11.4%, a decrease from 12.6% recorded in 2019-2020.[143] The highest share of innovative enterprises in the total number of innovative enterprises was recorded by enterprises in the manufacturing industry, accounting for 46.2% of the total number of innovative enterprises.

Table 9. Innovative enterprises based on economic activities

	2021 - 2022	2019 -2020
Total	**100.0**	**100.0**
Industry – total	**50.0**	**48.9**
Extractive industry	0.2	0.7
Processing industry	46.2	44.6
Production and supply of electricity and heat, gas, hot water and air conditioning	1.9	2.2
Water distribution, sanitation, waste management, and decontamination activities	1.7	1.3
Services – total	**50.0**	**51.1**
Wholesale trade	20.2	22.3
Transport and storage	8.8	7.1
Information and communication	11.4	14.1

[146] National Bureau of Statistics of Moldova. (2023). *Results of Enterprises Innovation Activity During 2021–2022*. https://statistica.gov.md/en/statistic_indicator_details/41 (April 2024).

Financial activities and insurance	5.0	4.2
Professional, scientific and technical activities	4.5	3.3

Despite efforts to promote innovation and entrepreneurship, systematic innovation remains absent throughout the economy. A primary impediment to innovation is the limited capacity of the private sector to engage in innovative activities, attributable to insufficient absorptive capacity among firms. This deficiency also restricts trade and investment activities' potential positive spillover effects. Enhancing the overall absorptive capacity of the private sector is therefore imperative for fostering innovative development, particularly in the realm of entrepreneurial innovation. Facilitating stronger science-industry linkages emerges as a critical strategy for bolstering innovation. Moreover, alongside addressing these challenges, creating incentives to align the education system with market demands is essential for remedying the widespread skills gap reported in the workforce.

Scarcity of skills

Overall, due to skill mismatch phenomena, Moldova faces limited human capital accumulation and low levels of innovation among firms. According to a WB-commissioned survey, 41% of employers identified skill levels as a major constraint, and 15.7% of enterprises consider the inadequately educated workforce as a major obstacle. Also, the lack of a qualified labour force is often mentioned as a reason not to settle a foreign business in Moldova.

The higher education system in Moldova is grappling with challenges in equipping graduates with the necessary skills to drive innovation and enhance productivity in the national economy. Over the past decade, the system has experienced a significant decline in enrolment, largely due to factors such as an ageing population and high levels of emigration. Recruitment of young professors and attracting fee-paying students, including those from abroad, has proven difficult. However, there has been recent momentum in prioritizing higher education on the government's agenda, with the Ministry of Education and Research's substantial investments directed towards university infrastructure, including research facilities.

Regarding human potential and skills, the number of university graduates from the faculties related to subjects relevant for green and digital transition is relatively modest; students still prefer law and economics when choosing a higher education institution. The trend continues while speaking about PhD studies.

Table 10. Graduates from higher education institutions by Fields of study (cycles and years, first cycle, licentiate)

	2023
Chemical sciences	35
Biological sciences	16
Environmental sciences	61
Physical sciences	19
Mathematics and statistics	2
Information and communication technologies	720
Engineering	555
Manufacturing and processing	167
Architecture and construction	141
Agriculture	83
Forestry	12
Veterinary	-

Table 11. Structure of the number of PhD students according to scientific fields in 2022(%)

	2022
Natural sciences	8.5
Engineering sciences and technologies	4.8
Medical sciences	21.4
Agricultural sciences	2.7
Humanities	11.9
Legal sciences	17.6
Economic sciences	12.4
Education sciences	9.9
Social sciences and journalism	10.0

An ETF study that assessed the skills in the two (out of four) areas selected as part of the smart specialization process (renewable energy and food processing) concluded that demand for workers, both skilled and less skilled, exceeds supply in both. The renewable energy sector suffers from skills shortages due to the emigration of the working-age population and the specific skills needed. Employers report that demand for workers currently exceeds supply. The renewable and biomass energy sector is a relatively new sector with important job creation potential. Basic training for occupational fields in renewable energy still lacks practical relevance and often fails to meet companies' requirements. Emerging profiles are connected with planning,

manufacturing and operating renewable energy technologies, and additional competences are required in existing jobs.

Energy

In **energy efficiency (EE) and renewable energy (RE),** Moldova is increasing its capacity in solar and wind energy installations. There has been a notable development in adopting biogas plants and small-scale solar projects, facilitated by local initiatives and international partnerships. These technologies are crucial for reducing dependence on imported energy and enhancing energy security. Many energy efficiency and renewable energy technologies are imported, underscoring the need for local capacity building in these sectors. Existing institutions like the National Centre for Sustainable Energy (CNED), which is the organization that must ensure the implementation of state policies in the energy sector, the Centre of Excellence in Construction and the Technical University provide some foundational knowledge and skills relevant to energy efficiency.

R&I are crucial for deploying clean energy technologies, and specific support instruments for the energy sector are necessary. Moldova plans to adopt a Smart Specialization Strategy, developed by the Ministry of Education and Research, to strengthen the connections between research and business environments and align scientific research with business sector needs. The Strategy's main objectives related to the energy sector include:

- Enhancing local energy autonomy through renewable energy resources.
- Strengthening centralized thermal energy supply systems in cities to increase efficiency.
- Promoting energy efficiency projects and renewable energy use in public and residential sectors, with accessible financing instruments, particularly for vulnerable consumers.
- Developing green energy by stimulating the production and consumption of renewable energy, including efficient and clean biomass technologies, and facilitating the connection of production facilities to distribution networks.

Currently, Moldova has limited R&D activities in the energy sector and a small number of low-carbon technology producers. Key priorities of energy research in Moldova are energy efficiency and renewable energy, smart grid control devices, and energy storage. Still, most of the companies in the energy sector are service-oriented, mainly in RES and EE. Therefore, there is a significant potential for scaling up low-carbon and energy-efficient solutions, starting from the demonstration and pivotal stage up to the market of renewable energy technologies and achieving more significant energy savings.

In 2021, the Global Cleantech Innovation Programme was launched in Moldova to support the country's cleantech enterprises in developing innovative solutions and scaling up the market adoption of cleantech innovations. The focus of the GCIP Moldova is enhancing institutional, market, and ecosystem capacities to support emerging clean technology start-ups and strengthening policy frameworks and mechanisms for technology innovation within and by SME's.

The National integrated energy and climate plan for the 2025-2030 period, currently under public discussions, foresees a series of cooperation mechanisms that will be implemented to support R&I in the energy sector:

- Creation of Advanced Electricity Storage Technologies R&D Programme;
- Creation of Advancing Renewables R&D Programme;
- Establishment of Better Buildings Initiatives, Accelerators and Support Programmes;
- Establishment of Bioenergy Research Centres;
- Implementation of Deep Retrofit Pilot Programmes;
- Implementation of Electric Vehicles R&D Programmes;
- Development of Energy Efficiency Grants Mechanisms;
- Co-funding for business-led research partnerships for new technologies;
- Funding for low greenhouse gas vehicle technologies research, development, demonstration and deployment;
- Support of Green Aviation R&D;
- Heat Pump Support Programmes;
- Participation in Horizon Europe Programme;
- Development of the National Hydrogen Strategy;
- Joint Research Programmes with Tertiary Institutions;
- Adoption of National Strategy/ Programme for Energy Research;
- Promotion of Education, Research and Innovation for Energy Technologies;
- Public Funding for Innovative Renewable R&D projects;
- Public-Private Partnership Mechanisms in Energy R&D;
- Establishment of Technology Commercialization Fund.

Climate change

Environmental and climate change R&I efforts are taking place at both national and international levels. At the national level, the National Programme in the fields of R&I for the years 2020-2023 stipulated Environment and climate change as one of the Strategic research priorities, split into five strategic directions:

- The impact of biotic and abiotic factors on the environment and society;
- Safe, clean and efficient energy;
- Waste, plastics and pollutants;
- Ecological security;
- Biodiversity conservation.

Within the competition of state programmes organized by the NARD, 26 projects from various organisations have been selected to be funded under this specific priority for 2020-2023, with an estimated four-year budget of around MDL 181,5 mln. At the international level, Moldovan organizations have been involved in Horizon 2020 projects regarding Environment and climate change, such as AXIS, BOND, BioHorizon, NCPsCaRE, SINCERE, IC4WATER, WaterWorks, AGRUMIG, METROFOOD-PP, Aquatic Pollutants, BRIDGE-BS, BiodivRestore, and Biodiversa+.

Emerging initiatives, such as hackathons, positively impact the generation of social innovation solutions in the area. For example, Climathon Moldova, organized in April 2024, brought together diverse participants to tackle climate challenges with innovative ideas. This dynamic event aimed to foster and support projects addressing critical issues such as energy efficiency, renewable energy, water management, green building development, and the promotion of green transport. The proposed solutions have the potential to significantly reduce carbon footprints, conserve natural resources, and enhance environmental quality. The National Centre for Sustainable Energy organised the event in collaboration with the United Nations Industrial Development organization (UNIDO) and was supported by the Ministry of Energy of the Republic of Moldova, the Global Environment Facility (GEF), Tekwill, and Technovator. The initiative is part of the "Clean Technology Innovation Programme for SMEs and Start-ups in the Republic of Moldova," which aims to foster innovation and sustainable development within the country.[144]

From Farm to Fork

The agriculture sector progressively integrates green technologies, focusing on organic farming and agroecological practices. Significant developments such as the planned Research Centre for Organic Horticulture indicate a strategic move towards sustainable agricultural practices – organic and agroecological practices. This shift is crucial given the sector's traditional reliance on conventional farming methods. The projects implemented in Food, Bioeconomy, Natural Resources, Agriculture and Environment thematic aria by Eco-TIRAS International Association of River Keepers, Fruit Producers and Exporters Association of Moldova, Association of Small Wine Producers in Moldova DIONYSOS, Public Association ECOCONTACT indicates a growing emphasis on soil health, crop rotation, and sustainable water management, all aimed at reducing environmental impacts and

147 Ministry of Energy of Moldova (2024). *Climathon Moldova 2024 – A Pioneer Event for Sustainability and Innovation*. https://energie.gov.md/ro/content/editia-nationala-climathon-ului-moldova-2024-un-eveniment-de-pionierat-sustenabilitatea-si (May 2024).

enhancing biodiversity. Nevertheless, there is a need for other educational and research directions to be developed within higher educational systems, such as:

A more holistic (permaculture) approach to agriculture and food systems (mainstreaming environmental concerns into agriculture and food study programmes and demonstrating the economic value of a nature-based approach) and vice versa, integrating agroecology, organic agriculture, and permaculture into study programmes such as biology and more traditional curricula.

- Research on the broader environmental and health benefits of sustainable agriculture (rather than the principle “not to harm” or minimum environmental requirements),
- Research of the combination of different sub-branches of agriculture into diversified agricultural production and landscape as suggested by the agroecological approach (annuals with perennials, perennials with livestock), e.g. agroforestry, silvo-pastoralism,
- Research on the sustainable use and management of pastureland and High Nature Value Grasslands,
- Research around nutrition (the study programme on Nutrition at Medicine University is very recent; until a few years ago, there was none in Moldova) and the links between nutrition and agriculture, including the role of more diversified diets and prevention of non-communicable diseases (NCDs),
- Data and evidence on the role of women in the green transition (home-manufactured foods, seeds) and healthy diets,
- Awareness about social capital and the benefits of societal cohesion around food and agriculture
- Research on circular agriculture, industrial symbiosis and economic model of small family farms.

There is significant donor support for developing R&I infrastructure in the area. For example, under the "Livada Moldovei" project, 16 investment projects are underway at educational and research institutions, worth €18 million, to improve educational infrastructure and promote advanced agricultural research. The funds come from a loan offered by the European Investment Bank, and the Ministry of Agriculture and Food Industry implements the project.

An analysis conducted several years ago by the Ministry of Agriculture and Food Industry on the potential of public research performing organizations in agriculture and food processing unveiled that the state funding is the main source of income for these institutions. The technical equipment, research methods and tools used during the assessment were mainly outdated and insufficient. Funding for maintenance of premises, purchase of new equipment or qualification of existing staff was limited or unavailable. Low salaries and existing working and living conditions have had a negative impact on the scientific potential in terms of quantity and quality. Out of the

total number of 770 people employed in research institutions, the share of research-innovation staff was 50.26%, 49.74% being auxiliary staff, and out of the total number of researchers, the share of those who have reached retirement age was 44.18%.[145] Moreover, the link between the research topics and actual research outputs and the needs of farmers was missing, and links between research institutions and businesses are weak and sporadic. Research projects were formulated based on the existing capacities of scientific institutions, taking little into account the needs of the real sector of the economy. Partners from civil society as well as from central and local public authorities have little involvement in setting priorities and objectives, and in the research evaluation. Weak cooperation and integration with the international research and education community were reported.

At the same time, when looking at the Moldovan budget for R&D activities, agricultural sciences rank third, with most funding directed towards applied research, leaving almost no expenditure for agricultural technology development. Approximately 12 per cent of NARD's total funding allocated in 2019 for the 4-year state programmes had been assigned to agricultural research projects. The Institute of Horticulture and Food Technologies has received funding for the largest number of projects (39% of funding allocated to agriculture), followed by the State Agrarian University of Moldova (21% of funding allocated to agriculture).

The effectiveness of R&D in agriculture significantly depends on the availability of complementary inputs such as rural infrastructure, insurance, capital markets, extension services, and active participation from farmers. In Moldova, many of these essential inputs are insufficient. Several factors contribute to the poor cooperation between agribusinesses and research institutes, including a lack of demand for innovation within the sector, limited domestic research capabilities, low adoption rates of new agricultural techniques, a deficient culture of collaboration, and weaknesses in the business enabling environment.[146] Additionally, the extended period required to see returns on R&D investments tends to deter businesses, while the research community lacks incentives to foster ties with enterprises.

In the food processing area, skills shortages and gaps are recognized by employers and policymakers. The priority area is impacted by the trends of automation of food processing operations, which require advanced professional skills to manage, regulate and maintain modern technologies. The EU-oriented export strategies also influence

[148] Government of Moldova. (2018). *Draft Decision on Restructuring R&I, Education, and Rural Extension in Agrifood*. https://cancelaria.gov.md/sites/default/files/document/attachments/proiectul_158.pdf (May 2024).
[146] UNECE (2022). Innovation for Sustainable Development Review (I4SDR) of Moldova/ Innovation for Sustainable Development Review of Moldova | UNECE. (May 2024)

the demanded skills. Moreover, opportunities in food processing with high value added include organic foods, which call for specialisations in quality and safety, organic food handling, and sales. Companies in food processing require a mix of technical and generic skills to support growth and innovation. There is a clear tendency in the increased demand for both basic and advanced digital skills, marketing and management skills, as well as knowledge on the processing and preserving food products, safety-related and environment-related issues. In line with the increased focus on sustainable production, emerging trends also point to the need for researchers in food technology or sustainable systems specialists. In addition, there is a demand for multi-skilled professionals with a broad range of skills, including technical, marketing and communication skills.[147]

In this situation, it is crucial to prioritize lifelong learning initiatives to equip the workforce with the necessary skills to transition to a green economy. This includes providing job-relevant training addressing the skills required for green industries and practices. Social partners encompass employers and employees and play a pivotal role in facilitating relevant lifelong learning opportunities. They can contribute by actively identifying skills gaps and needs within the workforce, designing tailored training programmes to address them, and fostering constructive social dialogue around skill development and workforce readiness for the green economy. Nevertheless, overall figures for the number of employees participating in continuous vocational training (CVT) are quite low.

Table 12. Number of employees who participated in at least one type of CVT (courses or/and other forms) in 2022 by economic activities148

Agriculture, forestry and fishing	1980
Mining and quarrying	398
Manufacturing	10993
Electricity, gas, steam and air conditioning supply	7322
Water supply, sewerage, waste management and remediation activities	1015
Construction	2473
Mining and quarrying	398
Wholesale and retail trade; repair of motor vehicles and motorcycles	14434
Transportation and storage	4414

[150] European Training Foundation (2023). *Skills for the Green Transition: Evidence from the EU Neighbourhood*. https://www.etf.europa.eu/sites/default/files/2024-02/Green%20paper_2023%20-%20edited.pdf (April 2024).
[151] National Bureau of Statistics of Moldova (n.d.). *Official Webpage*. https://statistica.gov.md (May 2024).

Accommodation and food service activities	882
Information and communication	10060
Financial and insurance activities	9008
Real estate activities	540
Professional, scientific and technical activities	1337

Going digital

Regarding **digital transition**, the ICT sector has become the main driver of digitisation and innovation in Moldova and is growing rapidly. In 2021, the IT industry reached a share of more than 4.2% of gross domestic product (GDP), exceeding 10 billion lei in sales, with the ICT sector's share of more than 7.6% of GDP, achieved by about 2000 companies with more than 30,000 employees. According to the National Bank of Moldova report for 2022, the export of ICT services reached USD 501.85 million. IT exports have grown by over 30% annually over the last five years, reaching a record level of USD 468.67 million in 2022. The 7% flat tax on sales revenue offered by the Moldova IT park and the wide range of eligible activities, including ICT-related R&D, have significantly boosted the development of the ICT sector. In its five years of operation, Moldova IT park has become one of the country's most successful IT sector development initiatives, having attracted over 1,395 residents, with about 18,700 employees and a projected revenue of over MDL 10.7 billion by 2023.[149] The development of Moldova's ICT sector accelerated during the Covid-19 pandemic. Moldovan businesses of virtually all sizes started or increased online business activity during the pandemic, with the strongest percentage recorded for small companies with 69.5%, followed by 67% for medium firms and 60% for large companies.[150] However, Moldovan SMEs' digital transformation remains nascent, with less than 17% reporting successfully adopting digital tools in 2020.

New opportunities for the sector became available in the meantime. The Programme to Support Digital Innovations and Technology Startups was launched by the GoM in 2022 to promote technological innovations, accelerate the implementation of the digital, circular, and technology-based economy, and increase the economic competitiveness of the Republic of Moldova in the field of digital innovation, green technologies, and sustainable production. Additionally, on the 19th of February 2024, Moldova joined the Digital Europe Programme. Moldova is eligible for 4 out of 5 components of the programme: Artificial Intelligence, Digital Skills, Digital Transformation and

[152] Government of Moldova (2023). *Decision No. 650 of 06.09.2023 on the Approval of the Digital Transformation Strategy for 2023–2030*. https://www.legis.md/cautare/getResults?doc_id=139408&lang=ro (May 2024).
[153] World Bank (2021). *Enterprise Surveys Follow-Up on COVID-19 – Moldova 2021, Round 3*. https://www.enterprisesurveys.org/content/dam/enterprisesurveys/documents/covid/country-profile-Moldova-Round-3_English.pdf (May 2024).

Connectivity. Thus, private, public and non-governmental sectors in Moldova can apply with innovative initiatives to receive funding.

Due to previous policies, digital skills have become integral to Moldova's educational framework. Digital competence is emphasized across all education levels, with specific modules such as "Digital Education" introduced as compulsory subjects in primary schools for grades I-IV since 2018. Older students continue to enhance their digital skills through mandatory informatics courses in upper secondary general schools and through integration into various other subjects. In vocational education and training (VET), digital skills training is imparted through two main approaches: a transversal approach focusing on fundamental IT skills and professional study programmes embedding IT skills within specific vocational fields. Higher education institutions must offer IT courses to first- and second-year students, supplemented by optional advanced courses covering robotics, mobile application design, website development, IT security, and artificial intelligence. Digital skills policies benefit from the active involvement of the private sector, which creates additional opportunities: the Moldovan Association of ICT Companies (ATIC) appears as a driving force, offering a wide range of services, such as training courses and awareness-raising campaigns. At the same time, lifelong learning initiatives remain nascent, and digital skills development among businesses of all sizes could be further encouraged, as this remains a significant challenge. This applies to both generic and advanced ICT skills.[151]

Industry and circularity

Moldova's industrial sector is transitioning towards greener and more sustainable methods. It moves towards circular economy models and cleaner production methods, which are nascent, with only initial steps being taken to align with EGD objectives. The Circular Economy Educational Programmes project encourages industries to adopt cleaner production techniques and reduce waste, supporting the shift towards a circular economy. Overall, there is a crucial gap in infrastructure to support large-scale industrial transitions to greener practices.

The National Programme for industrial development covering the 2024-2030 period, recently adopted by the GoM[152], aims to accelerate the green and digital transition of industry, integrate it into the European single market and to develop a strengthened and diversified industrial sector. The sectors targeted by the programme are: electronics, chemicals and pharmaceuticals, automotive components, textiles,

154 OECD (2024). *SME Policy Index: Eastern Partner Countries 2024 – Building Resilience in Challenging Times*. https://www.oecd-ilibrary.org/sites/4a15ad91-en/index.html?itemId=/content/component/4a15ad91-en (May 2024).
155 Ministry of Economic Development and Digitalization (2024). *National Industrial Development Programme 2024–2028*. https://mded.gov.md/programul-national-de-dezvoltare-industriala-pentru-2024-2028-aprobat-de-guvern/ (May 2024).

construction materials and food. Implementing the programme will significantly increase the share of the manufacturing industry within GDP from 8.2% in 2023 to a target of 11.5% by 2028. It will also increase the number of employees in manufacturing, which will account for 15% of all employees in the economy, and the volume of industrial production is expected to increase by at least 25% over the same period. Moldovan industry currently produces mainly low-value-added goods, with a workforce accounting for 13.5% of total employment and with an orientation towards the domestic market.

According to Government Decision No. 382/2019 on the Methodology for Financing R&I Projects, research organizations in Moldova are encouraged to collaborate with enterprises on various R&I projects. This framework is supported by the SMEs Law and national programmes designed to encourage and support innovation. However, it is important to note that a comprehensive coordination mechanism for these activities has not yet been fully established.

Demand-side policies could also contribute to Moldova’s innovation ecosystem. Notably, the law on public procurement introduces the concept of “innovation partnerships.” This mechanism, still unknown and underutilised by the business and research sectors, allows contracting authorities to stimulate investment in innovation by committing to procure goods or services that are not yet available in the market.

The Enterprise Europe Network (EEN) consortium in the Republic of Moldova has enhanced enterprises' innovation capacity through support, advisory, and training services. Over the past seven years, Moldova has benefited from EEN's advisory and support activities for SMEs on legislation and programmes, more than 30 customized business scale-up consultancies, and over 500 informative consultations on digitalization, women entrepreneurship, greening, and internationalization. Additionally, entrepreneurs have received pertinent information on SMEs' digitalization, women's entrepreneurship, and the green economy.

Mobility

The mobility sector in Moldova is exploring smarter and greener transportation strategies. However, existing R&I capabilities and infrastructure support are limited, with major strategies still under development and requiring significant enhancement in technology and skillsets. The Transport and Logistics Strategy, approved by the government in 2013, expired in 2022. The new National Mobility Strategy is under development and will be adopted this year. The draft Strategy includes a priority direction 1.3. intended to promote the adoption of advanced technologies and innovations that reduce environmental impact in air transport activities and encourage using more fuel-efficient aircraft, noise-reducing engine technologies, and sustainable aviation fuels to mitigate contamination and noise-related issues. Also, it states that research is vital to improving road safety. Developing and demonstrating components,

measures and methods (including telematics) and disseminating research results are important in increasing road infrastructure safety. This is why knowledge transfer is a key topic for developing and continuously improving knowledge in road safety engineering.

The initiatives like Road Safety Observatory within the Technical University of Moldova and the Strategy for Intelligent Transport and Mobility for the Municipality within the Chisinau City Hall with the support of UNDP Moldova and the Czech Republic are integral to the efforts towards achieving zero pollution goals. They contribute to making transportation systems safer and more efficient and support broader environmental objectives by reducing vehicle emissions and promoting cleaner transportation technologies. Yet, the country lacks specific MA/PhD programmes or substantial R&D projects in smart mobility, indicating a gap in academic and professional training in this area.

One of the major gaps in Moldova's R&I infrastructure is the insufficiency of adequate laboratory and analytical capacities necessary for the certification and standardization of green technologies and practices and those related to energy efficiency or renewable energy technologies. As the demand for technology increases, it becomes crucial to establish national laboratories that can provide reliable verification of EE/RE products, ensuring that Moldova can keep pace with international standards and market demands. That’s why establishing national laboratories equipped to verify and attest to the performance of green technologies is crucial. This will ensure that Moldova can independently certify and standardize green technologies, which is essential for building trust and fostering the adoption of these technologies locally and in international markets.

Building and renovation

There are a few institutions with capacities and knowledge to provide energy efficiency services and share knowledge related to green transition in the building sector, including the Centre of Excellence in Construction, the Faculty of Construction, Geodesy and Cadastre of the Technical University, and the Centre for Research and Laboratory Testing. These have a track record of implementing projects or training programmes related to energy efficiency, sustainable buildings, etc. This experience allows them to offer valuable insights, lessons learned, and best practices to stakeholders in the building sector. While the government adopted policies aiming for constructing buildings with nearly zero energy consumption and implementing incentive programmes within existing legislation, the prevalence of such structures in the economy is non-existent. The limited demand for these buildings primarily comes from a scarcity of technological and professional expertise, coupled with the high

construction costs (and missing co-financing support) prevailing in the current market environment.

For energy professionals in Moldova, government policies serve as crucial guidance, shaping their skill set needs and obligations towards minimum technical standards. However, with the EGD only beginning to gain traction in the public discourse, there appears to be a significant lack of awareness among professionals regarding its implications and potential development opportunities – the non-government sector is missing knowledge and skills for designing and applying nearly Zero-Energy Building (nZEB) technologies. Given the lack of nZEB implemented projects, it can be stated that currently there is a gap of skilled professionals on the labour market capable to deliver (plan, design, apply and install, and commission and maintain) nZEB technologies in the country. There are no trainings for designers, installers and energy auditors on nZEB technologies. Investment in improving the human capital stock is low, limiting the creation of a more productive workforce. The current curriculum of technical universities/faculties and other educational institutions doesn't create market-ready professionals capable of delivering a fully decarbonised buildings sector by 2050. Namely, theoretical and practical education to create understanding, skills, and practices for future engineers/energy practitioners on nZEBs does not yet exist. However, by piloting some nZEB projects, the design and installation of nZEB technologies will start to see its uptake.

5. Summary and conclusions

The GA GUMA — Green Agenda for Georgia, Ukraine, Moldova, and Armenia — project aims to assist the Eastern Partnership countries move towards green transition and climate neutrality. The present report addresses the nexus of European Green Deal (EGD) areas and R&I in the Republic of Moldova by giving an overview of the current state and trends, key stakeholders, policy framework, implementation gaps, and institutional capacity.

5.1 Current state of R&I and its relation to EGD areas in Moldova

Although themes about green and digital transitions are addressed in the primary strategic document concerning R&I, namely the National Programme for R&I, the full integration of the EGD into the R&I sector remains incomplete.

The National Development Strategy for *European Moldova 2030* outlines a progressive annual augmentation of funds allocated to the sector by 0.1% of GDP, alongside efforts to cultivate and fortify connections between research and business entities. In environmental policy and management, the document articulates the aim of integrating environmental standards across economic sectors, such as energy, agriculture, transport, industry, construction, and trade, while affirming Moldova's alignment with EGD objectives.

Overall, the Moldovan R&I system faces several internal constraints, still having a limited connection to the national economy. Regarding human potential, the number of scientists is diminishing, and the outflow of researchers is higher than the inflow. This was expressed by the brain drain of 3900 employees in 2022, including 2809 researchers, 6.4% less than in the previous year. In terms of funding, the gross domestic expenditure on R&D was only 0.23% of GDP in 2022 (approx. EUR 32.6 mln), with R&D spending per capita in Moldova of about EUR 13 in the same year, compared to €244 at the EU level in 2021. The current expenditures were mainly directed to natural sciences (35.2%), followed by medical sciences (17.6%), agricultural sciences (17.3%) and engineering and technology (14.6%). The share of R&I activities in the private sector is low in terms of both performance and funding, and the insufficient absorptive capacity within firms is considered a serious challenge for improving productive capacities and enhancing innovative activities in the private sector.

The Republic of Moldova possesses all the essential prerequisites for a swift and influential digital transformation, including advanced infrastructure, a mature ICT

private sector, government dedication to digitalization, established scientific expertise in exact sciences, and a population adept at embracing and utilizing digital technologies. Once equipped with adequate research infrastructure, workforce, robust funding, and collaborative instruments (intra- and inter-sectoral), the Moldovan R&I ecosystem could significantly contribute to achieving climate neutrality, supporting energy and circularity transitions, and biodiversity preservation.

The table below sums up Moldova´s performance in meeting the European Research Area (ERA) objectives.

Table 13. Moldova´s performance in meeting the objectives of the European Research Area (ERA).

Objectives of the ERA	Moldova's performance
More investments in research and innovation for a green and digital future	The Government of Moldova allocates limited funding from the state budget for R&I activities. There is no data on private investments in this area. Still, considering the share of innovative companies in the economy and the degree of sophistication of Moldovan exports, we assess that the investments are minor. In 2016, a European Commission Policy Support Facility[153] exercise stated that increasing the expenditure on R&I appears to be a capital necessity for Moldova. At that time, Moldova's spending on R&I was 0.40% of GDP, which was considered the "absolute minimum". Since then, the relative expenditure on R&I has continued to decline and reached 0.23% of GDP. Over the past decade, Moldovan authorities have undertaken a series of reforms aimed at increasing R&I outputs and enhancing the cost efficiency of research funding. The reforms have primarily focused on transforming the research funding mechanisms by increasing the proportion of competitive, project-based financing. A reduction in overall R&I funding has accompanied the push for efficiency. As cautioned by the PSF report, this reduction has not only negated potential positive effects but has further compromised the effectiveness of the already fragile national research framework. Increasing investment levels in R&I is an essential prerequisite for various positive national research and innovation outcomes. Investments are crucial for generating research impacts that drive economic growth and enhance quality of life. Without a significant increase in funding and a strong governmental commitment to sustained investment over time, other reforms are unlikely to affect R&I performance positively. In its latest assessment (November 2023), the EC asks Moldovan authorities to ensure sufficient financing for R&I under national programmes.
Uptake of research and innovation results on the markets	The development of tools for the transfer of knowledge and scientific results to potential users is facilitated through annual open calls for innovation, technology transfer, and innovation voucher projects, organized by the NARD in accordance with Government Decision No. 382/2019. These initiatives aim to foster applied collaborative projects between the scientific community and business representatives, with the goal of practical application and commercialization of new or substantially improved materials, products, devices, processes, systems, and services. Furthermore, to enhance public-private cooperation, the new National Programme in the fields of R&I for 2024-2027 includes a dedicated general objective and concrete measures in the Action Plan. The necessity of business-academia collaboration is also acknowledged in other public policy documents, such as the National Development Strategy "European Moldova 2030" and the National Programme for the Promotion of Entrepreneurship and Increasing Competitiveness for the years 2023-2027, which outline additional steps to strengthen this collaboration.

[156] European Commission (2016). *Peer Review of the Moldovan Research and Innovation System – Horizon 2020 Policy Support Facility*. https://op.europa.eu/en/publication-detail/-/publication/3eb4b6b3-4f05-11e6-89bd-01aa75ed71a1/language-en/format-PDF/source-68539949 (May 2024).

	However, at the level of research-performing organizations, the infrastructure necessary to support research commercialization, such as Technology Transfer Offices (TTOs), remains underdeveloped in Moldova. There is a lack of institutional incentives, such as reward schemes embedded in universities' and public research organisations' intellectual property (IP) policies, to encourage researchers to engage in regulated technology transfer activities. Additionally, there is an insufficient critical mass of personnel who possess the necessary skills, knowledge, and experience to effectively negotiate traditional technology transfer through the sale or licensing of rights. Entities with a clear mandate to protect and transfer IP are generally not prominent, and internal regulations to facilitate classical technology transfer, such as institutional IP policies and spin-off regulations, have not been established. S3 is being developed: the strategy will be adopted under the national legislation as a national programme and action plan for Smart Specialisation for the period 2024-2027. Related needs: • to secure proper funding for the implementation of the National S3 programme, • review the current law on S&T parks and innovation incubators to stimulate demand better and support the start-ups and spin-offs exploiting scientific results. • link innovation and technology transfer infrastructure to priority sectors identified under S3. • establish a national technology transfer office. • require RPOs to establish a clear intellectual property (IP) policy.
Better access to infrastructure and facilities for researchers	The 'National Roadmap for the Integration of the Republic of Moldova into the European Research Area for 2019-2021' sets specific objectives to develop research infrastructure at national level and remove legal and other barriers to cross-border access; create, strengthen and assure proper usage of available infrastructure and facilities, providing more resources for 'collective usage' and for facilities of major interest to the public and private sectors; stimulate participation in calls for the development of RIs under the EU's Framework Programmes and participating in European Strategy Forum for Research Infrastructure (ESFRI) thematic activities; and connect the national infrastructure to regional and European infrastructure. In 2021, MER launched a comprehensive mapping exercise of the existing research facilities, providing an overview of the national research infrastructure landscape, where RIs are located, and the state of the facilities and equipment. Related needs: • develop an open access policy to public RI for external stakeholders, primarily for the business sector, and make the RIs visible, • develop a vision to align the development of R&I infrastructures and the strategic priorities of Moldova, • develop a national Research Infrastructure Roadmap: by categorising according to their scope and degree of international presence and engagement research infrastructures mapped in 2021, identifying national pockets of scientific excellence with potential and links to the national Smart Specialisation Strategy, and identifying plans associated with existing European research infrastructures, ensure proper funding for developing and upgrading public RI.
Promotion of researchers' mobility, skills and career development opportunities	The personnel in R&I are diminishing, given the negative impact of ageing and brain drain. To alleviate this, GoM stimulates the involvement of young researchers, e.g. the Ministry of Education and Research issued Order No. 1685/2023 for establishing complementary institutional funding for research organizations with the presence of young researchers as a key performance indicator. The NARD launched the "Young Researchers" competition to support professional development and career opportunities for young researchers. Employment of young researchers is also a key performance indicator for university rectors, as stipulated in Order No. 165/2024. PhD programmes implemented by the ministry encourage young talents to pursue careers in science, offering support for their scientific and research endeavours. Furthermore, the Government Excellence Scholarship and Scholarship in Scientific Fields,

	strengthened by Government Decision No. 203/2024, provides annual financial support to outstanding young researchers. According to the State budget law for 2024,[154] the salary of scientific personnel increased by an average of 21.5 %. International mobility is mostly supported via bilateral programmes (e.g., Romania, Germany, Turkey) and international ones (e.g., Marie Curie Fellowships). Since 2012, Moldova is part of the network of states who adhered to the EU Strategy on Human Resources for Researchers (HRS4R), a forum for exchange of experience in the implementation of the principles of the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers in the EU and associated countries. So far, there are 16 local contact points and 3 EURAXESS service centres in Moldova. Seven organizations in the field of R&I have the right to use the logo "Excellence in research". Related needs: • launching additional social measures for supporting young researchers, • developing a mobility scheme for researchers to work within the business sector, • introducing the industrial PhD as a form for doctoral training, facilitating placements and internships in industry, • ensuring that mobility experiences are valued and recognized in career progression and evaluation criteria for researchers and professors, • providing access to career counselling, mentoring programmes to help researchers navigate their career paths • providing Comprehensive continuous training and development programmes.
Support for open science and better knowledge-sharing	In this context, the following achievements can be mentioned: the inclusion of the requirement regarding the publication of the results of the research projects financed from the state budget in Open Access as a condition for funding; development of the National Bibliometric Tool for indexing publications in journals, materials of scientific events and international publications of authors from Moldova; organizing the competition of research projects offering solutions on promoting the concept of Open Science and developing digital technologies relevant for R&I. The results of the survey "Attitudes towards Open Science"[155] conducted in 2021 among 532 participants (researchers, scientific and pedagogical staff, PhD students, librarians, R&I decision makers and other stakeholders) unveiled that 85.15% of respondents are familiar with the concept and practices of Open Science, and more than 50% practice and promote Open Science. Only 14.10% of respondents were not familiar with Open Science. Need: developing the national Open Science Programme.
Promotion of gender equality (women	According to the latest statistics[156] (2023), the share of female scientists at the national level is the following: • Members of the ASM -8.7%

[157] Government of Moldova (2024). *[Document Title Unavailable] – Legis Reference ID 140974*. https://www.legis.md/cautare/getResults?doc_id=140974&lang=ro (May 2024).

[155] Turcan et all (2023). Analysis of knowledge and awareness level of Open Science in the Republic of Moldova/29/05/24

[159] ANACEC (2023). *Femeile și fetele în știință din Republica Moldova*. https://anacec.md/ro/news/femeile-%C8%99i-fetele-%C3%AEn-%C8%99tiin%C8%9Ba-din-republica-moldova (May 2024).

represent 48% of EU graduates at the doctoral level, but only around 1/3 of all EU researchers and only 1/5 of those in the business sector)	• Members of the Academy of Sciences of Moldova's Sections - 31,1% • Rectors of universities - 20,8% • Directors of research institutes – 31.4% • University professors (position) – 24.8% • University lecturers (position) – 54.9% • University professors (title) – 27.3% • University lecturer (title) - 60.1% • Research scientists - 47.5% • Doctors habilitatus - 43,8% • Doctors of science – 63.1% As of 2021, the "State Programme" competition (2020-2023) registered the following situation regarding gender disparities: • Priority I – Health – out of a total of 40 projects, 14 projects were led by women; • Priority II – Sustainable agriculture, food security and food safety – out of a total of 27 projects, six project leaders were women; • Priority III – Environment and Climate Change – out of a total of 26 projects, eight were led by women; • Priority IV – Societal Challenges – out of a total of 45 projects, 25 were led by women; • Priority V – Economic competitiveness and innovative technologies – only one female project leader out of a total of 29 positions. The Republic of Moldova does not have a national plan or strategy for promoting gender equality in R&I. Still, there are actions in the National Roadmap for the Integration of the Republic of Moldova in the European Research Area for 2019-2021 and its Action Plan, approved by Government Decision No. 1081/2018. Moldova has made international and national commitments to promote gender equality and women's empowerment, particularly by ratifying the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) and the various conventions of the World Labor Organization. Since the adoption in 2006 of Law No. 5 on ensuring equal opportunities for men and women, several national strategies and action plans on gender equality have been implemented. MER is giving annual awards to women in science. Related needs: • Elaborating the national plan for promoting gender equality in research, ensuring funding for the identified activities. • Promoting role models of women researchers within Moldovan society.
Stronger engagement of citizens and research and innovation organisations	Promotion of research in society is mainly done through various events, e.g. World Science Day for Peace and Development, International Day of Women and Girls in Science, and European Researchers Night. Related needs: • establishing transparent communication channels between citizens, research organizations (forums, communication channels), • involving citizens and CSOs in decision-making processes related to R&I initiatives (going beyond the current public consultations of the draft documents on the governmental www.particip.gov.md platform). • organizing public campaigns to raise awareness on the role of R&I in the sustainable development process, • encouraging collaboration between citizens and research organizations on projects of mutual interest (co-creation workshops, hackathons, and joint research initiatives that address community needs and challenges). Introducing the concept of citizens' science within R&I public policy.

5.2 Summary of the enabling conditions, key gaps and needs

Recent evaluations conducted by the European Commission conclude that the Republic of Moldova continues to face challenges in integrating environmental and climate policies, as well as the EGD agenda, across all policy domains, including R&I.

The key challenges for R&I supporting the green transition in Moldova include:

1. **Excessive public sector focus:** R&I policies mainly target the public sector, neglecting private sector needs. There are no proper monitoring and evaluation mechanisms, including ex-ante and ex-post assessments of policies.

2. **Lack of inter-sectoral coordination:** there's no interministerial R&I platform, and R&I is poorly integrated into sectoral strategies, often treating innovation narrowly as tech adoption. A whole-government approach is needed.

3. **Funding limitations:** state investment and international funding are insufficient to support EGD-related R&I efforts. Improved use of funding tools is essential.

4. **Weak science-business cooperation**: few mechanisms exist for dialogue and collaboration between research and industry. Strengthening partnerships and creating national tech transfer units can close the gap.
5. **Human resource shortages:** there is a lack of skilled professionals in science and green transition fields, limiting innovation capacity. Investment in education and training is vital.

6. **Outdated infrastructure:** much of Moldova's R&I infrastructure is obsolete, deterring researchers and businesses from engaging. Modernization with a clear vision is essential.

7. **There is a lack of research programmes in EGD focus areas, no dedicated green research initiatives, and low stakeholder awareness**. New programmes and awareness campaigns can drive green innovation.

8. **Insufficient investments in innovation:** the country relies too much on existing technologies, with limited focus beyond renewable energy.

Broader innovation, skills, and infrastructure investment are needed to support sustainable industry and the circular economy.

The main gaps include obsolete research infrastructure dedicated to green innovation and research, limited science-business collaborations and a lack of tech transfer competencies within R&I organizations, a nascent innovation ecosystem around the green economy, and the shortage of researchers with green expertise.

The main opportunities lie in broadening access to international partnerships and collaboration, facilitating the acquisition of funding, retaining and building green expertise (especially among women and young researchers), and improving knowledge exchange.

Table 14 provides an overview of the enabling conditions, key gaps and needs.

Table 14. Enabling conditions, key gaps and needs resulting from the analysis

Main elements	Enabling conditions	Key gaps	Needs
EU Strategic framework and Acquis (policy and legal readiness, section 3.1)	The Government of Moldova (GoM) is a country associated with the Horizon Europe programme (previously also associated with the 7th Framework Programme and Horizon 2020). The country committed to 9 out of 18 actions from the ERA policy agenda for 2022-2024. The overarching goal of the new National Programme for R&I for the years 2024-2027 is the integration into the European Research Area. It should be mentioned that, in November 2018, the GoM adopted a National Roadmap for the Integration of the Republic of Moldova into the European Research Area for 2019-2021[157]. The declared goal of the actions	1. GoM concluded a limited number of international/bilateral agreements related to R&I. This limited engagement restricts the country's ability to benefit from international collaboration and knowledge exchange in the R&I sectors. 2. The authorities allocate inadequate resources to fulfil obligations stemming from international agreements related to R&I: Insufficient funding and resources hinder the effective implementation of international agreements, thereby limiting the impact and benefits of these collaborations. 3. Overall, the national strategic R&I priorities align with the objectives of the EGD: This alignment demonstrates an opportunity for sustainable	1. MER and NARD should increase Engagement in European International R&I Networks. They should also increase participation within the ERA Committee and explore more actively the status of a country associated with the HE programme by exploiting the capabilities of the EC Joint Research Centre and European Institute of Technology, among others. Moldovan authorities should actively pursue and negotiate additional international and bilateral agreements focused on research and innovation, especially with the EU member states. 2. GoM should allocate Sufficient Funding for International R&I Commitments. Ensure that adequate financial and human resources are allocated to fulfil obligations under international R&I agreements, including those arising from the associate and candidate status. This includes budget allocations and capacity-building initiatives. Special attention should be given to participation within European Partnerships under Horizon Europe, especially those from the following areas: health, digital, industry, climate, energy and mobility, food, bioeconomy, natural resources, agriculture and environment. 3. Strengthen the alignment and integration of national R&I priorities with the EGD by enhancing coordination and collaboration with EU-funded programmes and initiatives that support sustainable development. A special strategic research programme is needed to implement EDG objectives in Moldova.

[160] Government of Moldova (2018). *Roadmap for the Integration of the Republic of Moldova into the European Research Area, GD no. 1081/2018*. https://www.legis.md/cautare/getResults?doc_id=111352&lang=ro (April 2024).

	foreseen in the document is to take over and transpose EU requirements and standards into national practice in the fields of R&I. EU-Moldova Association Agreement, signed in June 2014 and full effect since July 2016, is the legal framework of relations between the Republic of Moldova and the EU foresees that cooperation in RTD shall cover, among others the policy dialogue and the exchange of scientific and technological information, facilitating adequate access to the respective programmes of the Parties, increasing research capacity and the participation of research entities of the Republic of Moldova in the research framework programmes of the EU and promotion of joint projects for research in all areas of RTD. In the latest country report, the European Commission is concluding that Moldova's legal, policy, and funding frameworks about	development and climate action in line with broader European initiatives. 4. The national strategic R&I priorities predominantly mirror the country's current scientific capabilities, overlooking the economy's requirements. This focus on existing resources rather than economic needs may prevent the development of new sectors and innovative solutions that could drive economic growth, including in the area of green and digital transition. 5. R&I remain relatively constrained within sectoral policy documents and are less present within strategies and programmes governing other sectors. The lack of integration across different policy areas limits the potential for interdisciplinary research and comprehensive innovation strategies.	4. Under the existing programmes, broaden the scope of national R&I priorities to include emerging economic sectors and societal challenges, particularly those related to the green and digital transitions. Encourage research that addresses the country's financial needs and future growth areas. Moving forward towards EU, the government should notably focus on adopting an innovative specialization strategy/programme and formulating a multiannual action plan with implementation measures. 5. Promote integrating R&I objectives within all relevant national strategies and programmes, ensuring a holistic approach to policy development that leverages R&I for broader societal benefits. Launching inter-ministerial discussions to incorporate R&I considerations into policy documents across sectors such as health, agriculture, energy, and digitalization (This could also fall under the mandate of the planed National Committee for smart specialization). Develop guidelines and frameworks that mandate the inclusion of R&I components in sectoral strategies.

	R&I policy, addressed by the Code of Science and Innovation, as well as the National Programme for R&I and its associated action plan, are broadly aligned with the EU's sectoral research strategies and framework programmes. Moldova is generally deemed moderately prepared for the R&I chapter negotiations, with no requirement for the transposition of EU acquis in this area. In 2015, Moldova committed to implementing the 2030 Agenda for Sustainable Development, which has at its heart the 17 Sustainable Development Goals (SDGs).		
Instruments for policy implementation (implementation readiness, section 3.2)	Among the key regulatory instruments impacting the R&I area in Moldova one could mention: the Code of Science and Innovation of the Republic of Moldova 259/2004, which provides a legal framework for the development of the national science and	1. The existing legal framework supports R&I broadly but needs further refinement to address the nuances and requirements of green R&I specifically. 2. While an ongoing effort to align with EU standards is underway, more targeted and comprehensive measures are	1. To effectively cater to the unique demands of green R&I, detailed legislative and regulatory frameworks that specifically address sustainable practices, environmental considerations, and green technology innovations are needed. These frameworks should include provisions for supporting green startups, incentivizing sustainable investments, and ensuring compliance with international green standards. 2. Moldova must implement more targeted and comprehensive measures in response to the ongoing effort to align with the EU's standards, particularly the EDG. These should include detailed

	innovation system; the National Programme for R&I for 2024-2027, setting up priorities and strategic directions for 2024-2027 in the fields of green R&I; the Methodology of Funding Projects in the Field of R&I, that stipulates that the state budget shall finance projects in the fields of R&I that correspond to the strategic priorities set out in the National Programme in the fields of R&I approved by the government; the Law 226/2018 on science and technology parks and innovation incubators. Also, the new Programme for the Promotion of Green and Circular Economy in the Republic of Moldova for the period 2024 – 2028 was developed and is currently under consultation. One of the Specific Objectives of this programme refers to the green innovation ”2.3. Stimulating eco-innovation and digitization for developing and implementing green	needed to ensure full compliance with the EGD. 3. Moldova has instruments in place but lacks specific regulations and incentives directly targeting green R&I, indicating partial coverage and a clear area for development. 4. The direct correlation between current instruments and tangible R&I improvements is unclear, indicating a significant gap in policy effectiveness and execution. 5. Mechanisms for effectively measuring the impact of R&I policies are lacking, highlighting the need for better tools and methodologies to assess outcomes and their direct impact on R&I advancements. 6. Current policies emphasize creating a supportive environment rather than focusing on specific outcomes, necessitating a shift towards more result-oriented strategies. 7. While initiatives exist, the absence of a centralized and comprehensive strategy for green R&I impacts the efficiency of these efforts.	action plans and regulatory guidelines defining how businesses, educational institutions, and government bodies can achieve compliance. The measures should cover all sectors impacting the environment and detail the steps for transition to green practices. 3. It is crucial to introduce specific regulations and financial incentives to promote green R&I. These should focus on reducing carbon footprints, enhancing energy efficiency, and promoting the use of renewable resources across industries. Financial incentives could include tax breaks, grants, and subsidies, encouraging companies to invest in green technologies and research. 4. There is a significant need to enhance the effectiveness of current R&I policies by developing mechanisms that link policy instruments to tangible R&I improvements. This involves setting up performance indicators and benchmarks that measure the direct impact of specific policies on innovation outputs, technological advancements, and sustainability metrics. 5. Robust tools and methodologies must be developed and implemented to address the gap in mechanisms for effectively measuring the impact of R&I policies, particularly those aimed at green innovations. These should be capable of assessing the direct outcomes of R&I activities on environmental sustainability, economic growth, and technological innovation, enabling policymakers to make informed adjustments and decisions. 6. Current policies need to be reoriented from merely creating a supportive environment to focusing on specific, measurable outcomes that contribute to green transitions. This shift should include establishing clear objectives that are regularly monitored and evaluated for effectiveness, ensuring that all initiatives contribute directly to the overarching goals of sustainability and environmental protection. 7. The efficiency of existing green R&I initiatives can be significantly enhanced by developing a centralized strategy that coordinates

	technologies in the economy". Regarding tax benefits to bolster private R&D activities, the Tax Code of the Republic of Moldova (No. 1163/1997) delineates several fiscal advantages for private R&D endeavours. One well-recognised instrument relevant for the IT-related innovation ecosystem is the special tax regime offered for the IT park residents. Incentives provided to entities operating within free economic zones (FEZs) could also be mentioned as stimulating instruments, as could projects and initiatives implemented and funded by international donors (e.g., the SDGs Fund).	8. The dispersion of efforts across various instruments without a centralized strategy or clear benchmarks for green R&I reduces the overall efficiency of the instruments in place.	and integrates all efforts. This strategy should outline a cohesive plan that aligns with national and international environmental goals, coordinates cross-sectoral initiatives, and streamlines resources to maximize impact. 8. To improve the coordination and efficiency of green R&I initiatives, it is essential to consolidate all efforts under a centralized strategic framework. This framework should include clear benchmarks for success, regular monitoring and reporting mechanisms, and clearly defined roles and responsibilities for all stakeholders involved.
Financial capacity (implementation/financial readiness)	There are two complementary channels for the public funding to be allocated to R&D institutions: (1) institutional funding -used mainly for the maintenance and development of public infrastructure in the fields	1. The amount of public funding allocated to the sectors is limited and is insufficient for producing a significant impact on the alignment of the EGD path 2. There is an insufficient level of cross-sectoral coordination in terms of developing and	1. Advocate for increased public investment in R&I sectors, at least in accordance with the dynamic foreseen by the NDS European Moldova. Prioritize alignment with EGD objectives to ensure significant impact. 2. Establish an interministerial committee to coordinate the development and implementation of funding instruments relevant to R&I. This committee should include representatives from key ministries such as energy, environment, agriculture, digitalization,

	of R&I and staff expenditure, research infrastructure and institutional performance and (2) project-based funding, used for competitive funding schemes. In 2019, the National Agency for R&D launched the biggest competition for basic and/or applied research projects, based on the strategic scientific directions identified in the National R&I Programme for the 2020-2023 period, entitled 'State Programme 2020-2023'. As a result, 166 projects were funded. NARD also implements bilateral grant programmes with Belarus, Turkey and Romania. R&I institutions interested in environment-related applied research can also apply to the National Environment Fund calls for proposals. Since 2018, Moldova has been a member country within COST, with Moldovan participants receiving	implementing funding instruments relevant to R&I 3. Limited funding opportunities for science-business collaboration. 4. International research programmes are important for developing research infrastructure in the country and offering access to transnational knowledge networks 5. Funding R&I goals is not a major priority within donor assistance. Overall, it should be mentioned that there are limited funding measures related to R&I. Insufficient involvement of the private sector in funding R&I activities results in a heavy reliance on public funding sources, which cover the current expenditures of the sector and offer limited growth opportunities. Support for R&I is neither at the top of the development partners' agenda. In this situation, participation within international R&I funding programmes represents an alternative avenue for conducting high-quality research	industry and finance to ensure a cohesive approach that leverages synergies and maximizes the impact of investments. 3. Develop targeted funding programmes and fiscal incentives to promote collaboration between research institutions and businesses. These programmes should focus on areas where such partnerships can drive innovation, particularly in green technologies and sustainable practices. Once in place and sufficiently funded, the policy mix related to smart specialization could also be relevant. 4. Actively participate in and promote international research programmes, such as Horizon Europe. Ensuring the necessary funding for the HE Office to assist researchers in applying for European grants and facilitate partnerships with foreign research entities. 5. Engage with international donors and development agencies to align their assistance programmes with Moldova's R&I goals, emphasizing the importance of funding for green transition projects and presenting well-defined projects that demonstrate the potential for significant impact on sustainable development.

	135,145.39 €. Potential funding sources for R&I activities are also the Interreg programmes, where the Republic of Moldova is eligible: Interreg Danube, Interreg NEXT România-Republic of Moldova (Interreg VI-B), NEXT Black Sea Basin Programme, and Interreg Europe Programme. The Digital Innovations and Technology Startups Support Programme implemented by the Entrepreneurial Development Organization is related to the digital green transition and relevant for promoting business sector innovations. The GoM created the Horizon Europe Office in 2023 to boost Moldovan entities' participation in EU framework programmes.	and retaining talent within the system.	
Public capacity (institutional capacity - effectiveness and efficiency - implementation	The Ministry of Education and Research oversees government policy on research and innovation. At the same time, the NARD serves as the primary	1. Inter-agency collaboration, EGD-related R&I activities are more of an exception than a rule.	1. Establish an EGD R&I Task Force comprising representatives from key ministries (MER, environment, economy, agriculture, energy), research institutions, and industry stakeholders (business associations, economic council under the PM) to facilitate regular inter-agency collaboration.

readiness, section 3.3)	funding agency, and the Academy of Sciences of Moldova acts as an autonomous strategic consultant to the government. Additionally, the Ministry of Health, the Ministry of Culture, the Ministry of Agriculture and Food Industry, the Ministry of Internal Affairs and the Ministry of Defence are founders of public R&I. On the other hand, the sector went through a series of institutional reforms in the last decade (MER took over the policymaking role and NARD the funding role from ASM, research institutes previously part of ASM went to MER and later were included in universities) with limited ex ante evaluation of their effects. It is premature to evaluate the outcomes of the respective reforms. The mandates are reasonably allocated, with policy development distinct from funding and research performance—an aspect highlighted as a weakness	2. No specific vision on the role of R&I for reaching EGD targets has been agreed on among the main stakeholders. 3. Human resources are a major constraint for the main institutions governing R&I fields. 4. There is a need to develop and implement continuous training programmes in research management. 5. Not enough data are gathered as evidence for new policy development. There is no adaptive management mechanism in place that allows for adjustments during project implementation based on learning from M&E data. 6.M&E is one of the weaknesses at the R&I system level. 7. Key stakeholders, including governmental bodies, NGOs, and research institutions, possess the mandate but often lack the necessary resources, particularly funding and human capital, to support and implement the green R&I transition effectively. 8. While some collaborative efforts among stakeholders aim to foster green R&I, these need	2. Organize a series of stakeholder workshops and consultations to develop a unified vision and strategic plan on the role of R&I in achieving EGD targets in Moldova. 3. Develop and implement a continuous professional development (CPD) programmes; partnering with international organizations (such as UNESCO) for training programmes can also be beneficial. 4. Create a public platform with all scientific results and a centralized R&I data repository that collects and disseminates comprehensive data on research activities, outcomes, and impacts. This repository should inform new policy development and enable adaptive management practices. 5. Strengthen the M&E framework by developing standardized indicators and methodologies for assessing R&I programmes and projects and introducing a piloting phase for new funding schemes. Regular training for M&E personnel and integrating feedback mechanisms into project cycles will enhance effectiveness. 6. Develop a capacity-building programme focused on enhancing local expertise in green R&I. This programme should include training and awareness workshops, investment in relevant research infrastructure (potentially a centre of excellence on EGD-relevant topics), and incentives for PPP in green R&I. 7.-8. Better science communication capacities within RPOs should be considered. This will eradicate the idea that the research system is obsolete and unable to contribute to economic growth.

	in the past by international reviews. However, the primary organizations, namely MER and NARD, face constraints in terms of human resources, placing considerable strain on existing personnel and impeding comprehensive coverage of the tasks outlined for them within the existing legal framework. Usually, the interested parties are consulted via a mandatory public consultation process while drafting policy documents. The Academy of Sciences of Moldova organizes public hearings of reports related to the implementation of research projects funded by the state. Research performers publish annual reports on their webpages. Still, their dissemination is limited, and there are no in-house science communicators to ”translate” the info for the general public.	to be significantly strengthened and better coordinated to achieve the desired impact. International partnerships and funding are crucial in supporting Moldova’s green R&I initiatives. However, greater local capacity building and investment are required to sustain these efforts.	
R&I capacity (implementatio	The non-governmental R&I sector, although with	1. Moldova's current technical and infrastructural resources are	1. Enhance and expand technical and infrastructural resources to adequately support the EGD goals and national sustainability

n readiness, section 3.4)	limited resources, shows potential in promoting environmental knowledge and technologies. The National Research and Educational Network of Moldova (RENAM) promotes the development of research and educational electronic infrastructure and its regional connectivity. The Eduroam service, an international Wi-Fi internet access roaming service for research and higher education users, has expanded significantly in Moldova. The Moldovan National Open Science Cloud Initiative (NOSCI) is currently in the process of being established. Through the European Open Science Cloud (EOSC) framework, universities and research institutes will implement Open Science (OS) practices and adhere to FAIR (Findable, Accessible, Interoperable, Reusable) principles. Moldova primarily facilitates the development	insufficient to meet the ambitious goals of the EGD and the national objectives for a just transition. 2. Current expenditure on R&D (0.23% of GDP) is significantly lower than needed to drive a comprehensive green transition, indicating a gap in the commitment to sustainable R&I funding. 3. There is a lack of laboratories equipped for testing and certification, essential for supporting the development and standardisation of green technologies. 4. While discussions on transitioning to greener technologies are underway, they are not sufficiently widespread or deep to drive substantial technological changes. 5. There is an ongoing need to integrate cutting-edge technologies and modernize research facilities. However, progress in adopting these technologies across sectors is slow and lacks comprehensive support.	objectives. This includes significant investments in modernizing existing facilities and developing new infrastructure specifically designed to support green R&I initiatives. 2. Substantially increase the funding for R&D to a level commensurate with the requirements for a comprehensive green transition. This increase should align with European averages and be earmarked specifically for sustainability projects, including renewable energy research, sustainable agricultural practices, and green technology innovations. 3. Establish and fund state-of-the-art laboratories equipped to handle testing and certification for green technologies. These should support the development and national & international standardization processes essential for innovative green products. 4. Expand the scope and depth of discussions on transitioning to greener technologies across all sectors. Encourage more inclusive and comprehensive dialogues that involve all stakeholders, including government bodies, NGOs, and the private sector, to foster a unified approach to technological changes. 5. Accelerate the integration of cutting-edge technologies and the modernization of research facilities to enhance the pace of adoption across various sectors. This need emphasizes the importance of comprehensive support and strategic partnerships to facilitate technological updates and innovation. 6. Implement targeted educational and training programmes to address the critical shortage of professionals trained in green technologies and sustainable practices. Focus on developing skills directly applicable to the industry's most pressing needs for such expertise. 7. Enhance the integration of green skills into educational and vocational training programmes. This should be widespread across all educational levels to build a workforce capable of supporting sustainable development. It should also include developing new

	of green skills through its educational institutions and targeted training programmes. Public awareness of green R&I has gradually improved, and it has been influenced by government policies and non-governmental efforts to promote sustainable development and environmental responsibility. The NGO sector is pivotal in advocating for environmental issues and has been active in integrating green skills into various sectors of the economy. Another important factor in Moldova's transition to a green economy is the international donors and collaborative projects (EU, WB, GIZ, UNDP). These provide funding, technical expertise, and access to global networks, which are crucial for developing and implementing innovative green technologies.	6. There is a critical shortage of professionals trained in green technologies and sustainable practices across key sectors. 7. Integrating green skills in educational and vocational training programmes is insufficient and not widely implemented. 8. While there are some initiatives for skill development, comprehensive government plans and measures for widespread skill enhancement are lacking. 9. Awareness of the need for a green transition exists within academic and policy circles but is not yet pervasive across all relevant sectors 10. Engagement in green practices is evident in some sectors, particularly in energy and agriculture, but many industries still lack the knowledge and tools to implement sustainable practices effectively. 11. While some industries adapt, many are still unaware of the steps needed to align with green transition goals.	curricula, enhancing existing programmes, and incentivising institutions to adopt and promote these programmes. 8. Develop and execute comprehensive plans for skill enhancement across the board, focusing on increasing capacity in green R&I. Ensure these plans are well-supported by national and international resources. 9. Launch an extensive awareness campaign to expand the understanding of the need for a green transition beyond academic and policy circles to encompass all sectors of society. This campaign should use various media and communication strategies to reach a broad audience and foster a deeper, widespread commitment to sustainable practices. 10. Provide targeted support, resources, and training to industries that lack the knowledge and tools to implement sustainable practices effectively. This support should include technical assistance, access to modern technologies, and financial incentives to encourage adopting sustainable practices. Better align ODA programmes for SMEs and those implemented by NARD on innovation and tech transfer. 11. Developing targeted communication strategies and educational programmes that clearly outline actionable steps for Moldovan businesses to align with green transition goals, incl. creating industry-specific guides and providing technical assistance to facilitate adopting sustainable practices. 12. Increase funding and resource allocation to key stakeholders involved in green R&I (not only from R&I-related funds but also from those dedicated to environment protection, regional development, and infrastructure). Implement capacity-building programmes that enhance their operational capabilities, providing technical training on their areas of activity, financial management skills, and project implementation expertise.

		12. Key stakeholders, including governmental bodies, NGOs, and research institutions, possess the mandate but often lack the necessary resources, particularly funds and human capital, to support and implement the green R&I transition effectively. 13. While there are some collaborative efforts among stakeholders aimed at fostering green R&I, these need to be significantly strengthened and better coordinated to achieve desired impacts. 14. International partnerships and funding support Moldova's green R&I initiatives. Greater local capacity building and investment are required to sustain these efforts.	13.-14. Establish a formal coordination body or framework that enhances collaboration and capacity building among all stakeholders involved in green R&I—an EGD R&I task force. This body should be tasked with aligning efforts, sharing best practices, and managing joint initiatives to ensure a cohesive approach to sustainability.

Annex 1: Mapping of the strategic national documents as well as relevant thematic objectives and targets

R&I relevant international or EGD policy area/ strategic document	Existing national strategic document	Time of adoption and date of last revision	Legally binding or not	Relevant objectives and targets	Comments:
Digitalization	The Digital Transformation Strategy of the Republic of Moldova for the Years 2023-2030	06/09/2023	Y	The Strategy has six general objectives, the most relevant for the R&I being GO3: *Create an **innovative** and resilient digital economy*.	Under GO3, the following directions are foreseen: Promotion of R&D cooperation between R&I subjects, public and private sector; Strengthening the links between research and production, encouraging open innovations; Practical implementation of open science principles and open access to research publications and data; Capitalization on the niches identified by S3 until 2030 to support innovation and digital transformation of national economy sectors.
Sustainable food systems	The National agricultural and rural development strategy for 2023-2030	17/02/2023	Y	The following GO are foreseen: 1) strengthening the potential of the primary agricultural sector and promoting smart, sustainable and climate-resilient agricultural practices; 2) developing the food industry and diversifying markets; 3) supporting sustainable rural socio-economic development; 4) ensuring transposition and	The Strategy acknowledges that the link between research topics, results, and farmers' and businesses' concrete needs is missing. Research projects are formulated based on the existing capacities of scientific institutions and do not consider the needs of the economy. The document foresees improving the quality of the agricultural education system, strengthening research performance and promoting innovation and knowledge transfer.

R&I relevant international or EGD policy area/ strategic document	Existing national strategic document	Time of adoption and date of last revision	Legally binding or not	Relevant objectives and targets	Comments:
				progressive implementation of the EU acquis in the field of agriculture, rural development and food safety.	
Energy	Concept of the Energy Strategy until 2050	Forthcoming	N	5 priority intervention areas: a) increasing energy security, b) the development of competitive energy markets and regional integration, c) promoting energy efficiency, d) the development of sustainable renewable energy, e) consumer protection.	At this stage, the concept states that education, innovation, research, and development will be covered as cross-cutting priorities, which will be reflected in all sectors of intervention.
Energy, climate	National Energy and Climate Plan (NECP) for the period 2025-2030	Forthcoming	N	Moldova's NECP covers the five dimensions of the Energy Union: (i) decarbonization, (ii) energy efficiency, (iii) energy security, (iv) internal energy market and (v) research, innovation and competitiveness.	To facilitate and foster RDI, the following initiatives are slated: transitioning human capital toward a knowledge-based economy, augmenting funding for research and development endeavours, involving the private sector in R&D efforts, and implementing S3 Strategy to reinforce ties between academia and industry, focusing on key sectors including Energy, IT, Agriculture, and Health.
Climate	National Programme on adaptation to	30/08/2023	Y	The main goal is to reduce vulnerability and increase resilience to climate change impacts through systemic	The programme strives to strengthen collaboration between government agencies,

R&I relevant international or EGD policy area/ strategic document	Existing national strategic document	Time of adoption and date of last revision	Legally binding or not	Relevant objectives and targets	Comments:
	climate change until 2030			transformations in all priority adaptation sectors.	universities, and research institutions to generate climate-related knowledge jointly.
Clean industry and circularity	National programme for the Promotion of Entrepreneurship and Competitiveness for the years 2023-2027	06/09/2023	Y	The three main goals are: Improving the regulatory framework for business, creating conditions for the promotion and implementation of Environment, Social and Governance principles by promoting a transparent economy, encouraging green transition, developing the social economy and supporting women entrepreneurs; Facilitating access to finance and increase the competitiveness of local products/services, also improve business productivity by promoting innovation, advanced technology and efficient management practices; Promoting entrepreneurial culture.	Related to R&I, the programme foresees boosting research activities to create start-ups and spin-offs. As relevant indicators: the rate of SMEs applying energy efficiency principles by investing in alternative energy sources or making energy consumption more efficient will increase by 50% by 2025 compared to 2022; At least 10% of SMEs certified by ISO 14001 (environmental management systems) or/and ISO 26000 (social responsibility); At least 60% of active SMEs did a self-assessment concerning green economy principles on the Entrepreneurship Development Organization web page.
Clean industry and circularity	Green and circular Economy Promotion Programme for the	Forthcoming	N	The most relevant is Specific objective 2.3, under which eco-innovation and digitization will be stimulated to develop and	The goal is to create and strengthen the infrastructure to support R&I activities and their application by entrepreneurs in developing green and circular business models. Foreseen

R&I relevant international or EGD policy area/ strategic document	Existing national strategic document	Time of adoption and date of last revision	Legally binding or not	Relevant objectives and targets	Comments:
	2024 - 2028 period			deploy green technologies in the economy.	indicators: the rate of environmental innovations/technologies applied in practice by economic operators will increase to 5% in 2026 and 7% in 2028. Also, it is foreseen to support research, development and uptake of technological solutions to capture and store carbon reduction emissions from the agricultural and energy sectors.
Climate	Environmental Strategy 2024-2030	Forthcoming	N	The Priority 1.8. refers to promoting environmental compliance, education, training, and research, as well as ensuring access to environmental information.	Here, mostly, will be developed/implemented basic and applied environmental and climate change research programmes.

Annex 2: Non-governmental organisations and R&I project proposals submitted under Horizon Europe (2023)

Topic	Non-governmental/private applicant	Proposal title
Climate, Energy and Mobility	Public Association ECOCONTACT	Cultivating networks of influence across isolated communities to accelerate a just transition
	Public Association of Technology Transfer Network of Moldova	Raise Awareness and Support Market Uptake of Renewable Energy Sources Involving Citizens, SMEs, Public Authorities and Civil Society Organisations
	Green Spark Ltd	i-Monitoring Platform for simulating the DH system in Bucharest
	Condominium Owners Association A0140-0031	Resilience Enhancement Via Vulnerability Identification and Awareness
Culture, creativity and an inclusive society	Public Association, the Institute of European Policies and Reforms	The EU's Democracy Promotion in the Eastern European Neighbourhood
	Institute of Public Policies	Changing Relations and Empowering Actors for Tomorrow’s Europe
	Institute for Development and Social Initiatives VIITORUL	Reconfiguring EU Democracy Support Towards a Sustained Demos in the EU's Eastern Neighbourhood
	Centre for Innovation and Policies in Moldova	DEMOCRATISATION POLICIES IN THE EU-NEIGHBOURHOOD THROUGH CO-CREATION APPROACHES
	Institute for Democracy	Data and stories against Political Extremism

Topic	Non-governmental/private applicant	Proposal title
	Foundation for Education and Development – Moldova	Europe and spatial mobility
	Public Association, the Institute of Strategic Initiatives	Invigorating Enlargement and Neighbourhood Policy for a Resilient Europe
	WatchDog.MD CSO Community for advocacy and public policy	CHANGING RELATIONS AND EMPOWERING ACTORS FOR TOMORROW'S EUROPE
	Public Association Institute European Policies and Reforms	REUNIR - Resilience, Enlargement, Union, Neighbourhood, International Relations
	ZIPHOUSE Design Hub	Circular Textile Supply Chain: Accelerated adaptation of circularity along the textile supply chain by applying cutting-edge technologies for sustainable climate transition.
	TRANSPORT MONI LLC	Mystical-historical-Enlightening-Reality of Europe
	Institute of Legal and Political Research	Russia's Information Manipulation and Interference Across Europe: Mapping Tactics and Impact
Digital, Industry and Space	"Wise Agile" LLC	Idealist transnational NCP project.
	RESEARCH AND EDUCATIONAL NETWORKING ASSOCIATION OF MOLDOVA	Using statistical, symbolic and knowledge-based Artificial Intelligence in distributed computing to decide where/when to store data and when/where to compute data.
	ALTEBO-IMPACT LLC	Elevating business efficiency in Agriculture by the Smart Feed platform for Farmers

Topic	Non-governmental/private applicant	Proposal title
European innovation ecosystems	National Inbound Tourism Association of Moldova	The European ecosystem growth programme
	Regional Centre for Sustainable Development	InCiViRe – Inclusive Cities, Villages, Remote innovation stakeholders
	GORA TECHNOLOGY GROUP SRL	Production of block greenhouses for cultivating fruits and vegetables, on a slope and flat terrain, with automation and innovative systems.
Food, Bioeconomy, Natural Resources, Agriculture and Environment	Green Moldova Public Association	Nature-Based Solutions Education Network
	Eco-TIRAS International Association of River Keepers	Novel Observation Strategies for Ecosystem Resilience
	Roma Awareness Foundation	Green Governance and Intelligent Societies – Solution 108
	Fruit Producers and Exporters Association of Moldova, Ampelos Plus SRL, Association of Small Wine Producers in Moldova "DIONYSOS"	Awareness-raising and decision-making, Digital Intelligent System, and tailor-made measures for tackling Desertification and reversing land degradation
Health	Public Association Health for Youth	Family-focused adolescent & lifelong health promotion
	Public Association, the Community Centre for Information Access and Training in Moldova, INFOGROUP	Green science at the service of a healthy society

Topic	Non-governmental/private applicant	Proposal title
MSCA	Gender-Centre	(WaSaBi) War, Sanctions, Bilateral Cooperation and Reconstruction: Building Energy Security and Resilient Communities in the EU and Eurasia
	GESUNDHEIT Medical Centre	Evidence-based treatment of post-COVID syndrome
	POLIVALENT-95 LLC	Powering the Future: Non-Noble Metal Complexes as Catalysts for Water Splitting
	Public Association Community Centre for Information Access and Training in Moldova, INFOGROUP	Empowering science for peace and sustainable development
The European Innovation Council	Startup Moldova	Reframing the ecosystem of Startups and SMEs in UKRAINE
Widening	Moldova Salvation Anchor Foundation	Leadership and twinning for advancing assistive technologies

GREEN AGENDA
MOLDOVA

www.green-agenda.org