National Action Plan for Open Research

2022-2030

April 2022

Draft for public consultation

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1. Introduction

This *National Action Plan for Open Research* outlines objectives and actions for the next chapter in Ireland's transition towards open research. It builds on a number of national policies and international recommendations, including the *National Principles on Open Access* (2012), the *European Commission Recommendation on access to and preservation of scientific information* (2018), the *National Framework on the Transition to an Open Research Environment* (2019), and the *UNESCO Recommendation on Open Science* (2021).

The process of developing this National Action Plan has been led by Ireland's National Open Research Forum (NORF),[1] a broad group that combines the expertise of representatives from policy, research funding, research performing, the library sector, research infrastructures, enterprise and other key stakeholders in the research system across Ireland. During a planning exercise conducted in 2021, NORF Working Groups and Coordination Groups analysed the landscape of open research support structures in Ireland and developed recommendations for nationally coordinated actions that would improve support for open research and assist researchers in navigating this transition. NORF's analyses have been published in a *National Open Research Landscape Report* and series of policy briefs that provide background and further details on the actions described in this plan (see Section 7). Opportunities for public consultation and comment were held in conjunction with the drafting of the *National Open Research Landscape Report* (30 March to 7 May 2021) and targeted consultations were held with specific communities to help develop recommended actions over 2021.

Implementation of the *National Action Plan for Open Research* will be overseen by NORF and resourced through initial funding provided by the Department of Further and Higher Education, Research, Innovation and Science (DFHERIS). The transition to open research is a shared responsibility across the research system, with local efforts required to implement policies, infrastructure and incentives within research performing and research funding organisations. National-level actions are designed to encourage a coordinated approach and complement and connect with efforts at international and local levels. Periodic reviews of the National Action Plan will be conducted every three years to review progress made and release updates with further actions. For further details regarding coordination, implementation and monitoring, see Section 6.

Open consultation

There is an opportunity to comment on the *National Action Plan for Open Research* via a short survey. The survey is open from **4 April until 6 May 2022**. We strongly encourage responses at the organisational level, but also welcome individual responses.

Access the survey: https://www.surveymonkey.com/r/NORFNAP

[1] NORF: https://norf.ie/

2. Vision for Open Research in Ireland

Open research: definitions, core values and ambitions

Open research,[2] also referred to as open science or open scholarship, is an approach to the scientific process based on open cooperative work, tools and diffusing knowledge.[3] As part of Ireland's endorsement of the *UNESCO Recommendation on Open Science* (2021),[4] we adopt the following definition:

> Open science is defined as an inclusive construct that combines various movements and practices aiming to make multilingual scientific knowledge openly available, accessible and reusable for everyone, to increase scientific collaborations and sharing of information for the benefits of science and society, and to open the processes of scientific knowledge creation, evaluation and communication to societal actors beyond the traditional scientific community.

Further, we align with and support UNESCO's definition of the core values of open research, which include quality and integrity, collective benefit, equity and fairness, and diversity and inclusiveness. The practices of open research support research quality and integrity by encouraging transparency and allowing broader evaluation and scrutiny. Open practices benefit the collective in that sharing outputs with the global community positions research as a global public good and promotes equity through equal access to knowledge.

In terms of specific practices, open research includes open access to publications, open research data, open source software/tools, open workflows, citizen science, open educational resources, and alternative methods for research evaluation. More broadly, these practices are not ends in themselves, but contribute to realising a more transparent and trustworthy shared global research knowledge system or knowledge commons.[5] As the Open Science Policy Platform (European Commission, 2020, p. 4) has stated:

> Openness is a vital instrument which, when used responsibly, can fuel a faster, more effective, more reliable, more trustworthy, more equitable and more innovative shared research knowledge system. Research cannot be 'excellent' without such attributes at its core.

We also seek to align with the ambitions of the European Commission in relation to open science, which have been structured through eight areas: open data; European Open Science Cloud (EOSC); new generation metrics; future of scholarly communication; rewards; research integrity and reproducibility of scientific results; education and skills; citizen science.[6] Further, open science is a fundamental part of Horizon Europe, in which a range of open science practices are mandated or

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[2] The term open research is used to clarify that all disciplines are included in this National Action Plan.
[3] As defined by the Horizon Europe (2021-2027) Framework Programme for R&I. For a further introduction see https://think.f1000research.com/open-research-europe-submission/open-research-europe/
[4] *UNESCO Recommendation on Open Science* (unanimously adopted Nov 2021): https://unesdoc.unesco.org/ark:/48223/pf0000379949.locale=en
[5] As called for in the final report of the European Commission's Open Science Policy Platform (2020) and the *Joint Appeal for Open Science* by the Directors-General of UNESCO and WHO and the United Nations High Commissioner for Human Rights (2020).
[6] The EU's open science policy: https://ec.europa.eu/info/research-and-innovation/strategy/strategy-2020-2024/our-digital-future/open-science_en

recommended, and open science is considered in the evaluation of proposals under 'excellence' and 'quality and efficiency of implementation'. We also aim to take action in relevant areas highlighted by conclusions on the European Research Area, which notes the role of open science in boosting impact, quality, efficiency, transparency and integrity of research and innovation, encourages action in implementing open science practices in reward and evaluation systems, and recognises that bibliodiversity, multilingualism and the acknowledgement of all scientific productions are relevant elements of an ERA open science policy.[7]

At the national level, Ireland's *National Framework on the Transition to an Open Research Environment* outlines national objectives across five strategic areas: open access to research publications; enabling FAIR research data; infrastructures for access to and preservation of research; skills and competencies; and incentives and rewards.[8] These objectives are reaffirmed and updated in this National Action Plan, streamlined according to three overarching themes.

National Action Plan for Open Research

This National Action Plan serves as a roadmap for the implementation of open research across Ireland, outlining national goals and coordinated actions that will assist the national research system as a whole to better support open research practices. The plan covers the period 2022-2030, aligned with Ireland's next strategy for research and innovation. It will be subject to periodic assessment and updated every three years to further define actions needed in subsequent years.

The plan is structured according to three themes or overall aspirations, under which a vision, goals, and actions are articulated. The overall national vision for a research system fully aligned with open research principles and practices by 2030 is as follows:

Theme 1: Establishing a culture of open research

By 2030 a culture of open research will be embedded at every level of the Irish research system. The re-orientation of research recognition and rewards towards responsible research evaluation, and open research metrics and practices will be well underway or complete, and approaches to research assessment will be broadly aligned at a system level across all stakeholders. Researchers at all career levels will have opportunities to learn open research skills, with clear incentives to do so. Across the system, there will be widely available specialist open research support for researchers, provided by dedicated support professionals, who have access to accredited training and clear career progression routes.

Theme 2: Achieving 100% open access to research publications

By 2030 Ireland will have implemented a sustainable and inclusive course for achieving 100% open access to research publications. Provisions put in place to support a diverse OA publishing ecosystem and the retention of authors' rights will ensure Irish researchers have the freedom to choose from a

[7] Council conclusions on the new European Research Area (Dec 2020): https://data.consilium.europa.eu/doc/document/ST-13567-2020-INIT/en/pdf; see also open science principles and practices in Council recommendations on a Pact for R&I in Europe (Nov 2021): https://data.consilium.europa.eu/doc/document/ST-13701-2021-INIT/en/pdf

[8] Ireland's *National Framework on the Transition to an Open Research Environment* (July 2019): https://doi.org/10.7486/DRI.0287dj04d

range of quality options for making their research OA. An interoperable and robust network of repositories will contribute to making Irish research more visible and accessible locally and internationally. Benchmarking, drawing on a transparent national OA monitoring mechanism, will place Ireland amongst the leading countries internationally in terms of achieving 100% OA.

Theme 3: Enabling FAIR research data and other outputs

By 2030 Ireland will have a mature ecosystem of infrastructures to support the responsible management and sharing of research data and other outputs in line with the FAIR principles. A diverse range of research activities and outputs will be recognised and rewarded in research assessment and evaluation, including data sharing. Data stewardship will be firmly established in the national landscape, with data stewards providing key expertise to assist researchers with research data management needs. Open research infrastructures will be considered and planned for within national roadmaps for research infrastructures. As an outcome of national roadmapping processes, open research infrastructures will receive adequate funding, form part of a coherent and sustainable approach to RIs, and will be benchmarked against other national RIs.

3. Establishing a culture of open research

As an approach to the research process, open research practices impact on methodologies across the research lifecycle and contribute to research excellence. Open research should therefore be fostered and become embedded in the Irish research system through consistent and system-wide recognition and reward mechanisms. Key to achieving this objective of broader uptake and incentivisation is the systematic provision of standardised skills and training in open practices, local support networks, and the alignment of research assessment with the principles of open research.

In line with the *National Framework on the Transition to an Open Research Environment*, we reaffirm the importance of training in open research for researchers at all career levels, and specialised training for relevant professional support staff.[9] Institution-wide open research support units or networks should encompass roles and services designed to support open practices throughout the research lifecycle and maximise the use of local, national and international open research infrastructures.

At an organisational level, we encourage the prioritisation of open research in institutional strategies, supported by policies and local action plans for open research aligned with international and national objectives. Policies and procedures should cover key areas including open access, research data management, and research assessment. Institutional support networks should be broad, involving professional support staff as well as teams of academic champions or fellows that support local engagement and effective implementation.[10]

As called for by international statements such as the San Francisco Declaration on Research Assessment (DORA), the assessment of research and researchers should move away from journal and publication-based metrics and towards more qualitative measures, supported by the responsible use of quantitative indicators.[11] Broad and inclusive research assessment supports a diversity of contributions and careers in research and helps to acknowledge and reward open research practices and open sharing of research results.

Vision for 2030

By 2030 a culture of open research will be embedded at every level of the Irish research system. The re-orientation of research recognition and rewards towards responsible research evaluation, and open research metrics and practices will be well underway or complete, and approaches to research assessment will be broadly aligned at a system level across all stakeholders. Researchers at all career levels will have opportunities to learn open research skills, with clear incentives to do so. Across the system, there will be widely available specialist open research support for researchers, provided by dedicated support professionals, who have access to accredited training and clear career progression routes.

Progress and goals

[9] Professional support staff include, but are not limited to, library professionals, data managers/stewards, research software engineers, and IT personnel.
[10] Examples of academic support teams are the Faculty Open Science Teams at Utrecht University.
[11] See the European Commission scoping report *Towards a Reform of the Research Assessment System*: https://data.europa.eu/doi/10.2777/707440

As detailed in NORF's *National Open Research Landscape Report*, Ireland's progress in establishing a culture of open research has been demonstrated through initiatives to build skills and offer training in open research and encouragement by institutions and funders towards open practices. In the skills area, several Irish institutions offer accredited training as part of research modules and there have been successful communities of practice developed around open research at the local and disciplinary levels. Structures and staffing to support open research vary across institutions and a range of related open research roles have emerged, often based within libraries.

Regarding the incentivisation of open research, there is increasing awareness and encouragement towards open practices, but little demonstrable progress towards the enforcement of reporting or evaluation of open research at a national level. Local initiatives to encourage open practices and consideration of societal impact include awards and research impact positions. More tangible incentives include funder initiatives such as the use of narrative CV formats and reporting on public engagement and dissemination. A number of Irish funders and institutions have signed DORA and have implemented DORA-compliant assessment procedures and practices.[12]

To make further progress in relation to establishing a culture of open research, the following goals have been identified:

Goal	Description	Related actions
G3.1	Strengthen and standardise training on open research, including adopting an agreed framework that defines the required skills-base and encourages a competency-based, consistent approach to training.	A3.1
G3.2	Factor in dedicated open research support roles in institutional staffing plans in order to improve local awareness, community building, and uptake of open practices.	A3.1
G3.3	Address the gap in system-level mandating or incentivisation of open research, including open research-relevant criteria for career progression or hiring.	A3.2, 3.4 & 3.5
G3.4	Further develop commitments to reform research assessment and research evaluation, including the responsible use of research metrics.	A3.3

Actions

Action	Description	Key stakeholders	Timeline
A3.1 Upskill researchers and relevant professional support staff in open research.	A3.1.1 Develop a national open research training programme to enable researchers at all stages of their career, from early to late, as well as postgraduate students, to upskill in open research	NORF, RPOs, IUA, THEA	2022-23

[12] DORA signatories in Ireland: https://sfdora.org/signers/?_organization_country=ireland

	practices. This will include defining a core curriculum and adapting a standardised framework, such as FOSTER, to national needs.[13]		
	A3.1.2 Develop pathways and core curricula for the training of professional support staff such as library professionals, data managers/stewards (see A5.1), IT personnel, as well as training for policymakers and policy officers.	NORF, RPOs, professional library bodies, RFOs	2023-24
	A3.1.3 Establish and ensure accreditation of open research training appropriate to cohort and level.	RPOs, awarding bodies (e.g. QQI), professional library bodies	2022-24
	A3.1.4 Establish a national network of open research trainers to promote the exchange of best practices and to develop and share Open Education Resources (OERs) in open research.	NORF, RPOs, research infrastructures	2022-23
	A3.1.5 Linked to A5.1, professionalise, embed and create sustainable career pathways for professional support staff in open research within the national landscape.	RPOs, IUA, THEA, DFHERIS, staff unions	Ongoing
A3.2 Strengthen the system-wide recognition and reward of open research practices.	A3.2.1 Convene an inclusive group of stakeholders to identify and progress system-level changes required, broad principles and arenas for action (e.g. government policy, funder process, institutional HR policies), specific proposals for each actor, and any evaluation model. This may include adapting existing models designed to recognise and reward a broad range of research activities such as the Open	RPOs, IUA, THEA, DFHERIS, staff unions, RFOs, government agencies	2023-24

[13] FOSTER: https://www.fosteropenscience.eu/

	Science Career Assessment Matrix (OS-CAM) to the national context.[14]		
A3.3 Align research assessment with the principles of open research.	A3.3.1 Strongly recommend further Irish research stakeholders sign DORA and/or participate in similar initiatives (e.g. Leiden Manifesto, Hong Kong Principles, Paris Call on Research Assessment, and the European Commission's coalition on reforming research assessment).[15] Support the implementation of research assessment that is aligned with and inclusive of open research, research integrity, and developing a positive research culture.	RPOs, RFOs, government agencies	Ongoing
	A3.3.2 Develop a national statement on the adoption of responsible research metrics (RRM) by all stakeholders in the Irish research system, including oversight and mechanisms to ensure compliance. Encourage ongoing implementation and embedding of RRM into all relevant processes and policies e.g. recruitment and promotion, quality reviews, strategic planning, career development frameworks, grant applications, peer review etc.[16]	RPOs, IUA, THEA, RFOs, government agencies	2022-23
A3.4 Support institutional and community networks for open research.	A3.4.1 Recognise, encourage and support the creation and development of peer-led and expert networks for open research to stimulate awareness and participation in open research. Such networks include institution-wide open research support units, regional open scholarship	NORF, RPOs, RFOs	Ongoing

[14] National level examples include NOR-CAM in Norway and the Dutch Recognition and Rewards Programme (https://recognitionrewards.nl/). See NORF's policy brief on *System-level Incentivisation of Open Research Practices*: https://doi.org/10.7486/DRI.k069nz78d

[15] DORA: https://sfdora.org/; Leiden Manifesto: http://www.leidenmanifesto.org/; Hong Kong Principles: https://www.wcrif.org/guidance/hong-kong-principles; Paris Call: https://osec2022.eu/paris-call/; see Irish organisations participating in the European Commission's coalition on reforming research assessment: https://ec.europa.eu/info/files/list-organisations-having-expressed-interest-being-part-coalition-reforming-research-assessment_en

[16] See NORF's policy brief on *Responsible Research Metrics Policy Development and Alignment*: https://doi.org/10.7486/DRI.jw82n294d

	communities, and networks fostering reproducibility.[17]		
A3.5 Encourage funding programmes and awards for open research.	A3.5.1 Recommend funders and institutions develop funding programmes and awards for supporting innovative aspects of open research and the uptake of open research practices, either as dedicated programmes or embedded in existing calls.[18]	RPOs, RFOs	Ongoing

[17] Examples include Open Scholarship Communities (e.g. https://osc-galway.ie/) and Reproducibility Networks (https://www.ukrn.org/international-networks/)

[18] Funder examples include the French National Research Agency's Flash Call Open Science, the Dutch Research Council's Open Science Fund, and Wellcome's Research Enrichment - Open Research (https://wellcome.org/grant-funding/schemes/research-enrichment-open-research). For institutional examples, see the UKRN primer: https://doi.org/10.31219/osf.io/kqgez

4. Achieving 100% open access to research publications

Ireland supports the principle of full and immediate open access to research publications to ensure the widest possible dissemination of research. Making research publications openly and freely accessible contributes to an informed citizenship, the democratisation of knowledge, and maximises the impact of research processes and outputs.

In line with Ireland's *National Framework on the Transition to an Open Research Environment*, we reaffirm the national objective that all Irish scholarly publications resulting from publicly funded research will be openly available by default.[19] Our aim is to implement a sustainable and inclusive course for achieving 100% open access to research publications by 2030.

To progress towards this objective, we support multi-track policies and pathways to open access, enabling both repository-mediated (also known as Green OA) and publisher-mediated (Gold OA) routes, without an embargo period.[20] Open access publications must be accompanied by an open licence. Authors should retain sufficient rights to enable full and immediate open access via the Green or Gold route.[21] For academic books, it is recognised that some stakeholders may permit embargo periods, but these should be as short as possible.[22]

A collaborative approach involving all actors is encouraged in the transition from subscription-based to open access models, particularly for the facilitation of agreements with publishers. While transformative agreements[23] play a role in accelerating open access options with a range of publishers, such agreements should be considered transitional and form part of a broader strategy that encompasses and promotes a diversity of business models. The payment of author-facing open access publishing fees to hybrid journals[24] is not supported, except as a limited part of transformative agreements with a clearly defined timeframe. Monitoring the degree to which these agreements are transformative will be a key indicator of the success of this aspect of the national open access strategy.[25]

In line with the principle of bibliodiversity,[26] we strongly encourage and support local and disciplinary publishing practices, society and academic-led publishing initiatives, non-profit open access publishers, and OA models in which journals or publishers do not charge fees to either authors or

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[19] Publicly funded research is research undertaken in whole or in part via publicly funded resourcing or remuneration, e.g. salaries, grants, contracts, etc.
[20] For further definitions see https://www.jisc.ac.uk/guides/an-introduction-to-open-access
[21] See NORF's policy brief on *Copyright Legislation to Support Rights Retention*: https://doi.org/10.7486/DRI.jd47gm74p
[22] As stated in Ireland's *National Framework to an Open Research Environment* and in line with international practice: https://www.coalition-s.org/coalition-s-statement-on-open-access-for-academic-books/
[23] Transformative agreement is an umbrella term for several agreement types, such as read and publish/publish and read agreements, transitional agreements and offsetting agreements. See glossary for further definition.
[24] Hybrid journals publish both OA and closed/subscription articles. Articles may be made OA on publication on payment of an article processing charge (APC). For why this route is not supported, see: https://www.coalition-s.org/why-hybrid-journals-do-not-lead-to-full-and-immediate-open-access/
[25] ESAC's spectrum of transformation provides a framework for assessing TAs: https://esac-initiative.org/wp-content/uploads/2021/12/ESAC_HowTransformativeIsIt_Dec2021.pdf
[26] Bibliodiversity relates to the diversity of publishing forms and sources at the local, regional, national and international levels. See NORF's policy brief on *Supporting Bibliodiversity in Ireland* https://doi.org/10.7486/DRI.5t3568774

readers (also known as Diamond OA).[27] The sustainability of this national strategy must be underpinned by investment in both local and global scholarly communication infrastructure.

We strongly advocate for every researcher in Ireland to have the rights and the facility to deposit or publish via a suitable open access journal, platform, or repository. To realise an inclusive system of infrastructure and incentives for open access, differences in publication culture between disciplines should be accounted for and supported, with implementation guided by overarching principles of equity and collective benefit.

In the transition to full open access, assessment of research and researchers should move beyond journal-based and particularly impact-factor-based measurement. This helps to diversify the scholarly landscape by recognising the value of diverse publication types and incentivises authors to fully leverage the potential of digital technology.

Vision for 2030

By 2030 Ireland will have implemented a sustainable and inclusive course for achieving 100% open access to research publications. Provisions put in place to support a diverse OA publishing ecosystem and the retention of authors' rights will ensure Irish researchers have the freedom to choose from a range of quality options for making their research OA. An interoperable and robust network of repositories will contribute to making Irish research more visible and accessible locally and internationally. Benchmarking, drawing on a transparent national OA monitoring mechanism, will place Ireland amongst the leading countries internationally in terms of achieving 100% OA.

Progress and goals

As detailed in NORF's *National Open Research Landscape Report*, Ireland's progress in the area of open access to research publications has been demonstrated by a steady growth in repository-mediated OA and an increase in publisher-mediated OA from 2015 onwards. Initiatives supporting the growth and uptake of open access have included a growing number of transformative agreements facilitated by IReL,[28] the commencement of Plan S (supported by Science Foundation Ireland and others), the growth of the Health Research Board's Open Research platform, support for local and international open access initiatives, and ongoing developments in the repository landscape.

To make further progress in relation to full and immediate open access, the following goals have been identified:

Goal	Description	Related actions
G4.1	Set clear baselines and appropriate domain targets for open access, including establishing criteria for monitoring open access at the	A4.4 & 6.2

[27] Action Plan for Diamond OA: https://doi.org/10.5281/zenodo.6282402

[28] IReL provides a number of Irish Higher Education Institutions with access to e-journals and other resources. In addition to subscription access, IReL negotiates to include in agreements that publishing of articles by corresponding authors from member institutions will be on an open access basis and at no additional cost: https://irel.ie/

	national level. National monitoring will promote transparency, enable progress to be tracked, and allow for the identification of gaps and targeted interventions to ensure equity in terms of access to open access publishing options.	
G4.2	In relation to repositories, address staff capacity and bring all repositories up to a minimum level to support evolving open access requirements, agree a national standard for quality metadata, and standardise metadata in line with international initiatives.	A3.1 & 4.1
G4.3	Address the need for a coordinated approach to rights retention to support Irish researchers to retain their rights and make their work open access immediately.	A4.2
G4.4	Address equity of choice and access to funds to support open access publishing and further investigate means of supporting varied publishing practices across disciplines.	A4.1, 4.2 & 4.3
G4.5	Address the lack of preservation policies and infrastructure to support sustainable access to scholarly publications.	A4.1
G4.6	Address the lack of alignment between the various funder policies and institutional policies relating to open access.	A4.5

Actions

Action	Description	Key stakeholders	Timeline
A4.1 Strengthen Ireland's network of open access repositories.	A4.1.1 Conduct a national programme of open access repository assessment and alignment to deliver standardised metadata nationally while building infrastructure alignment in-line with international best practices. For example, OpenAIRE guidelines, Plan S requirements, and evolving practice.[29]	NORF, RPOs, RFOs, research infrastructures (e.g. IReL)	2022-23
A4.2 Support rights retention for Irish researchers.	A4.2.1 Conduct a legal assessment of ways to support Irish researchers retain their rights and make their work open access immediately. These may include introducing secondary rights retention into Irish copyright legislation.	NORF, RPOs, RFOs	2022

[29] See NORF's policy brief on *Coordinated Support for Open Access Repositories*: https://doi.org/10.7486/DRI.j960fq90j

A4.3 Support bibliodiversity in Ireland.	A4.3.1 Conduct a feasibility study and pilot with a view to establishing a publicly-owned, centralised national platform for Diamond OA publication of journals and books.[30] This programme will be aimed at supporting OA models for Irish-based academic journals and publishers.	NORF, RPOs, RFOs, research infrastructures, publishers, learned societies, editors	2022-23
	A4.3.2 Expand open access support to a wider range of publication types and encourage publishing innovations. These include, for example, open access monographs and book chapters, preprints, overlay journals, open peer review, and the interlinking of scholarly outputs through open publication platforms.	NORF, RPOs, RFOs, research infrastructures (e.g. IReL), publishers	Ongoing
	A4.3.3 Support the open infrastructure for scholarly communication that underpins bibliodiversity in the international context by funding and establishing connections to initiatives such as the Global Sustainability Coalition for Open Science Services (SCOSS), infrastructures for Diamond OA, and endorsing the Action Plan for Diamond OA.[31]	NORF, RPOs, RFOs, research infrastructures (e.g. IReL)	Ongoing
	A4.3.4 Sign the Helsinki Initiative on Multilingualism in Scholarly Publishing,[32] supporting dissemination of research results, protecting publishing locally relevant research, and promoting language diversity.	NORF, RPOs, RFOs	2022 (NORF), ongoing
A4.4 Invest in Persistent Identifier infrastructure to enable consistent monitoring and improve	A4.4.1 Support the Irish ORCID Consortium and encourage further development and adoption of ORCID according to international best practice by researchers and within the systems and processes of publishers, research performing	NORF, RPOs, RFOs, research infrastructures (e.g. IReL)	Ongoing

[30] European examples include national platforms in Finland, Croatia, France, the Netherlands and Spain.
[31] Global Sustainability Coalition for Open Science Services: https://scoss.org/; Action Plan for Diamond OA endorsing organisations: https://scieur.org/diamond-actionplan
[32] Helsinki Initiative on Multilingualism in Scholarly Communication: https://www.helsinki-initiative.org/

interoperability.	organisations, research funding organisations, and infrastructures.[33]		
	A4.4.2 Develop a national roadmap for the adoption of a range of Persistent Identifiers according to international best practice, such as ORCID, DOIs, RAiDs and ROR identifiers. Implement this roadmap to consolidate national coordination and accelerate the uptake and integration of priority identifiers.	NORF, RPOs, RFOs, research infrastructures (e.g. IReL)	2022-23
A4.5 Align policies for open access to publications.	A4.5.1 Encourage funders and institutions to develop and implement open access policies that support the objectives of the *National Framework on the Transition to an Open Research Environment* and alignment with international approaches such as Plan S.[34] In implementing and monitoring these policies, clear guidance and support should be provided to researchers.	RPOs, RFOs	Ongoing

[33] Irish ORCID Consortium: https://irel.ie/orcid-consortium/

[34] For an overview of current funder OA policies see Appendix 2 of NORF's *National Open Research Landscape Report*: https://doi.org/10.7486/DRI.5q485c938; Plan S: https://www.coalition-s.org/plan_s_principles/

5. Enabling FAIR research data and other outputs

The FAIR (Findable, Accessible, Interoperable and Reusable) principles were formalised in 2016 with respect to scientific research data, but are now more widely applied to all research outputs and across all disciplines. In addition to research data, FAIR can be applied to software code, algorithms and models, tools and instruments, educational materials and other outputs.[35] The aim of the principles is to enhance usefulness and (re)use by humans and machines, therefore increasing the value of the outputs and supporting greater reproducibility and transparency of research. The principles do not require complete openness; rather FAIR outputs are "as open as possible, as closed as necessary." As noted in *Turning FAIR into Reality* (European Commission, 2018, p. 21), "Data can be FAIR or Open, both or neither. The greatest benefits come when data are both FAIR and Open, as the lack of restrictions supports the widest possible reuse, and reuse at scale."

In line with the *National Framework on the Transition to an Open Research Environment*, we reaffirm support for the FAIR principles, the responsible management and open sharing of research data and other outputs by default, and the need for long-term preservation of research outputs to support continued access, reuse and reproducibility. Research data and other outputs should be managed according to the FAIR principles, be made as open as possible with clear licensing, and be deposited in a trustworthy repository for long-term preservation and stewardship. To achieve this, a mature ecosystem of technical and human infrastructure is required.

The Irish landscape of infrastructures to support open research and FAIR data is complex and varied, encompassing networking and computing infrastructures, meta-infrastructures, data infrastructures, and thematic or disciplinary infrastructures. Further, to enable the broadest possible approach to open research, other key data sources should be encouraged and supported towards openness; for example, arts, humanities and social science researchers rely heavily on the holdings of memory institutions or the 'GLAM' sector (Galleries, Libraries, Archives, Museums). Enabling mechanisms for FAIR data include services that support effective management and sharing at each stage of the research data management lifecycle, as shown in Figure 1.

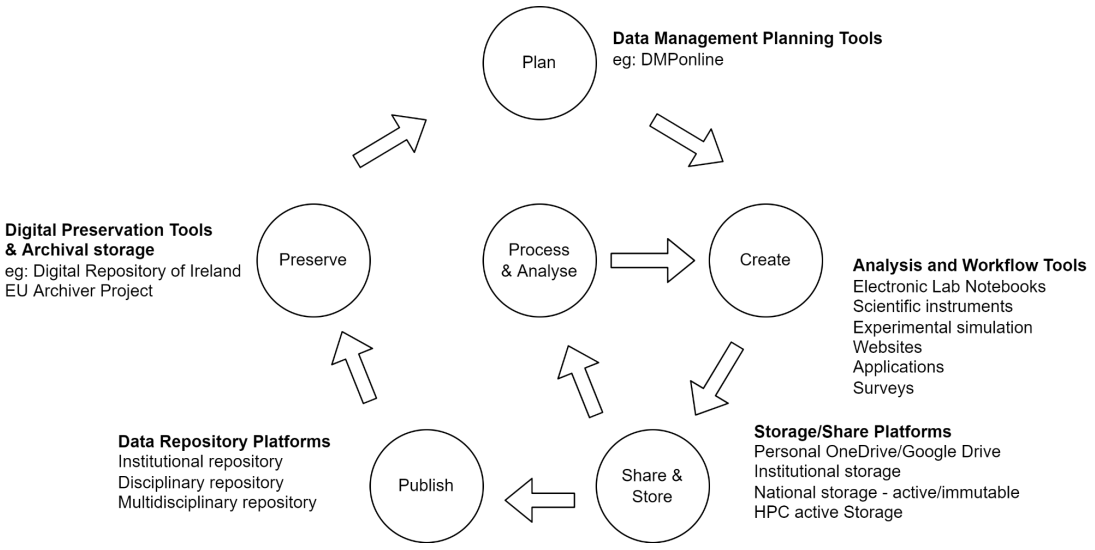

Figure 1 Research Data Management Lifecycle

[35] FAIR principles: https://www.go-fair.org/fair-principles/

Key to integrated and efficient use of data infrastructures, tools and services are the involvement and expertise of professional support staff, such as data stewards and research software engineers. Such roles act as a bridge between services and researchers, and serve a coordinating function within and across organisations that can include policy implementation, training provision and specialist advice.

Vision for 2030

By 2030 Ireland will have a mature ecosystem of infrastructures to support the responsible management and sharing of research data and other outputs in line with the FAIR principles. A diverse range of research activities and outputs will be recognised and rewarded in research assessment and evaluation, including data sharing. Data stewardship will be firmly established in the national landscape, with data stewards providing key expertise to assist researchers with research data management needs. Open research infrastructures will be considered and planned for within national roadmaps for research infrastructures. As an outcome of national roadmapping processes, open research infrastructures will receive adequate funding, form part of a coherent and sustainable approach to RIs, and will be benchmarked against other national RIs.

Progress and goals

As detailed in NORF's *National Open Research Landscape Report*, Ireland's progress in the area of enabling FAIR research data and other outputs has been demonstrated by policies for data management and sharing (especially from funders), training initiatives at the local and national level, and infrastructure to support FAIR data provided by institutions, funders and national services.

To make further progress in relation to enabling FAIR, the following goals have been identified:

Goal	Description	Related actions
G5.1	Encourage and foster awareness and adoption of FAIR and open data.	A5.3, 5.5 & 6.3
G5.2	Address the provision of training programs for researchers and support staff on the skills required to create, manage, store and preserve FAIR data.	A3.1 & 5.1
G5.3	Address the under-estimation and under-resourcing of human capital investment needed to operate the necessary infrastructure to support FAIR data, and foster core intermediary expertise to maximise the uptake and use of national and international infrastructures.	A3.1 & 5.1
G5.4	Support open research infrastructures as an integral part of research and innovation strategies, prioritised via a national roadmap for RIs. A coherent and sustainable approach needs to encompass all components that support the research ecosystem, take advantage of economies of scale, and allocate funding for	A5.4 & 5.5

	adequate periods to meet the longer term planning goals of research infrastructures.[36]	

Actions

Action	Description	Key stakeholders	Timeline
A5.1 Support the development and professionalisation of research data stewardship nationally.	A5.1.1 Establish a national data stewardship network across research performing organisations, funders, and related research support services and infrastructures to build national capacity and develop a collective voice and pool of expertise.[37]	NORF, RPOs, RFOs, research infrastructures	2022-23
	A5.1.2 Linked to A3.1, professionalise, embed and create sustainable career pathways for the role of the data steward within the national landscape, including fostering links with industry representatives to identify common skillsets.	RPOs, , IUA, THEA, DFHERIS, staff unions, RFOs, research infrastructures	Ongoing
	A5.1.3 Linked to A3.1, develop a national approach to data stewardship training informed by best practices internationally which addresses training requirements at all levels.	RPOs, RFOs, research infrastructures	2023-24
A5.2 Support national services for storing, managing, sharing and preserving research data.	A5.2.1 Develop a national shared data storage service for active data, starting with a pilot for a small number of research groups with the aim to grow the service into a national service.[38]	RPOs, RFOs, research infrastructures (e.g. HEAnet, ICHEC)	2022-24
	A5.2.2 Linked to A5.4, identify and support further services to address current gaps in national level support for	RPOs, RFOs, research infrastructures	2024-30

[36] A roadmapping process for research infrastructures should guide future coordinated actions linked to this National Action Plan, helping to develop, evaluate and prioritise investment. See NORF's policy brief on a *Research Infrastructure Roadmapping Process*: https://doi.org/10.7486/DRI.jm21jd42w

[37] Models for such a network include the Dutch National Coordination Point Research Data Management: https://www.lcrdm.nl/en. See NORF's policy brief on *Coordinated Support for Data Stewardship*: https://doi.org/10.7486/DRI.js95m610b

[38] See NORF's policy brief on *National Shared Data Storage Infrastructure*: https://doi.org/10.7486/DRI.jh34hh58j

	research data management during active research and post-project preservation and FAIR sharing. For example, services for immutable storage, sensitive data (Safe Havens), services for participation in future ESFRI projects, and European Open Science Cloud (EOSC) services.	(e.g. HEAnet, ICHEC)	
	A5.2.3 Strongly recommend widespread certification of data infrastructures using international standards, such as the CoreTrustSeal.[39]	RPOs, RFOs, research infrastructures	Ongoing
A5.3 Align policies for the management and sharing of research data and other outputs.	A5.3.1 Linked to A3.2 & 3.3, recognise and reward the documentation and sharing of research data, software and a diverse range of outputs and activities in the assessment and evaluation of research and researchers.	RPOs, RFOs	Ongoing
	A5.3.2 Create a national research data management framework informed by established tools and matrices[40] to include elements such as national reference policy guidelines, methods of versioning and communication changes in research data policies to key stakeholders, and adoption of a framework or criteria for the selection of trustworthy repositories. With respect to data management planning, converge on a Data Management Plan (DMP) template framework with disciplinary guidance as appropriate and establish a national approach to the use and evaluation of DMPs during the research lifecycle.	NORF, RPOs, RFOs	2022-23
A5.4 Contribute to a Research Infrastructure roadmapping strategy.	A5.4.1 Strongly advocate for and contribute to a coherent, transparent Research Infrastructure roadmapping strategy, process, funding model and	DFHERIS, NORF, RPOs, RFOs, research infrastructures	2022-24

[39] CoreTrustSeal: https://www.coretrustseal.org/

[40] For example, see Science Europe's *Practical Guide to Sustainable Research Data: Maturity Matrices* https://doi.org/10.5281/zenodo.4769702 and FAIRsFAIR's *Creating and Sharing Structured Policy Descriptions* https://doi.org/10.5281/zenodo.6281105

	governance structure, drawing on best practice and lessons learned from comparable EU Member States (as recommended by successive high-level national reports since 2007).		
	A5.4.2 Develop a process to operationalise the Principles of Open Scholarly Infrastructure (POSI) in evaluating and monitoring RIs.[41] Similarly, require low-barrier access to RIs by third-party researchers based on scientific merit.	DFHERIS, NORF, RPOs, RFOs, research infrastructures	2022-24
A5.5 Strengthen connections to international infrastructures supporting open research and research data.	A5.5.1 Actively engage with and support the European Open Science Cloud (EOSC) through membership of the EOSC Association[42] and participation in expert groups and consultations. Contribute Irish infrastructures and datasets to the EOSC catalogue and marketplace, promote EOSC resources, and support Irish researchers and institutions to use EOSC's system of federated data and services.	Research infrastructures (e.g. HEAnet), DFHERIS, NORF, RPOs, RFOs	Ongoing
	A5.5.2 Support the work of the Research Data Alliance (RDA)[43] in defining and developing best practices for data sharing, stewardship and reuse through regional membership of the RDA.	DFHERIS, NORF, RPOs, RFOs, research infrastructures	Ongoing

[41] Principles of Open Scholarly Infrastructure: https://openscholarlyinfrastructure.org/
[42] EOSC Association: https://eosc.eu/
[43] RDA: https://www.rd-alliance.org/

6. Coordination, implementation and monitoring

Implementation of the *National Action Plan for Open Research* will be overseen by Ireland's National Open Research Forum (NORF). Initial funding of €1.725 million has been provided by the Department of Further and Higher Education, Research, Innovation and Science (DFHERIS) through the Higher Education Authority (HEA) to support objectives and actions under the National Action Plan. This funding has been allocated to the Digital Repository of Ireland (DRI) for management and distribution to key initiatives through an onward allocation process overseen by NORF. These funds will support actions in the plan that commence in 2022, including pilots that are necessary to scope, test and identify future activities and develop national-level services. Beyond this initial commitment, further national and other funding will be sought as part of ongoing coordination activities by DFHERIS and NORF.

The transition to open research is a shared responsibility across the research system, with local efforts required to implement policies, infrastructure and incentives within research performing and research funding organisations. National-level actions are designed to encourage a coordinated approach and complement and connect with efforts at international and local levels. In the implementation of this plan, particularly in terms of infrastructure, actions should be guided by the principles outlined in the *UNESCO Recommendation on Open Science* regarding open science infrastructures, the Budapest Open Access Initiative recommendations regarding open infrastructure, and the widely adopted Principles of Open Scholarly Infrastructure.[44]

Periodic reviews of the National Action Plan will be conducted every three years to review progress made and release updates with further actions. A successor plan will be considered in 2030, in conjunction with future national strategies for research and innovation.

Progress and goals

In relation to the continued coordination of the open research agenda and implementation of the National Action Plan, the following goals have been identified:

Goal	Description	Related actions
G6.1	Monitor, track and assess progress of the National Action Plan. Respond to and support future developments in open research.	A6.1, 6.2 & 6.4
G6.2	Ensure transparency in the allocation of funding and resources.	A6.1
G6.3	Achieve robust coordination and engagement at a national scale for actions through continuous communication and awareness-raising.	A6.1 & 6.3

[44] *UNESCO Recommendation on Open Science*: "Open science infrastructures are often the result of community-building efforts, which are crucial for their long term sustainability and therefore should be not-for-profit and guarantee permanent and unrestricted access to all public to the largest extent possible." (p. 12); Budapest Open Access Initiative 20th Anniversary Recommendations: "We recommend hosting and publishing OA texts, data, metadata, code, and other digital research outputs on open, community-controlled infrastructure" (https://www.budapestopenaccessinitiative.org/boai20/).

Actions

Action	Description	Stakeholders	Timeline
A6.1 Coordinate Ireland's open research agenda.	A6.1.1 Support the ongoing coordination of the national open research agenda through the National Open Research Forum (NORF). Participate in the Council for Open Science Coordination (CoNOSC) to share and collaborate with international peers.	DFHERIS, NORF	Ongoing
	A6.1.2 Commit national funding and seek additional sources for the implementation of nationally coordinated actions to progress open research.	DFHERIS, NORF	Ongoing
	A6.1.3 Strengthen links between open research and related national agendas and activities including research integrity, open education, and citizen science.	DFHERIS, NORF, NRIF, RPOs, RFOs	Ongoing
A6.2 Establish a national monitoring service for open access and open research more broadly.	A6.2.1 Develop a monitor for open access at the national level, initially through pilot reports and a national dashboard to publish, analyse and track progress towards 100% OA.[45] As part of open access monitoring, agree a national definition of OA and analyse overall costs to the national research system. The monitoring service will be driven by community requirements and draw on open data and tools wherever possible, including institutional sources identified under Action 3.1.[46]	DFHERIS, NORF, HEA, RPOs, RFOs, research infrastructures (e.g. IReL)	2022-24
	A6.2.2 Establish a national, high-level working group to make recommendations on the design and implementation of a national research reporting, monitoring and evaluation system that enshrines open	DFHERIS, NORF, HEA, RPOs, RFOs, research infrastructures	2022-23

[45] See NORF's policy brief on *National Open Access Monitoring*: https://doi.org/10.7486/DRI.j673dv060
[46] Philipp, T., Botz, G., Kita, J-C., Sänger, A., Siegert, S., & Reumaux. M. (2021). *Open Access Monitoring: Guidelines and Recommendations for Research Organisations and Funders*. https://doi.org/10.5281/zenodo.4905554

	research principles and aligns with international best practice.[47]		
	A6.2.3 On the basis of recommendations made, expand the national monitor to encompass further aspects of open research activity and measures relevant to the national context. This may include indicators related to FAIR data, policies and societal impact.	DFHERIS, NORF, HEA, RPOs, RFOs, research infrastructures	2025-27
A6.3 Conduct a national-level survey on open research.	A6.3.1 Undertake a national multi-stakeholder survey on open research awareness, attitudes, skills, needs and policy alignment. Results to be used as a baseline for future reviews (A6.4) as well as informing current and future actions (e.g. A5.1, 5.2 & 5.3).	DFHERIS, NORF	2022
A6.4 Conduct periodic reviews and updates of the National Action Plan.	A6.4.1 Conduct periodic reviews and updates of the National Action Plan to report on progress made and specify further actions for 2025-27 and 2028-30, aligned with international developments in open research and the national strategy for research and innovation.	DFHERIS, NORF	2025 & 2028

[47] See NORF's policy brief on *National Reporting and Evaluation Supporting the Transition to an Open Research Environment*: https://doi.org/10.7486/DRI.zg657b23t

7. Supporting documents and further references

The following NORF publications have informed the development of this National Action Plan and provide further background and rationale for the actions described.

NORF publications

NORF. (2019). *National Framework on the Transition to an Open Research Environment*. https://doi.org/10.7486/DRI.0287dj04d

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8. Glossary and acronyms

AAM	Author's Accepted Manuscript. The version of an article that has been through a formal peer-review but does not include publisher's copy-editing, typesetting and formatting.
APC	Article Processing Charge. A fee paid to the publisher to make articles Open Access at the time of publication.
DFHERIS	Department of Further and Higher Education, Research, Innovation and Science
DOI	Digital Object Identifier
DORA	San Francisco Declaration on Research Assessment (also SFDORA)
DMP	Data Management Plan
EOSC	European Open Science Cloud. An initiative to offer researchers a virtual environment with open and seamless services for storage, management, analysis and re-use of research data, across borders and scientific disciplines by federating existing data infrastructures.
EPA	Environmental Protection Agency
FAIR	Findable, Accessible, Interoperable and Reusable. Set of agreed principles applicable to research data.
HEA	Higher Education Authority. The statutory policy-advisory body for higher education in Ireland.
HEAnet	Ireland's National Education and Research Network (NREN)
HEI	Higher Education Institution
HRB	Health Research Board
IRC	Irish Research Council
IReL	IReL is a nationally funded e-resource licensing consortium providing access to leading Science Technology and Medicine (STM) and Humanities and Social Sciences (HSS) resources on behalf of participating Irish publicly funded higher education institutions.
IUA	Irish Universities Association
NORF	Ireland's National Open Research Forum
NRIF	Ireland's National Research Integrity Forum
OA	Open Access
ORCID	ORCID provides a unique persistent digital identifier (an ORCID iD) that distinguishes researchers and a record that supports automatic links among all professional activities.
OSPP	Open Science Policy Platform. High Level Advisory Group established by the Commission in May 2016 to provide advice on the development and implementation of Open Science in Europe.
Plan S	Plan S is an initiative for Open Access publishing that was launched in September 2018. Plan S is supported by cOAlition S, an international

	consortium of research funding and performing organisations.
RDM	Research Data Management
RFO	Research Funding Organisation
RPO	Research Performing Organisation
SFI	Science Foundation Ireland
TA	Transformative agreement. An umbrella term describing those agreements negotiated between institutions (libraries, national and regional consortia) and publishers in which former subscription expenditures are repurposed to support open access publishing of the negotiating institutions' authors.[48] Transformative agreements typically jointly pay for both subscription access to closed content while also allowing affiliated authors to publish works open access without author-facing fees.
THEA	Technological Higher Education Association
VoR	Version of Record. The final typeset and edited version of an article.

[48] See https://esac-initiative.org/about/transformative-agreements/

Appendix: Summary of actions

Summary of action	Short description	2022-2024			2025-2027			2028-2030		
A3.1 Upskill researchers and relevant professional support staff in OR	A3.1.1 National OR training programme									
	A3.1.2 Training of professional support staff									
	A3.1.3 Accreditation									
	A3.1.4 National network of OR trainers									
	A3.1.5 Career pathways for support staff in OR									
A3.2 System-wide reward of OR	A3.2.1 Identify and progress system-level changes									
A3.3 Align research assessment with the principles of OR	A3.3.1 Implement DORA and similar initiatives									
	A3.3.2 National statement on the adoption of RRM									
A3.4 Community OR networks	A3.4.1 Peer-led and expert networks for OR									
A3.5 OR funding and awards	A3.5.1 Funding programmes and awards for OR uptake									
A4.1 Strengthen OA repositories	A4.1.1 OA repository assessment and alignment									
A4.2 Support rights retention	A4.2.1 Legal assessment of rights retention routes									
A4.3 Support bibliodiversity	A4.3.1 Feasibility study for Diamond OA platform									
	A4.3.2 Expand OA support									
	A4.3.3 Support open infrastructure for scholarly comms									
	A4.3.4 Helsinki Initiative on Multilingualism									

A4.4 Invest in Persistent Identifier (PID) infrastructure	A4.4.1 Further adoption of ORCID									
	A4.4.2 National PID roadmap									
A4.5 Align policies for OA	A4.5.1 Develop and implement OA policies									
A5.1 Support the development and professionalisation of research data stewardship nationally.	A5.1.1 National data stewardship network									
	A5.1.2 Professionalise the role of the data steward									
	A5.1.3 National approach to data stewardship training									
A5.2 Support national services for storing, managing, sharing and preserving research data.	A5.2.1 National shared data storage service (pilot)									
	A5.2.2 Identify and support further RDM services									
	A5.2.3 Certification of data infrastructures									
A5.3 Align policies for the management and sharing of research data and other outputs	A5.3.1 Reward documentation and sharing of data etc.									
	A5.3.2 National research data management framework									
A5.4 Contribute to a Research Infrastructure roadmapping strategy	A5.4.1 Research Infrastructure roadmapping strategy									
	A5.4.2 Principles of Open Scholarly Infrastructure									
A5.5 Strengthen connections to international infrastructures	A5.5.1 Support the European Open Science Cloud									
	A5.5.2 Support the Research Data Alliance									
A6.1 Coordinate Ireland's open research agenda.	A6.1.1 Support coordination via NORF									
	A6.1.2 Resourcing of national actions									
	A6.1.3 Links between OR and related national agendas									

A6.2 Establish a national monitoring service for OA and OR more broadly	A6.2.1 National OA monitor									
	A6.2.2 Reccs on reporting, monitoring and evaluation									
	A6.2.3 Expand the national monitor									
A6.3 National-level OR survey	A6.3.1 National multi-stakeholder survey on OR									
A6.4 NAP updates	A6.4.1 Conduct NAP periodic reviews and updates									