

Unite! white paper

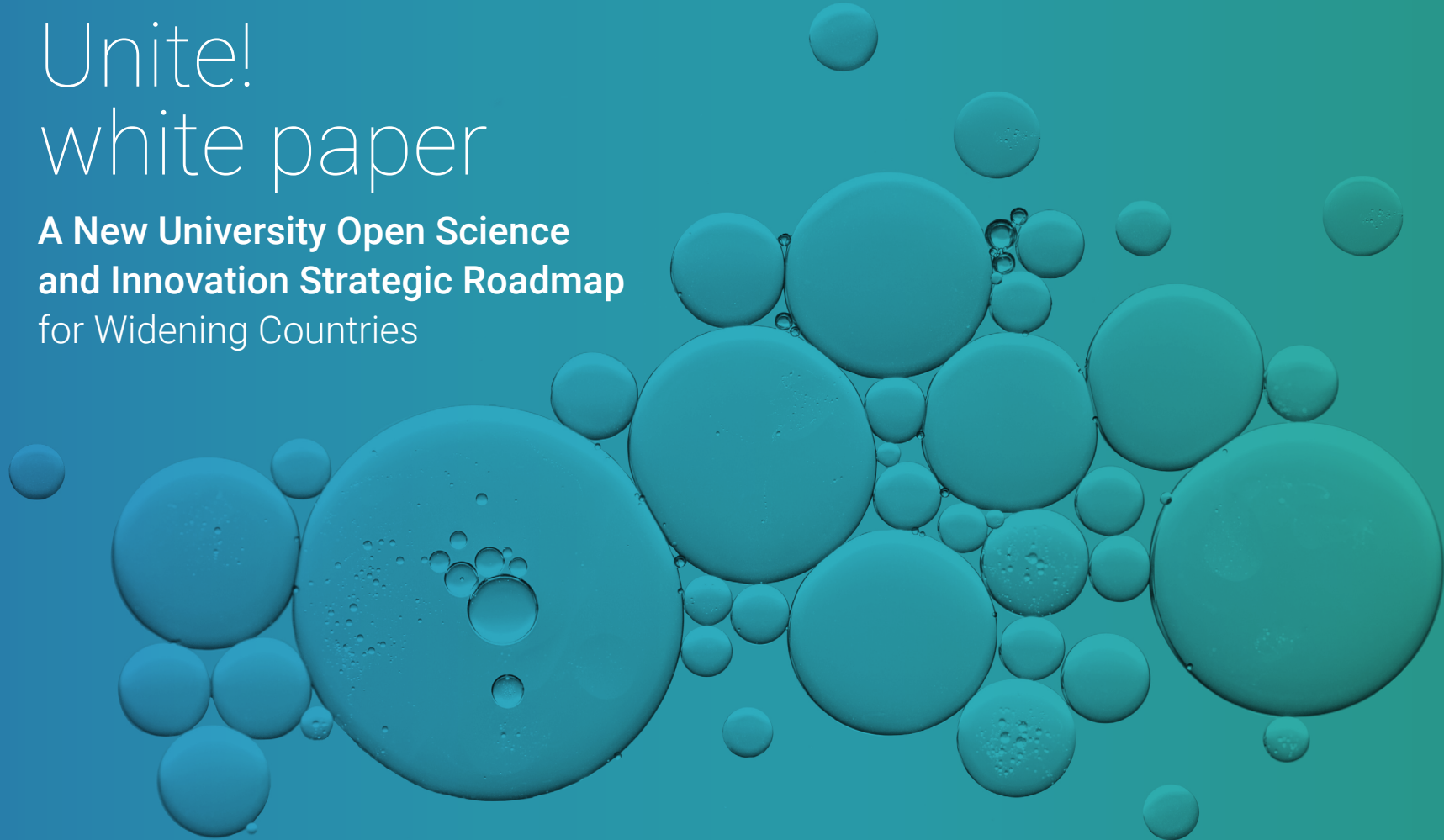
A New University Open Science & Innovation Strategic Roadmap - adapted version to Widening Countries

Work Package 4 - Deliverable 4.5

Project title	Raise excellence in R&S&I in HEI for widening countries
Project Acronym	Unite.WIDENING
Project number	101136765
Project Call	HORIZON EUROPE
Granting authority	European Research Executive Agency
Project starting date	1 January 2024
Duration	60 months
Work Package	WP4-2.1 (WP2- Task 2.5 Enabling a European Open Science and Innovation Area)
Deliverable	Deliverable D4.5 – Unite! white paper. A New University Open Science & Innovation Strategic Roadmap - adapted version to Widening Countries
Lead Beneficiary	Aalto University
Date	20 December 2024

Unite! white paper

**A New University Open Science
and Innovation Strategic Roadmap
for Widening Countries**



The Unite! Alliance is committed to the co-creation of scientific knowledge by and for all humanity, the expansion of the human right to science recognised in Art. 27.1 of the Universal Declaration of Human Rights, by weaving and widening an interconnected global open science system.

Open science weaves transnational alliances and empowers local, regional, national, and global interconnected knowledge communities to widen each of their welfare levels.



01

Introduction

Building an Interconnected
Global Open Science
System | P.04

- Our purpose: enabling a European Open Science and Innovation Area among Widening and non-Widening Countries
- Our mission: empowering European open science and innovation in universities in Widening Countries
- Our commitment: widening University open science and innovation communities across Europe

02

Implementing the Institution of Open Science in European Universities | P.06

- Research evidence-based tools and guidelines for operationalisation | P.07
- Why open science and innovation in universities? | P.09

03

Methodology and Data

ULisboa and Wrocław Tech
as a testbed for universities
in Widening Countries | P.11

- Unite! open science policy forums for expanding open science and innovation in universities in Widening Countries | P.12
- Unite! open science and innovation community as a spearhead platform for triggering institutional transformations in universities | P.14

04

A New Strategic Roadmap for Widening European Open Science and Innovation in Universities | P.15

- 4.1** Widening hubs of excellence on open science and innovation management in Europe | P.16
- 4.2** Unite! Open Science and Innovation Action Plan 2025-2027 for universities in Widening Countries | P.21

05

Summary

Enabling a European Open
Science and Innovation Area
Among Widening and Non-
Widening Countries | P.29

Introduction
Building an
Interconnected
Global Open
Science System

01



Enabling a European Open Science and Innovation Area among Widening and non-Widening Countries

This white paper presents a transnational joint strategic roadmap for university managers, funders, and local, regional, and national policymakers of Widening Countries to renew university research and innovation governance models for an efficient openness in the sharing and production of knowledge, along with its transfer for a sustainable world.

Empowering European open science and innovation in universities in Widening Countries

This white paper is a practical tool designed to perform an effective operationalisation of the institution of open science at universities in Widening Countries by 2028. It provides a set of research evidence-based recommendations in the form of strategic objectives, tactical actions, and operational outcomes—a robust and measurable framework through Key Performance Indicators (KPI)—for turning university open science and innovation policies and strategies into university open science and innovation action plans.

Widening University open science and innovation communities across Europe

This bottom-up white paper co-created among researchers, university managers, policymakers, staff, faculty, students, and partners of European Widening and non-Widening Countries drives and strengthens the transition from modern science to open science in universities of Widening Countries.

The background features a collection of overlapping circles and bubbles of various sizes, some with internal textures, set against a solid teal background. A thin white line forms a large arc that frames the title text on the left and points towards the number '02' in the center.

**Implementing
the Institution
of Open Science
in European
Universities**

02

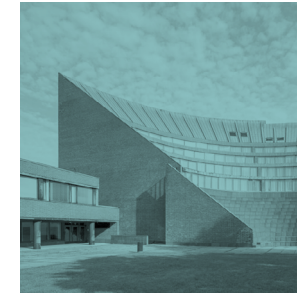
Research evidence-based tools and guidelines for operationalisation

The Unite! open science and innovation community has been developing research evidence-based strategic-level policy tools and operational-level guidelines since 2021 for researchers, staff, faculty, university managers, policymakers, and funders to enhance the efficient management of open science and innovation at universities. These tools and guidelines contribute to advancing the role of European universities and European University Alliances (EUAs) in building an interconnected global open science system.

How can the institution of open science be implemented at European universities?



Technical University of Darmstadt (TUDa)



Aalto University (Aalto)



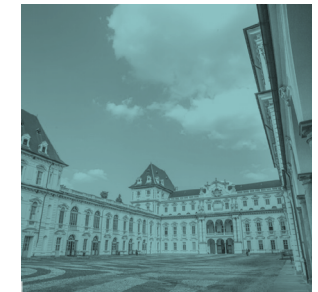
Graz University of Technology (TU Graz)



Grenoble INP, University Grenoble Alpes (Grenoble INP-UGA)



KTH Royal Institute of Technology (KTH)



Politecnico Di Torino (PoliTO)



Universidade de Lisboa (ULisboa)



Universitat Politècnica de Catalunya · BarcelonaTech (UPC)



Wrocław University of Science and Technology (Wrocław Tech)

Unite! open science and innovation vision

Unite! Open Science and Innovation strategic roadmap is a policy tool for advancing the institutional aim to achieve the co-creation of scientific knowledge by and for all humanity. The objectives and recommendations encompass the international framework of policies and practices set by the UNESCO Recommendation on how to advance open science and foster transparency, accessibility, legitimacy, and the active participation of researchers, students, staff, faculty, citizens, and other professional groups.

Unite! open science and innovation strategy

Unite! white paper. A new University open science and innovation governance model and policy is a policy tool for guiding university managers, policymakers, and funders to drive the institutional changes required to renew university research and innovation governance models for a sustainable world by 2030. This white paper presents a new university open science and innovation governance model for advancing a sustainable economy, technology, society, and environment, and sheds light on a set of policy recommendations to support its implementation in universities and EUAs.

Unite! open science and innovation management handbook

Unite! handbook of best practices for effective mainstreaming of open science and innovation at Universities is a practical guide for facilitating researchers, R&I support services, and university managers to transition from modern science to open science. This handbook reveals a high-impact understanding of the best open science and innovation practices on Unite! research teams and highlights operational guidelines for the adoption of these practices.



<https://zenodo.org/records/8305449>



<https://zenodo.org/records/10639557>




<https://zenodo.org/records/10262984>

Why open science and innovation in universities?

The global-scale societal challenges we face today for a peaceful, free, equal, diverse, and sustainable world—such as the climate change disasters and wars that occurred in 2024—show us that they can only be overcome through new ideas and humanistic ideals, new levels of integration and cooperation, new science and innovation practices, and new mechanisms of global collaboration among the grassroots communities of diverse nations and regions of the globe.

Open science is transparent and accessible knowledge that is shared and developed through collaborative networks (Vicente-Saez and Martinez-Fuentes, 2018)¹. It involves co-creating ideas, data, methods, prototypes, reviews, and results with local, national, regional, and global collaborative networks of researchers, students, staff, faculty, citizens, and professional groups in science and international organisations (e.g., the European Commission, the United Nations, and the World Bank).

The aim of the institution of open science in the digital era is the expansion of informed and extended knowledge co-creation (Vicente-Saez et al., 2021)². Open science seeks to increase scientific collaboration and information sharing for the benefits of science and society; make multilingual scientific knowledge openly available, accessible, and reusable for everyone; and open the processes of scientific knowledge creation, evaluation, and communication to societal actors beyond the traditional scientific community (UNESCO, 2021)³.



Open science expands the human right to science recognised in Art. 27.1 of the Universal Declaration of Human Rights, from “the sharing in scientific advancement and its benefits” to sharing and production: “the co-creation of scientific knowledge by and for all humanity”

Open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal and external innovation (adapted from Chesbrough et al., 2006; Chesbrough and Bogers, 2014)⁴. Novel open science practices for the sharing and production of knowledge have created extraordinary possibilities for a new knowledge creation and transfer process. These practices are expanding not only the ethos of science, but also the ethos of innovation in universities. Open science practices are transforming science and innovation practices in universities. Novel open innovation practices are emerging, along with novel inbound and outbound open exploration practices.

The adoption of open science practices, principles, and goals can enhance both the internal (academic) and external (societal) processes of learning and creation of new knowledge, fostering trust in science, nurturing innovative and entrepreneurial people, and accelerating research and innovation processes for finding solutions to achieve the Sustainable Development Goals (SGDs) 2030 and those that will follow in the next decade.



Open science weaves transnational alliances and empowers local, regional, national, and global interconnected knowledge communities **to widen the welfare level of each**

1 Vicente-Saez, R., Martínez-Fuentes, C. (2018). Open Science now: A systematic literature review for an integrated definition. *Journal of Business Research* 88, 428–43. <https://doi.org/10.1016/j.jbusres.2017.12.043>

2 Vicente-Saez, R., Gustafsson, R., Martínez-Fuentes, C. (2021). Opening up science for a sustainable world: An expansive normative structure of open science in the digital era. *Science and Public Policy*. <https://doi.org/10.1093/scipol/scab049>

3 UNESCO Recommendation on Open Science (2021). <https://unesdoc.unesco.org/ark:/48223/pf0000379949>

4 Chesbrough, H., Vanhaverbeke, W., West, J. (2006). *Open innovation: Researching a new paradigm*. Oxford University Press.

Chesbrough, H., Bogers, M. (2014). Explicating open innovation: Clarifying an emerging paradigm for understanding innovation. In: Chesbrough, H., Vanhaverbeke, W., West, J. (Eds.), *New frontiers in open innovation*. Oxford: Oxford University Press, pp. 3–28.

Methodology and Data

ULisboa and Wrocław
Tech as a testbed for
universities in
Widening Countries

03

Unite! open science policy forums for expanding open science and innovation in universities in Widening Countries

This white paper builds on the application of the research forum (Thomas et al., 2021)¹ as a methodological framework for co-creating public policy and governance among the Unite! communities of researchers, university managers, policy-makers, staff, funders, faculty, students, and partners of Widening and non-Widening Countries.

We organised two Unite! open science policy forums to understand which tactical actions and operational outcomes university managers, funders, and local, regional, and national policymakers of Widening Countries should promote at the university, regional, and national levels to turn university open science and innovation policies and strategies into university open science and innovation action plans for implementing the proposed university open science and innovation governance model for a sustainable world.

The forums were conducted in October 2024 and led by three European universities in the Unite! Alliance: Aalto University in Finland (Aalto), Universidade de Lisboa in Portugal (ULisboa), and Wrocław University of Science and Technology (Wrocław Tech). Four additional members of the Unite! Alliance actively contributed to the development of the forums: Grenoble INP-University Grenoble Alpes in France (Grenoble INP-UGA), Universitat Politècnica de Catalunya · BarcelonaTech in Spain (UPC), Politecnico Di Torino in Italy (PoliTO), and Graz University of Technology in Austria (TU Graz). Finally, two members participated in the forums: the Technical University of Darmstadt in Germany (TUDa) and KTH Royal Institute of Technology in Sweden (KTH).

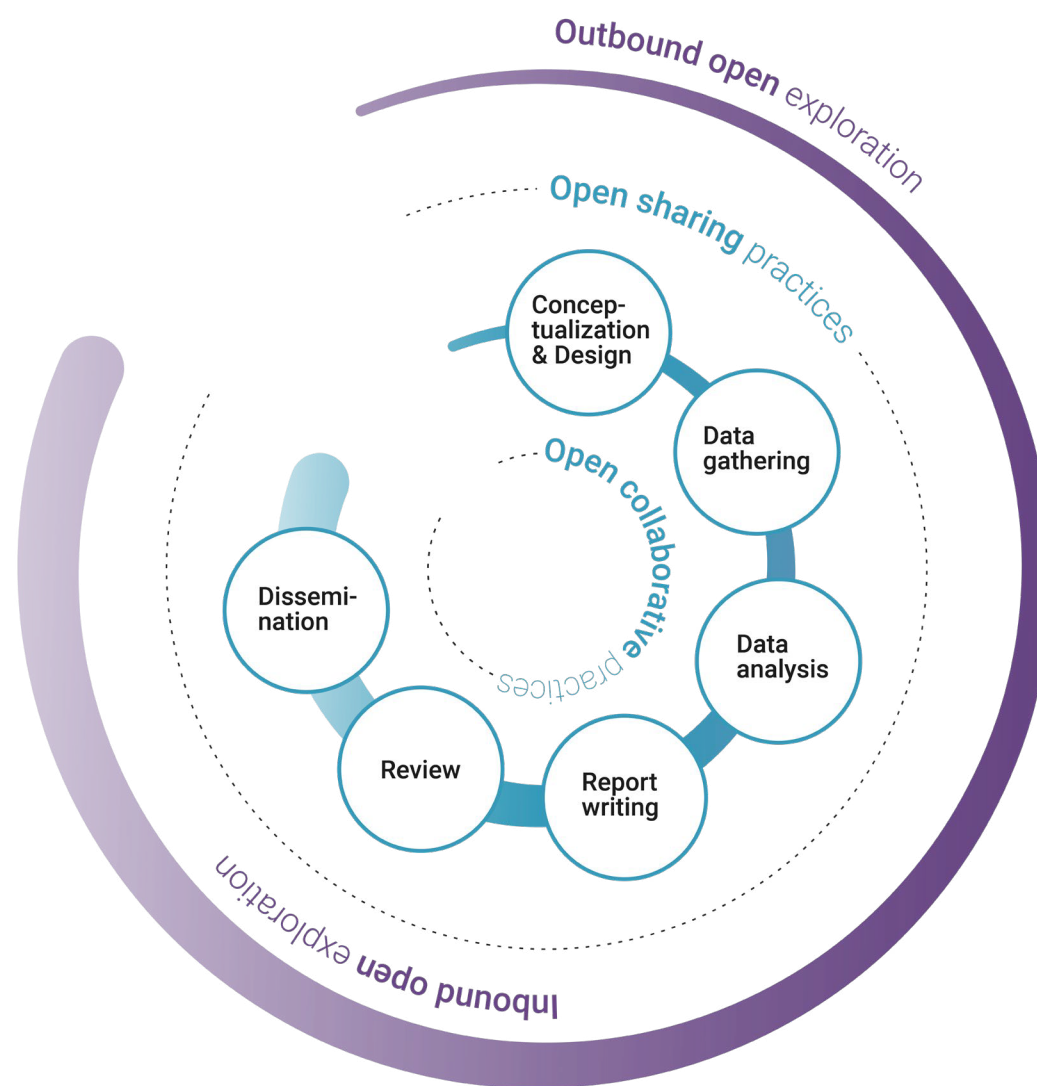
In addition to the primary data of the forums, secondary data (such as web-based material on university guidelines and background archival documents on open science and open innovation policies in Poland, Portugal, and Europe) was gathered to ensure research validity by means of triangulation (Tracy, 2010)².

1 Thomas, S., Scheller, D. & Schröder, S. (2021). Co-creation in citizen social science: the research forum as a methodological foundation for communication and participation. *Humanit Soc Sci Commun* 8, 244. <https://doi.org/10.1057/s41599-021-00902-x>

2 Tracy, S. J. (2010). Qualitative quality: Eight "big-tent" criteria for excellent qualitative research. *Qualitative inquiry*, 16(10), 837-851. <https://doi.org/10.1177/1077800410383121>

Open science practices

Novel open innovation practices



Open sharing practices

- Open protocol sharing
- Open data sharing
- Open source research software sharing
- Open access publishing
- Open multimedia sharing

Open collaborative practices

- Interdisciplinary research practice
- Transdisciplinary research practice with emerging academics
- Transdisciplinary research practice with citizens
- Transdisciplinary research practice with professionals
- Recombining open science outputs

GRAPH 1: A new university open science and innovation governance model in the digital era

Unite! open science and innovation community as a spearhead platform for triggering institutional transformations in European universities

Unite! open science policy forums are a transdisciplinary research tool for learning, sharing, and co-creating policy ideas, actions, and indicators among the collaborative network of Unite! communities of researchers, university managers, policymakers, staff, funders, faculty, students, and partners from the multitude of arenas of knowledge, including basic research, applied research, humanities, experimental development, design, and art of Unite! universities.

Each forum was focused on the deconstruction of the policy recommendations of what we term the [Unite! open science and innovation strategy \(2023\)](#).

Wrocław Tech's open science policy forum, led by Wrocław Tech and Aalto University, focused on the advancement of Unite! policy recommendation 2. Reforming the university reward systems of science and innovation; and Unite! policy recommendation 5. Enhancing interoperability of university digital infrastructures and accessibility of physical infrastructures.

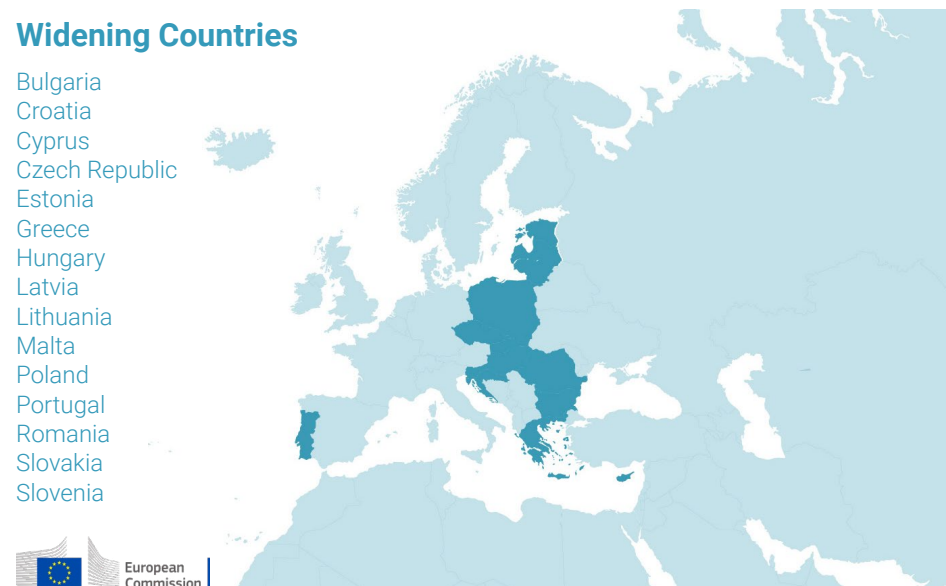
ULisboa's open science policy forum, led by ULisboa and Aalto University, centred on the progression of Unite! policy recommendation 3. Promoting transdisciplinary open science support services for an efficient openness in the sharing and production of knowledge and its transfer; and Unite! policy Recommendation 4. Incorporating open science competencies in university bachelors, masters, and doctorate levels of education to foster global citizenship.

Finally, the comprehensive Unite! policy recommendation 1. Renewing university open science and innovation policies and developing school open science strategies, implementation, and evaluation plans for the co-creation of global knowledge was transversally tackled in both Wrocław Tech! and ULisboa forums.

These Unite! widening open science forums gave a voice to researchers for sharing, explaining, and revealing how they conduct open science and innovation in universities in the digital era, how R&I support services staff can help them adopt these practices, and how university managers, funders, and policymakers can develop university- and school-level actions, redesigns, and incentives for advancing and setting up open science and innovation practices, principles, and goals in universities located in Widening Countries.

Widening Countries

- Bulgaria
- Croatia
- Cyprus
- Czech Republic
- Estonia
- Greece
- Hungary
- Latvia
- Lithuania
- Malta
- Poland
- Portugal
- Romania
- Slovakia
- Slovenia



**A New Strategic
Roadmap for Widening
European Open Science
and Innovation in
Universities**

04

4.1

Widening hubs of excellence on open science and innovation management in Europe

Open science a key policy priority for Europe

2018EC Recommendation on
'Access to and Preservation of Scientific Information'**2020**EC Communication on the a
'New European Research Area (ERA) for Research and Innovation'**2021**Council Recommendation on a
'Pact for Research & Innovation in Europe'Council Conclusions on the
'Future Governance of the ERA' & ('Policy Agenda 2022-2024')**2022**Council Conclusions on
'Research Assessment and Implementation of Open Science'Council Conclusions on
'Research Infrastructures'**2023**Council Conclusions on
'High-quality, transparent, open, trustworthy and equitable scholarly publishing'

Source: CC BY 4.0 European Commission, DG Research & Innovation, Open Science and Infrastructures Unit, DG Research & Innovation (2024)

National-level analysis of the state of art in Portugal

Open science and innovation have become pivotal frameworks for enhancing transparency, accessibility, and inclusivity in research. Open science promotes science's social and economic impact, increases understanding of the scientific process, improves research efficiency, enhances scientific collaboration, and empowers citizen science. In turn, advancing the quality of scientific knowledge and driving technological progress fosters innovation. Additionally, open science and innovation promotes the creation of new research areas and themes, supporting the reuse of scientific data, sharing, and ultimately broadening a culture of science that is more inclusive and visible to all.

Portugal's political commitment to open science is through the establishment of guiding principles for a national open science policy, aiming to ensure that R&D institutions actively contribute to open science, ensuring free and open access to scientific knowledge and promoting engagement and interaction with society. Portugal's alignment with EU-wide initiatives like *OpenAIRE* and *EOSC (European Open Science Cloud)* provides Portuguese researchers (and even more importantly, early-career researchers) with access to valuable networks and resources, enabling collaboration and sharing of best practices with other researchers.


The Science and Technology Foundation (FCT), Portugal's main funding agency for science, technology, and innovation, supports open science and innovation initiatives through funding mechanisms that encourage open access to research outputs and data. FCT has been instrumental in aligning national policies with European open science policy, ensuring Portugal remains an active participant in European research networks.

Open access to scientific publications is widely recognised as a pillar of open science. Their benefits are directly centred on research, facilitating interdisciplinarity and increasing the visibility of the knowledge produced, having a social and economic impact, and bringing research to professionals in other areas, companies, and the public and society in general. Therefore, this movement counts with researchers, universities and R&D institutions, international agencies, and public funding agencies. Portugal is recognised in Europe for its innovative open access policy, with the Open Access Scientific Repositories of Portugal (RCAAP) playing an essential role in increasing the visibility of the knowledge produced by Portuguese universities and the rapid enlargement of open access institutional repositories nationwide. Portuguese universities and research centres integrate open science practices by adopting open access requirements in the RCAAP, supporting the global movement toward unrestricted access to research outputs. Researchers are encouraged to publish in open access journals or to deposit preprints in repositories, thus enhancing Portugal, University, and researcher visibility in the global scientific community. For instance, Universidade de Lisboa is at the forefront of this movement because it actively promotes open access publications and open data sharing through a wide range of practices and tools.

The pursuit of open science practices and their associated benefits becomes even more significant when scientific and technological activities are supported by public funding. Transparency, accessibility, and public engagement are essential, re-

inforcing the notion that publicly funded research should yield benefits that are openly accessible and widely shared. This effort starts with the adoption of the open access policy for scientific publications and the data management and sharing policy for research funded by FCT, as well as from other sources (e.g., European). Through these policies, FCT aims to ensure that publications and research data generated from funded projects are made openly accessible, promoting wider availability and transparency of scientific outputs, in addition to dissemination to the scientific community and the general public. The context of digital transformation has contributed to the growing relevance of research data. Similarly, the practice and principles of open science have been promoting the openness, sharing, and reuse of research data (particularly those resulting from publicly funded research), contributing to confidence in science and a greater capacity to address global challenges.

Beyond academia, open science and innovation in Portugal has also enhanced cooperation with industry through policies encouraging companies to participate in collaborative open innovation projects. Open innovation models, which involve co-development between universities, research institutions, and public or private companies, are becoming more common. In sectors like renewable energy, health technology, and digital solutions, companies are increasingly aligning with open science and innovation principles, creating innovation hubs where shared data and open research practices drive applied research and technological development. Initiatives like the Collaborative Laboratories, introduced by FCT, have been instrumental in fostering public-private partnerships. These labs bring together academia and industry stakeholders to develop joint solutions, stimulating open innovation and encouraging data sharing between sectors. The collaborative model not only enhances knowledge transfer but also strengthens Portugal's research and innovation ecosystem.



Open science can strengthen international cooperation for forecasting and addressing the challenges that the planet and humanity will face in the next decade (2030–2040)

University-level analysis of the state of art in Poland

The legal and policy framework for open science in Poland is a combination of non-binding guidelines, fragmented legal provisions, and contractual obligations tied to publicly funded research projects. Documents like the “Development directions of Open Access to publications and research results in Poland,” issued by the Ministry of Science and Higher Education in 2015, largely emphasise recommendations over enforceable mandates, encouraging institutions to adopt open access and open data practices.

The State Science Policy (2022) highlights government support for open science, focusing on FAIR Principles and promoting actions like appointing open access officers, creating institutional open science policies, and developing digital repositories. However, these remain indicative rather than obligatory, with critical gaps in infrastructure and researcher training. Poland lacks comprehensive incentives in its research evaluation system to encourage the dissemination of open research outputs.

Funding agencies exhibit inconsistent approaches: while the National Science Centre mandates open access but excludes publishing costs as eligible expenses, the National Centre for Research and Development ties dissemination to pub-

lic aid levels. This inconsistency undermines alignment with broader European practices like Horizon Europe. A unified national open science strategy is urgently needed to address these gaps and standardise practices across institutions.

State of art of Unite! policy recommendation 1

Polish universities have made strides in adopting open science and innovation policies, although their implementation remains uneven. Many institutions align their policies with the national Open Access Policy (2015) and the European Union’s directives, including Plan S and the FAIR Principles. However, the focus often remains limited to open access to publications and data sharing, with less emphasis placed on the broader spectrum of open science practices, such as citizen science, open peer review, and transdisciplinary collaboration.

Despite progress, only a handful of universities have formalised comprehensive open science strategies. These institutions typically include guidelines for open access, research data management, and intellectual property rights. Others are in the early stages of integrating open science into institutional policies, often driven by funding requirements or the influence of international collaborations.

State of art of Unite! policy recommendation 2

Traditional reward systems in Polish academia emphasise publication metrics, such as the number of papers in high-impact journals, often overlooking contributions to open science. This creates a barrier to the adoption of open practices, as researchers perceive limited recognition or tangible benefits from engaging in open access publishing, data sharing, or collaborative innovation.

In recent years, some universities have begun revising their academic evaluation criteria to include open science practices. Initiatives include recognising open access publications, participating in data sharing projects, and creating open educational resources. However, these changes are typically experimental and lack widespread adoption.

National funding bodies and programs, such as the National Science Centre (NCN) and the Ministry of Education and Science, have incorporated elements of open science into grant evaluation processes. For example, data management plans (DMPs) are now a requirement for some funding calls, encouraging researchers to consider data sharing practices early in their projects.

Challenges persist despite these efforts, including a lack of alignment between institutional, national, and EU reward criteria.

State of art of Unite! policy recommendation 3

Open science support services in Polish universities are still in their early stages of development. While some universities have established dedicated support teams, others rely on ad-hoc arrangements.

The emergence of dedicated support units within libraries has been a significant step forward. These units assist researchers in creating data management plans, navigating copyright issues, and selecting appropriate open access outlets. Some institutions have also established data stewardship roles to provide hands-on support for research projects.

However, gaps remain in providing comprehensive and interdisciplinary support. Smaller universities often lack the resources to establish such services, leaving researchers without adequate assistance.

State of art of Unite! policy recommendation 4

The integration of open science competencies into higher education curricula in Poland remains at an early stage. While some universities have incorporated topics such as open access publishing and research data management into PhD training programs, systematic efforts to embed open science education at the bachelor's and master's levels are limited.

Doctoral schools are leading the way, with programs introducing concepts like FAIR data, ethical research practices, and collaborative tools. These efforts are often linked to the requirements of EU-funded projects, which mandate open science training. However, such programs tend to focus on technical competencies rather than the broader cultural and ethical dimensions of open science.

At the undergraduate and master's levels, open science topics are typically introduced through individual courses rather than as part of a structured curriculum. This piecemeal approach limits students' exposure to the interdisciplinary and collaborative nature of open science.

State of art of Unite! policy recommendation 5

Polish universities are making progress in developing digital infrastructures to support open science, although significant challenges remain in ensuring their interoperability and accessibility. Institutional repositories are now widespread, enabling open access to publications and, increasingly, research data. Some universities have integrated their repositories with European infrastructures like OpenAIRE and the European Open Science Cloud (EOSC).

However, interoperability across institutions and with international platforms is limited. Many digital systems lack standardisation, making it difficult for researchers to share data and collaborate effectively. Smaller universities often face financial and technical barriers to upgrading their digital infrastructure, resulting in unequal access to resources.

Accessibility of physical infrastructures, such as research labs and libraries, also varies widely. Larger institutions provide well-equipped facilities and spaces for interdisciplinary collaboration, but smaller universities struggle to maintain modern research environments.

4.2

Unite! Open Science and Innovation Action Plan 2025-2027 for universities in Widening Countries

In this section, based on the primary analysis of the data gathered in the two forums—together with the analysis of university guidelines and policies, national policies, and EU reports—we outline practical guidelines for supporting university managers, funders, and local, regional, national policymakers to turn university open science policies and strategies into university open science and innovation action plans.



We present the Unite! Open Science and Innovation Plan for 2025–2027 —an extended strategic roadmap— for empowering European open science and innovation universities in Widening Countries

Strategic Objective 1

Renewing university open science and innovation policies and developing school strategies, implementation plans, and evaluation frameworks

2025

Action 1.1

Updating university-level open data sharing and open access policies

Outcome 1.1.1 Advance FAIR-compliant policies: Findability, Accessibility, Interoperability, and Reusability standards for research data and scientific publications, with clear monitoring and reporting mechanisms.

Outcome 1.1.2 Broaden publisher agreements and foster the use of the Open Research Europe publishing platform.

KPI 1.1.1 Number of open access datasets published.

KPI 1.1.2 Number of open access publications (diamond, gold, and green route).

2026

Action 1.2

Developing a comprehensive university-level open science policy for knowledge co-creation

Outcome 1.2.1 Advance FAIR-compliant policy for fostering the openness in the sharing of all research outputs, with clear monitoring and reporting mechanisms.

Outcome 1.2.2 Broaden publisher agreements and foster the use of the Open Research Europe publishing platform.

Outcome 1.2.3 Boost science-society policy for fostering openness in the production of knowledge, with clear monitoring and reporting mechanisms.

Outcome 1.2.4 Foster regular science communication workshops, interactive demonstrations and prototypes with hands-on exhibits, product demos, or virtual simulations to engage and co-create scientific knowledge with the public and policymakers, enhancing the societal impact of research.

KPI 1.2.1 Number of open access datasets, publications, models, algorithms, software, protocols, notebooks, workflows, and all other research outputs.

KPI 1.2.2 Number of major citizen science projects addressing critical societal issues like climate change, public health, and education.

2026

Action 1.3

Developing school-level open science implementation plans for advancing the operationalisation of the institution of open science considering

Outcome 1.3.1 Turn university-level open science and innovation action plans into school-level open science and innovation implementation plans that reflect the specific needs and practices of each research area.

KPI 1.3 Number of university schools that have developed open science implementation plans adapted to their research and innovation area.

2027

Action 1.4

Aligning university-level open science and open innovation policies to foster novel knowledge and technology transfer

Outcome 1.4.1 Promote innovation challenges to explore novel open innovation practices – open exploration practices - as use cases for policy-development, hosted in collaboration with industry leaders and end-users to accelerate internal and external responsible product and service innovation for a sustainable world.

Outcome 1.4.2 Foster use cases in novel open exploration practices—use of open science outputs and working with collaborative networks of participants in research—in startup incubators or accelerators.

KPI 1.4 Number of hackathons, networking events, pitch competitions, or venture capital events organised or participated in regarding the advancement of open science and open exploration practices for growth and scaling.

Strategic Objective 2

Reforming the university reward systems of science and innovation

2025

Action 2.1

Fostering university commitment to CoARA Principles

Outcome 2.1.1 Prepare and implement an action plan toward the reform of research assessment with improved institutional policies to incorporate qualitative assessments, recognition of societal impact, and contributions to the sustainable development goals (SDGs).

Outcome 2.1.2 Establish clear criteria and a set of responsible metrics for rewarding open science practices (elements to consider, for example, are the ratio of open access publications, the conducted number of peer reviews, data sharing activities, number of published datasets or publications in data journals, contributions to open source software, citizen science engagement, and interdisciplinary or transdisciplinary research); and novel open innovation practices: open exploration practices (elements to consider, for example, are the use of open science outputs and working with collaborative networks of participants in research to accelerate internal and external responsible product and service innovation).

KPI 2.1 Number of improved institutional policies toward the reform of research assessment.

2026–2027

Action 2.2

Raising awareness of the reform assessment at the national and university levels

Outcome 2.2.1 Develop a communication strategy to inform all stakeholders about the updated assessment system.

Outcome 2.2.2 At the national level, bring the topic of the reform to the competent government authority responsible for science and higher education for discussion to advance a national framework.

Outcome 2.2.3 Launch awareness at the university level to familiarise researchers, university managers, evaluators, and administrators with the updated assessment framework.

KPI 2.2 Number of pilots, trainings, workshops, and seminars organised to explain the changes and address concerns.

2026–2027

Action 2.3

Quality control of the reform assessment at the university level

Outcome 2.3.1 Monitor the reform by gathering feedback with/from researchers, university managers, evaluators, and administrators to make necessary adjustments to ensure the system remains aligned with evolving open science practices.

KPI 2.3 Number of improved institutional policies/practices readapted toward the reform of research assessment.

Strategic Objective 3

Promoting transdisciplinary open science support services

2025

Action 3.1

Implementing an interdisciplinary research data management centre

Outcome 3.1.1 Establish an open data centre/division at the university level working on the current landscape of data management practices in scientific research, identifying key areas where improvements can be made.

Outcome 3.1.2 Create training programs for researchers and staff that are tailored to different levels of expertise (from beginner to advanced) to implement FAIR Principles effectively.

KPI 3.1.1 Appointment of rector's proxy for open science at the university level, open science committees at the school level, number of data stewards assigned to different scientific disciplines, and volume of help desk support requests received.

KPI 3.1.2 Number of open data training programs/sessions organised.

2026–2027

Action 3.2

Advancing a transdisciplinary open science and innovation management centre

Outcome 3.2.1 Incorporate specialists from university learning, research, and innovation services at the centre/division to exploit the full power of open science and drive responsible innovation to address societal challenges and advance sustainable development goals.

Outcome 3.2.1 Provide training and guidelines for researchers and staff on how to get involved in open science and open exploration components.

Outcome 3.2.3 Create mentorship programs where open science specialists—together with experienced researchers or faculty members—guide researchers on how to incorporate open science and open exploration practices into their work. Mentors should help navigate challenges related to open science, including data management, copyright issues, making research publicly available, or building partnership between academia, industry, and societal stakeholders.

KPI 3.2.1 Number of open science specialists—data stewards and knowledge brokers—assigned to different scientific disciplines.

KPI 3.2.2 Number of open science and open exploration training programs/sessions organised.

KPI 3.2.3 Number of help desk support requests successfully solved by mentors.

Strategic Objective 4

Incorporating open science competencies in the university bachelor's, master's, and doctorate levels of education

2025–2026

Action 4.1

Integrating open science training into the curriculum

Outcome 4.1.1 Development and implementation of first-entry open science management educational modules for undergraduate bachelors.

Outcome 4.1.2 Development and implementation of open science educational courses for masters in FAIR Data Principles and Ethics.

Outcome 4.1.3 Development and implementation of open science specialised training for PhD candidates in open science mindset, open educational resources, data skills (preparing DMP, searching data repository and uploading the data, preparing the data for publishing, and assigning proper metadata), openness in the sharing of knowledge (open access publishing models, licences, data journals, FAIR Principles, open code, open protocols), and openness in the production of knowledge (citizen science engagement and interdisciplinary or transdisciplinary research).

KPI 4.1 Number of open science courses developed for the bachelor's and master's levels, as well as specialised training for PhD candidates.

2027

Action 4.2

Fostering new entrepreneurial mindsets, skills, and leadership for solving the grand challenges of the next decade (2030–2040)

Outcome 4.2.1 Foster postgraduate involvement in novel open exploration practices through colleges and networks. Focus on developing new mindsets, skills, and leadership to use open science outputs, while also collaborating with research networks to accelerate responsible product and service innovation (both internally and externally).

KPI 4.2 Number of training programs launched or scaled using existing structures and partnerships.

Strategic Objective 5

Enhancing interoperability of university digital infrastructures and accessibility of physical infrastructures

2025–2027

Action 5.1

Upgrading digital infrastructures to ensure seamless interoperability and security between repositories, publishing platforms, research information systems, or virtual research environments

Outcome 5.1.1 Improve metadata in institutional repositories to increase visibility and interoperability globally.

Outcome 5.1.2 Develop or improve institutional data repositories that meet security requirements for sensitive data but also ensure open access to all the scientific research outputs that can be made publicly available.

Outcome 5.1.3 Ensure that the research management system will comply with the EOSC interoperability framework.

KPI 5.1 Number of successfully adopted platforms achieving full interoperability and compliance with security standards.

2025–2027

Action 5.2

Ensuring that physical infrastructures such as research labs, libraries, meeting spaces, museums, and botanical gardens are accessible, inclusive, and support collaborative and inter/transdisciplinary practices

Outcome 5.2.1 Establishment or renovation of physical infrastructures to promote public engagement and diversity.

Outcome 5.2.2 Integrate physical infrastructures with digital platforms for broader accessibility.

Outcome 5.2.3 Develop platform and policies to manage the sharing of physical resources across departments and institutions to foster collaboration.

KPI 5.2 Number of physical infrastructures transformed into open physical infrastructures.

Summary

Enabling a European
Open Science and
Innovation Area Among
Widening and Non-
Widening Countries

05

We present the Unite! Open Science and Innovation Action Plan for widening university open science and innovation communities across Europe in 2025–2027 and empowering them to enhance the effective management of open science and innovation at universities

We present a set of evidence-based recommendations in the form of strategic objectives, tactical actions, and operational outcomes. We reveal a robust and measurable framework for triggering institutional transformations to advance the implementation of the new governance model for the co-creation and transfer of scientific knowledge at universities in Widening Countries for a sustainable economy, society, and environment, for a sustainable world.

This new extended strategic roadmap is a practical tool for the operationalisation of the institution of open science in Polish and Portuguese universities and holds the potential of scalability across universities in Widening Countries, but also in non-Widening Countries. There is a gap in turning university open science policies and strategies into university open science action and implementation plans across European universities. This university-level open science and innovation action plan is the initial step in deploying and further developing school-level open science and innovation implementation plans by identifying and allocating resources and considering the specificities of the multitude of arenas of knowledge.

With this action plan, aligned with the policy actions of the next European Research Policy Agenda for 2025–2027, the European Competence Framework for Researchers, and the UNESCO Recommendation on how to boost open science, and from a university and European University Alliance perspective, we aim to contribute to transforming universities in Widening Countries as hubs of excellence on open science and innovation management.

The proposed Unite! Open Science and Innovation Action Plan is a research evidence-based policy tool to advance a transparent, accessible, collaborative, and legitimate European Research Area and European Higher Education Area: **a truly European Open Science and Innovation Area to build an interconnected global open science system.**

Unite! Open Science and Innovation Action Plan

SO_1

Renewing university open science and innovation policies and developing school strategies, implementation plans, and evaluation frameworks

Action 1.1 (2025)

Updating university-level open data sharing and open access policies.

Action 1.2 (2026)

Developing a comprehensive university-level open science policy for knowledge co-creation.

Action 1.3 (2026)

Developing school-level open science implementation plans for advancing the operationalisation of the institution of open science.

Action 1.4 (2027)

Aligning university-level open science and open innovation policies to foster novel knowledge and technology transfer.

SO_2

Reforming the university reward systems of science and innovation

Action 2.1 (2025)

Fostering university commitment to CoARA Principles.

Action 2.2 (2026–2027)

Raising awareness of the reform assessment at the national and university levels.

Action 2.3 (2026–2027)

Quality control of the reform assessment at the university level.

SO_3

Promoting transdisciplinary open science support services

Action 3.1 (2025)

Implementing an interdisciplinary research data management centre.

Action 3.2 (2026–2027)

Advancing a transdisciplinary open science and innovation management centre.

SO_4

Incorporating open science competencies in the university bachelor's master's, and doctorate levels of education

Action 4.1 (2025–2026)

Integrating open science training into the curriculum.

Action 4.2 (2027)

Fostering new entrepreneurial mindsets, skills, and leadership for solving the grand challenges of the next decade (2030–2040).

SO_5

Enhancing interoperability of university digital infrastructures and accessibility of physical infrastructures

Action 5.1 (2025–2027)

Upgrading digital infrastructures to ensure seamless interoperability and security between repositories, publishing platforms, research information systems, or virtual research environments.

Action 5.2 (2025–2027)

Ensuring that physical infrastructures such as research labs, libraries, meeting spaces, museums, and botanical gardens are accessible, inclusive, and support collaborative and inter/transdisciplinary practices.

SO: Strategic Objective

An interconnected global open science system...

...for an efficient openness in the sharing and production of knowledge and its transfer

...to foster global citizenship

...and a peaceful humanity

...for the co-creation of global knowledge

Open science weaves transnational alliances and empowers local, regional, national, and global interconnected knowledge communities to widen each of their welfare levels.

... for a sustainable world by 2030

Authors' Contributions

Ruben Vicente-Saez led the conceptualisation and design of the first and second Unite! Widening open science policy forums; all data gathering at Unite! Alliance; the data analysis; and the original draft writing and final review of the white paper. Ruben Vicente-Saez was also responsible for supervising the research and managing the project.

Maria H Ribeiro co-led the conceptualisation and design of the second forum; all data gathering at ULisboa; the data analysis; and the original draft writing and final review of the white paper.

Liudmyla Trotsenko co-led the conceptualisation and design of the first forum, all data gathering at Wrocław Tech, and the data analysis and contributed to the original draft writing and final review of the white paper.

Cecilia Rodrigues participated in the conceptualisation and design of the second forum, all data gathering at ULisboa, and the data analysis and contributed to the original draft writing and final review of the white paper.

Wojciech Wodo supported data gathering at the second forum, participated in the data analysis and contributed to the original draft writing and final review of the white paper.

Ilire Hasani-Mavriqi supported data gathering at the first and second forums and contributed to the final review of the white paper.

Mauro Paschetta supported data gathering at the first forum and contributed to the final review of the white paper.

Anna Rovira Fernandez supported data gathering at the second forum and contributed to the final review of the white paper.

Acknowledgements

We thank **Dejan Dvorsek and Ersébet Toth Czifra** for supporting data gathering in the first forum, and **Sami Niinimäki and Pantelis Tziveoglou** for supporting data gathering in the second forum.

We thank **Alessandra Cerato, Renata Frączek, Anna Gosławska, Tomasz Kajdanowicz, Katarzyna Materska, Mikko Mikkola, Paula Milewska, Maciej Piasecki, Tomasz Psonka, Pierre-Nicolas Timsit, Mateusz Tykierko, Roksana Wilk, Andrzej Żurawowicz, and Karolina Żurawska** for supporting data gathering in the first forum.

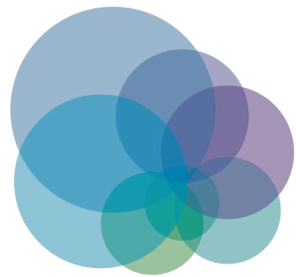
We thank **André Cardador, Pedro Gois, Susana Henriques, Anna Maria Kaminska, Jorge Malheiros, Fátima Montemor, Ana Moutinho, Ana Paiva, Jorge Revez, Beatriz Rodrigues, Eloy Rodrigues, Antti Rousi, Maria Grazia Santangelo, Francisco Santos, Ricardo Santos, Beatriz Silva, and Monica Tunniger** for supporting data gathering in the second forum.

We thank **Konrad Löbcke and Rosa Lönneborg** for contributing to the final review of the white paper.

Credits

Cover photography: Sharon Pittaway, Unsplash.com

Design and layout: Eva Álvarez Garabito, Niugrafic.com



unite!

University Network for Innovation,
Technology and Engineering

Unite! Open Science and Innovation Community

Recommended citation: Vicente-Saez, R., Ribeiro, M., Trotsenko, L., Rodrigues, C., Wodo, W., Hasani-Mavriqi, I., Paschetta, M., Rovira-Fernandez, A., (2024). Unite! white paper. A New University Open Science and Innovation Strategic Roadmap for Widening Countries. Unite! Alliance Publications.

© 2024. This work is openly licensed via **CC BY 4.0**