



Trinity College Dublin

Coláiste na Tríonóide, Baile Átha Cliath

The University of Dublin



Next-Generation Metrics Including Open Science Metrics: A Practical Perspective

CHARM-EU Open Science Day, 9th June 2023

Niamh Brennan, Programme Manager, TCD Research Informatics



The Metrics Minefield



Use Metrics Responsibly!

Science & Tech

ELCONVALLEY · YOUTUBE · GOOGLE · LATEST NEWS

SCIENTIFICETHICS>

A researcher who publishes a study every two days reveals the darker side of science

Spain's most prolific scientific academic — meat expert José Manuel Lorenzo — put his name on 176 papers last year, exposing an underworld of shady practices



[nature](#) > [news](#) > [article](#)

NEWS | 06 June 2023

Tanzania's researchers offered US\$22,000 to publish in international journals

The move is designed to encourage research and help boost institutions' rankings. But some researchers say it will reward those already established in their careers.

[Synopsis Report](#)



<https://sfdora.org/>



<http://www.leidenmanifesto.org/>



<https://viennaprinciples.org/>



<https://doi.org/10.1371/journal.pbio.3000737>



<https://responsiblemetrics.org/the-metric-tide/>



<https://data.europa.eu/doi/10.2777/707440>

Coalition for Advancing Research Assessment

Our vision is that the assessment of research, researchers and research organisations recognises the diverse outputs, practices and activities that maximise the quality and impact of research. This requires basing assessment primarily on qualitative judgement, for which peer review is central, supported by responsible use of quantitative indicators.



Strategy Evaluation Protocol

2021-2027

VSNU KNAW MWO

https://www.universiteitenvannederland.nl/en_GB/nieuws-detail.html/nieuwsbericht/572-making-way-for-all-aspects-of-quality

Tracking Impact: which indicators?

Traditional Metrics

Number (and types) of research outputs*; peer reviewed? non-peer reviewed? **to be altered to non-binary**
 Research productivity
 Citations/citations per paper/h-index
 Collaborations national/international
 Industry liaison (patents, licences, patent citations)
 Grant applications (number & amount)
 Grant awards (number & amount)
 PhD students (number, number of completions),
 *Full range of research activities added in TCD
 in line with Royal Irish Academy KPIs.

Altmetrics

News & mainstream media
 Social media
 Policy papers
 Wikipedia
 YouTube etc.
 Open Science metrics

'HumetricsHSS'

Collegiality
 Quality
 Equity
 Openness
 Community

Impact Indicators

Societal
 Cultural
 Economic (inputs AND outputs)
 Open Science metrics

} Tracked changes
 Case studies
 Policy papers
 More...

Esteem Indicators

Awards & honours
 Invited talks/keynotes
 Elected by peers
 Editorial roles
 Reviewer
 etc.

Creativity & Innovation

Currently under investigation in TCD
 Focus groups & consultation underway

Process & Practice/Production

Under investigation in TCD
 via focus groups / consultation

Interdisciplinarity Indicators

[IDR contributes to impact *and* is an impact in its own right]

- Specifically-funded IDR projects
- RPO structure/unit: cross/inter-structural activity.
- Policies (funder/RPO)

- Project proposals / awards in cross-disciplinary / interdisciplinary research
- Cross-disciplinary/ interdisciplinary collaborations eg co-authorship
- Outputs in cross-disciplinary / interdisciplinary journals/conferences/books
- Disciplinary classifications of researchers *[more in 2020 from H2020 SHAPE-III]*

Level/Lens/Focus?

View

REVIEW

Peer Review

Critical Review

Audience/ Other Review?









Bench-marking?



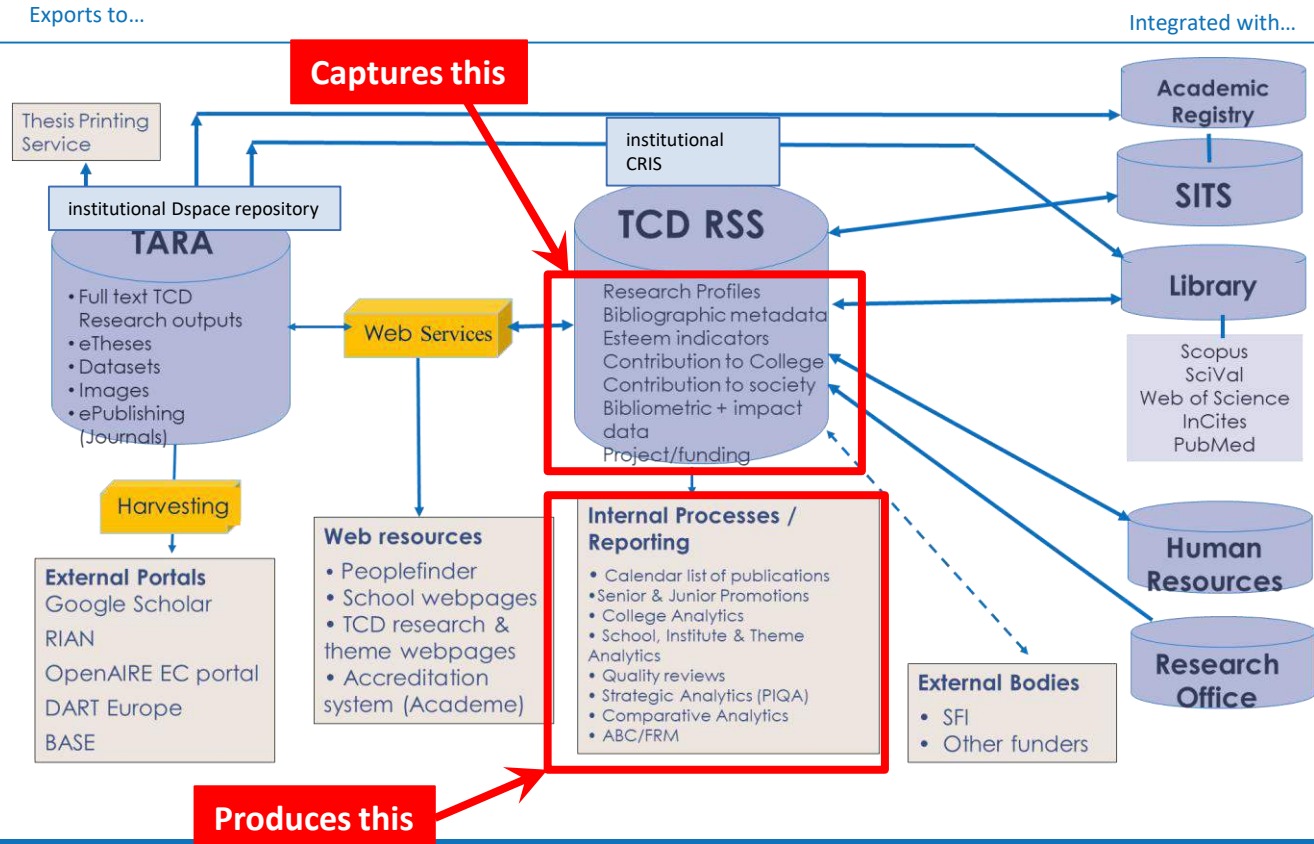
Name	Supplier	Subscription	Free	Open Source	Where:
ImpactStory	ImpactStort				Web-based
Google Analytics	Google				Web-based
Repository stats & plugins	Various				Repositories
OA Publisher statistics	Various				OA journals & publishing platforms
Web of Science /InCites	Clarivate Analytics				Commercial database
Scopus/SciVal	Elsevier				Commercial database
Dimensions	Digital Science				Commercial database
Unpaywall	ImpactStory				Dimensions Web of Science, Browser extension.
Kopernio	Clarivate Analytics				Browser extension

Open Research Metrics & Related Tools

Altmetric Tools

	Name	Supplier	Subscription	Free/Free version	Free Plug-in/API	Embedded in:
	Altmetric.com	Digital Science	  	 		Dimensions; Repositories: Journal articles/data -bases
	PlumX	Elsevier				SciVal; Journal articles/data -bases
	Kudos					Application Website

TCD Research Support System (CRIS) : integrated research information



Data currently captured by the RSS CRIS (1 of 2)

Field	Data/description	Notes
Personal details	photo, name, title, gender, college address, contact details, ORCID number, website/s	Only ORCID & website/s are editable, all else is imported from and is editable only at source, not the RSS.
Media Directory	Sign up & additional contact details plus keywords for the Communication Office Media Directory	Optional. Supplies data to the Communication Office
Biography	Text-based narrative	Freetext
Teaching	Text-based narrative	Freetext
Description of Research Interests	Text-based narrative	Freetext
Entrepreneurial ventures	Text-based narrative	Freetext
Philanthropic ventures	Text-based narrative	Freetext
Services to discipline/society	Text-based narrative	Freetext
Qualifications	List with specific fields & dates	Structured list with dates
Representations	External to College. List with specific fields & dates.	Structured list with dates

Data currently captured by the RSS CRIS (2 of 2)

Outreach Activities	Breakdown/list of events etc.	Freetext
Administrative Functions	List with specific fields & dates	Structured list with dates
Service to College	Text-based narrative	Freetext
Memberships	List with specific fields & dates	Structured list with dates
Awards	List with specific fields & dates	Structured list with dates
Education	List with specific fields & dates	Structured list with dates
Languages	Standardised multiple choice pick list	Structured list
Affiliations	To research centres, institutes etc. Multiple choice pick list	Multiple choice from standardised list of centres/institutes.
Employment	List with specific fields & dates	Structured list with dates
Conferences Organised	List with specific fields & dates	Freetext
Collaborations	Text-based narrative	Freetext
Themes	College research themes. Multiple choice pick list	Multiple choice from standardised list
Keywords	Research Prioritisation Exercise fields / Draft National Research Classification fields. Multiple choice pick list	?
Tags	Personal choice	?
Projects	Includes submissions, status and collaboration data	?
Publications	Includes broad list of research works, includes links, open access & collaboration data	?

And that's not all!

New Ways of Capturing and Reporting information via TCD RSS & related tools

- **Civic engagement**
- **School themes**
- **UN Sustainable Development Goals**
- **Collaborations**
- **Interdisciplinarity**
- **National/International Leadership**
- **Public Patient Involvement**
- **Altmetrics (News, Social media mentions)**
- **Open Scholarship metrics**

- **Reviewer Activity**
- **Supervisory Activity**
- **Innovation (patents, licences, consultancies)**
- **Public policy engagement**
- **Public policy mentions**
- **Research Impact Case Studies**
- **Research Impact (Campus Engage)**
- **Creativity / creative practice**
 - > **Full range of multimedia & creative arts practice works are included**
 - > **Specially developed Creativity App**

Spotlight on Collaborations



Collaborations

Source: TCD RSS (Individual Researcher Generated) AND external tools: Scopus, Web of Science, Altmetrics
In the RSS: can be applied to: Individuals; Research Works; Projects; Collaborations; Student Dissertations
In Scopus, Web of Science etc. can be applied to: Publications

Up until recently, reported mainly via co-authorship data, research office information.

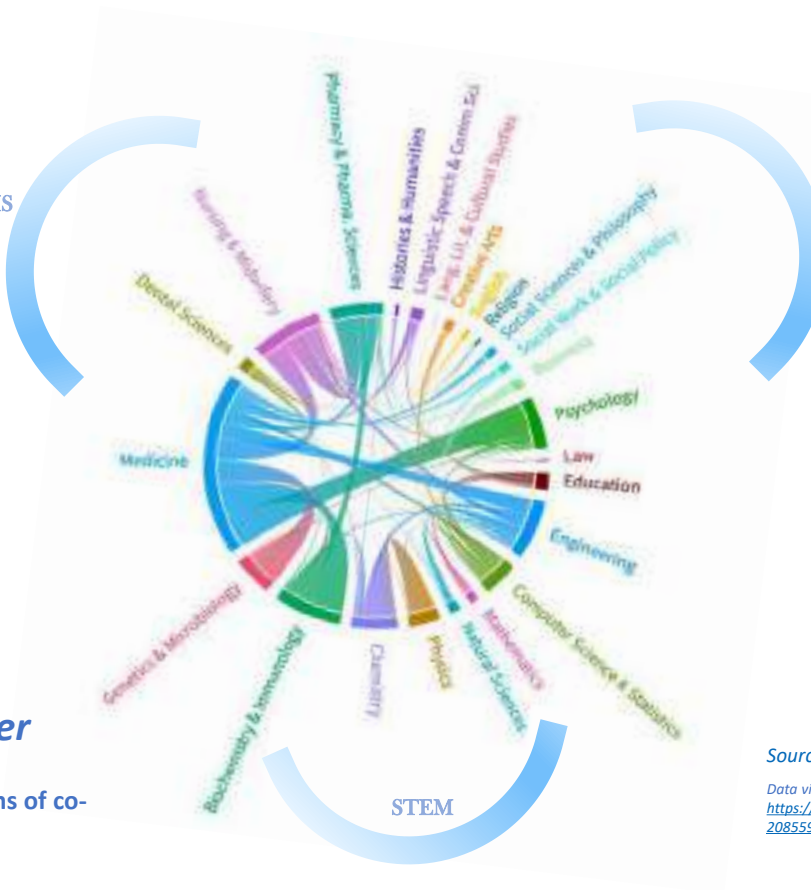
Now, about to be reported through the RSS (and the new RPAMS) – BUT requires content from researchers.

School of Medicine Collaborations (via co-authorship)



FHS

AHSS



Trinity Together

TCD Inter-School

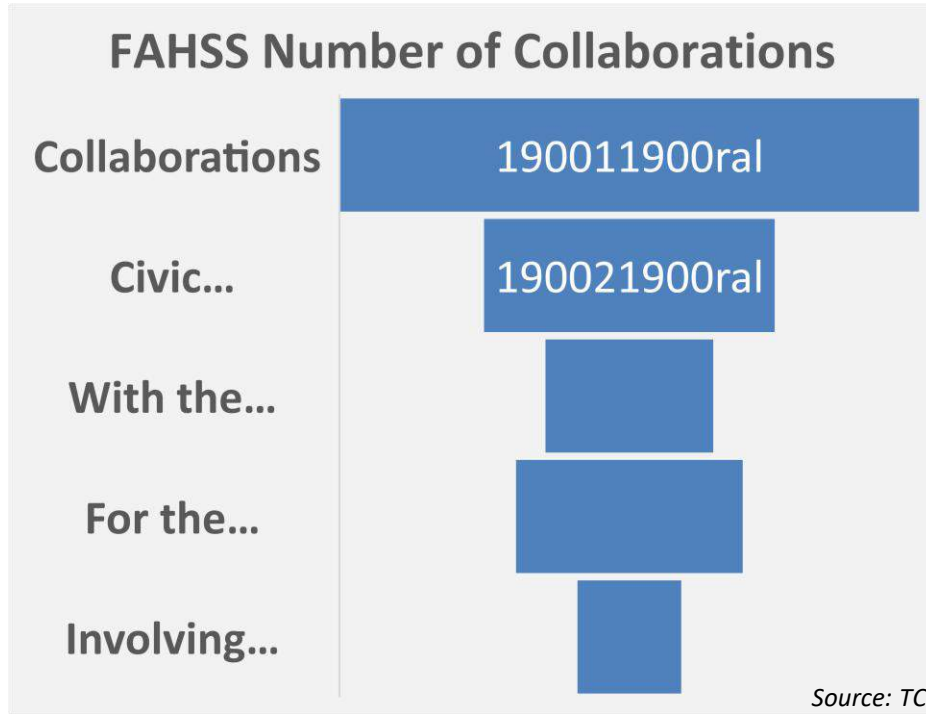
Collaborations in terms of co-authorship

2017-2021

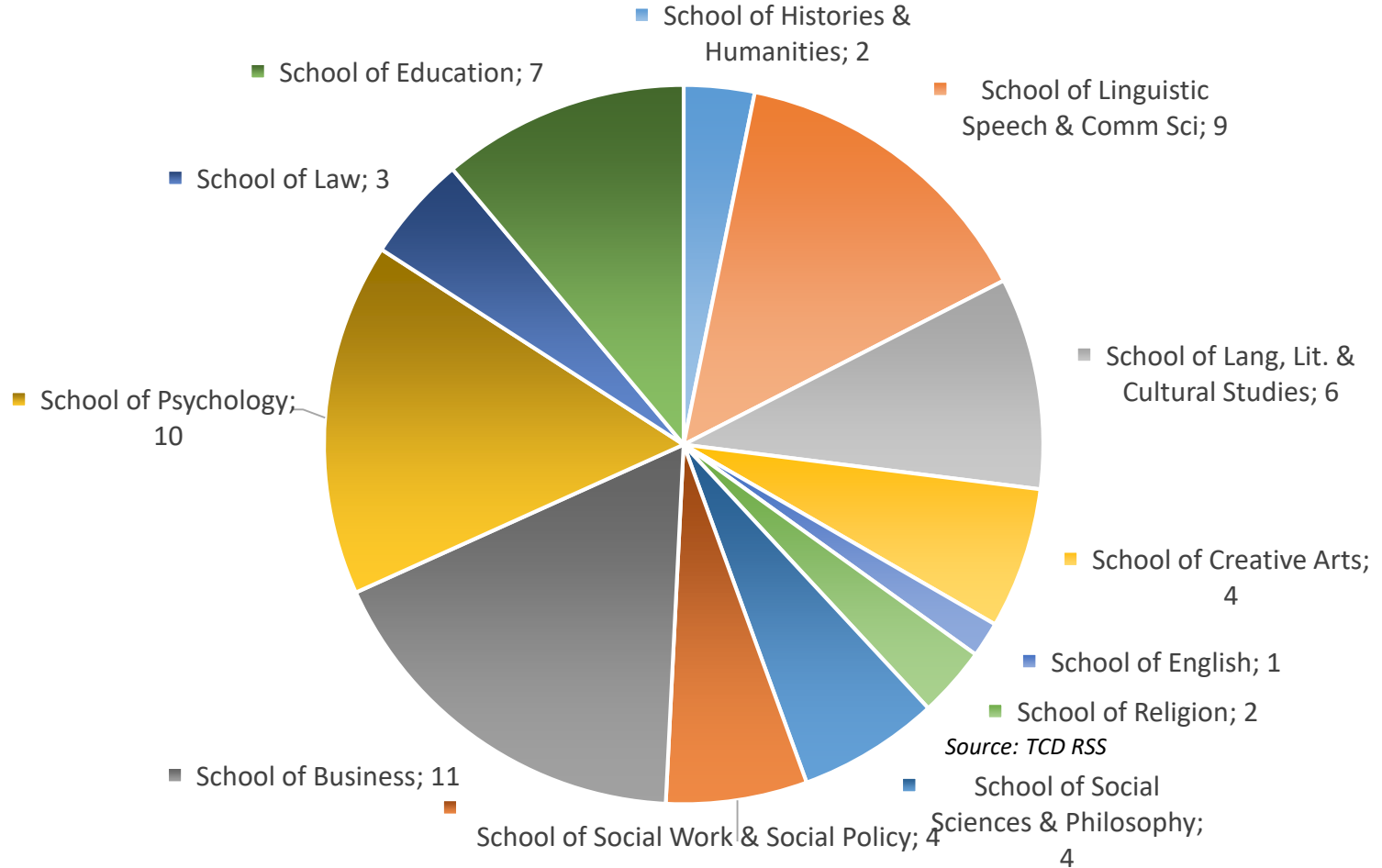
Source: TCD RSS

Data visualization: Flourish
<https://public.flourish.studio/visualisation/2085595/>

Civic / Societal Engagement



FAHSS Entrepreneurial Activity (by no. of people)



Spotlight on Public Policy Engagement



From TCD Strategic Plan:

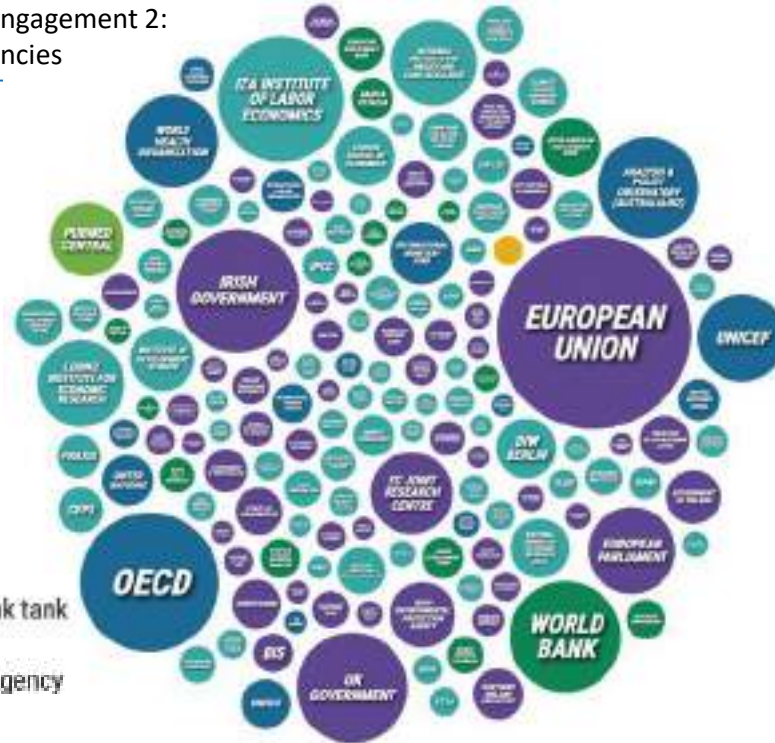
- 4.5 Systematically present **policy** relevant research to decision-makers through a host of seminars and workshops. (J, RES)
- 4.11 Leverage Trinity's central location in an EU capital city as a focus for social science research and outreach activities, bringing research impact and an evidence base to vital **policy** debates on growth, equality ethics and Ireland's position in a changing world. (DR, FWHSS)

FAHSS Public Policy Engagement 2: The Public Policy Agencies

3.5  7

-  Government
-  Think tank
-  Aggregator
-  Intergovernmental Agency

Interactive chart:
<https://public.flourish.studio/visualisation/12804317/>



Source: Overton & TCD RSS, based on TCD author ORCIDs

FAHSS Schools Public Policy Engagement 1
1,061 publications cited by 417 policy sources in 52 countries



Source: Overton & TCD RSS, based on TCD author ORCIDs

Spotlight on the UN Sustainable Development Goals

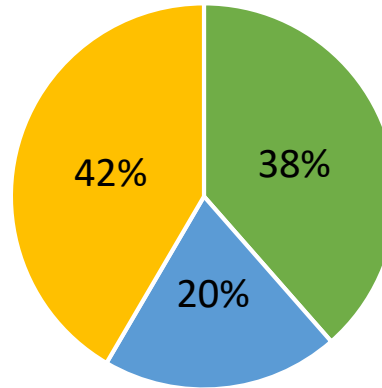


From TCD Strategic Plan:



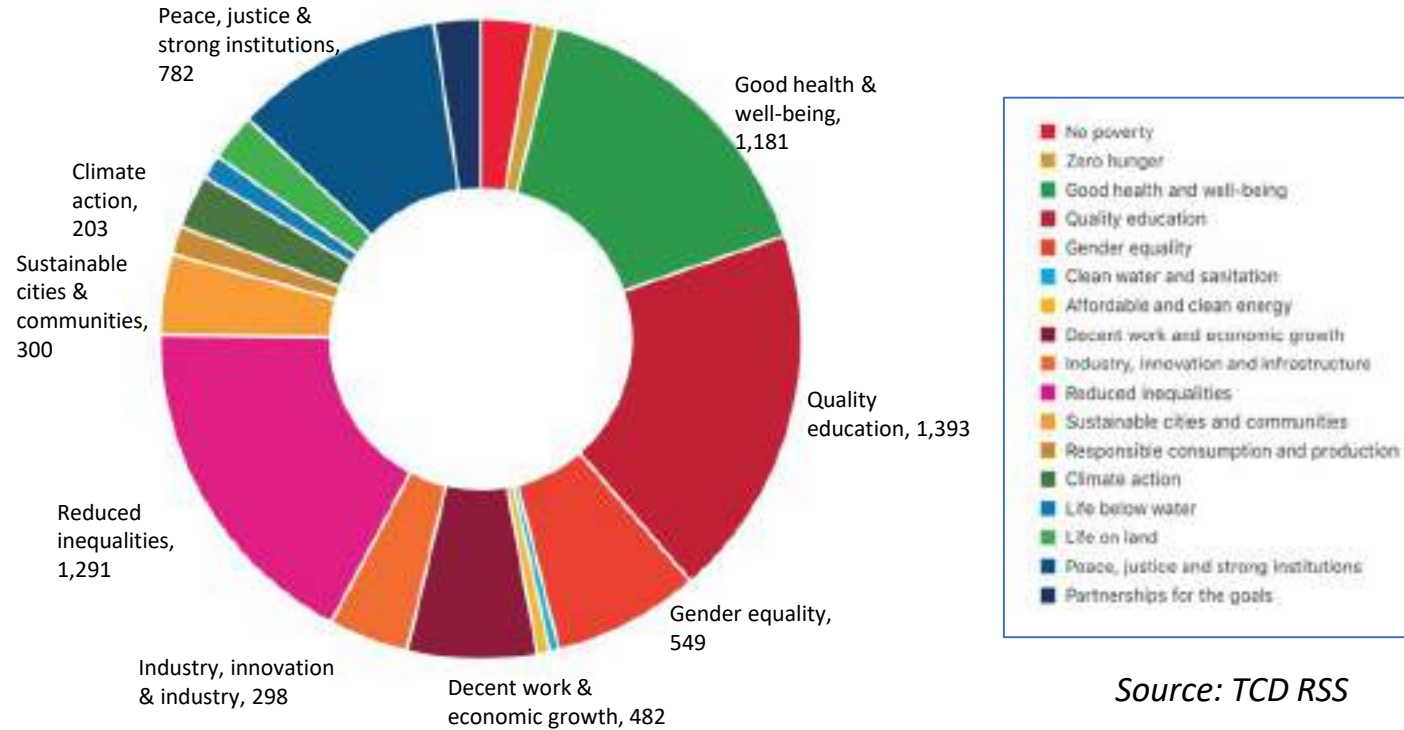
5.5 Support and conduct civically-engaged research thereby increasing the number of research outputs connected to UN SDGs by 20% by 2025. (LAES; SST)

% of TCD publications addressing U.N. SDGs

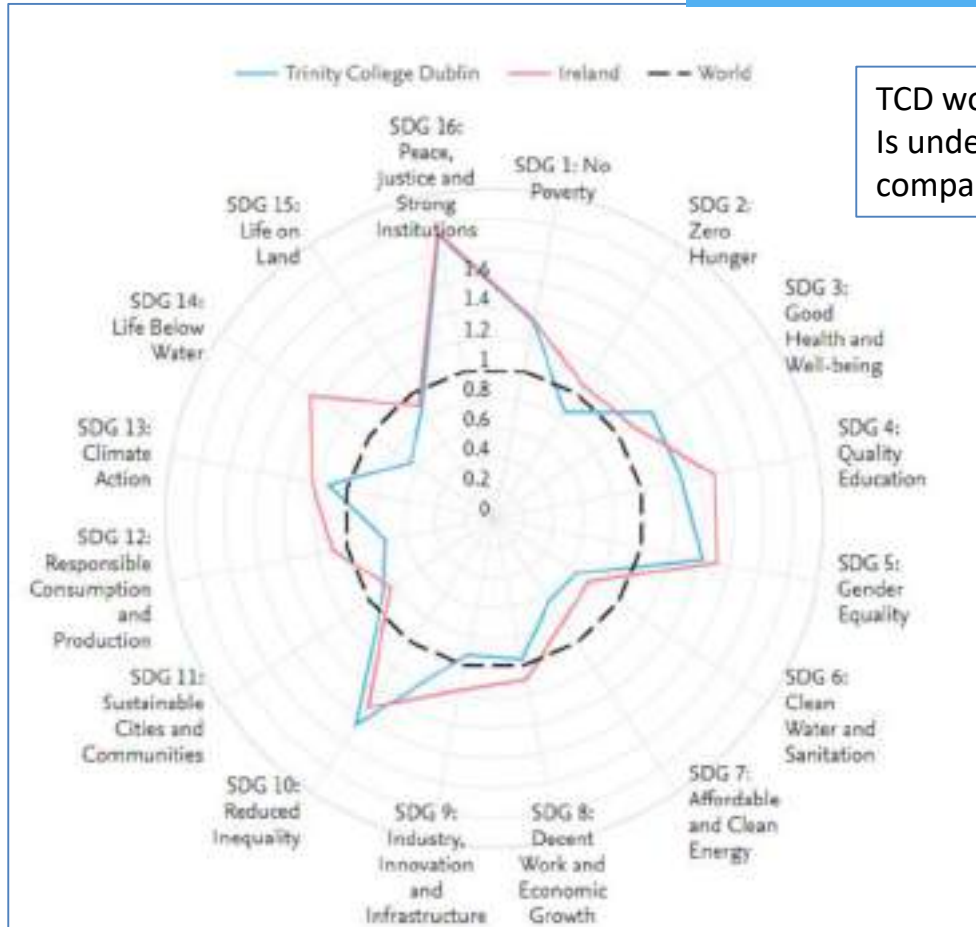


- Arts, Humanities and Social Sciences
- Science, Technology, Engineering and Mathematics
- Health Sciences

Source: TCD RSS



ALL SDGs	No Poverty	Zero hunger	Good health & well-being	Quality education	Gender equality	Clean water and sanitation	Affordable and clean energy	Decent work and economic growth	Industry innovation and infrastructure	Reduced inequalities	Sustainable cities & communities	Responsible consumption and production	Climate action	Life below water	Life on land	Peace, justice and strong institutions	Partnerships for the goals
7387	192	88	1181	1393	549	35	47	482	298	1291	300	106	203	89	178	782	173



TCD work addressing U.N. SDGs is under-represented in SciVal compared with TCD RSS data

Spotlight on Gender

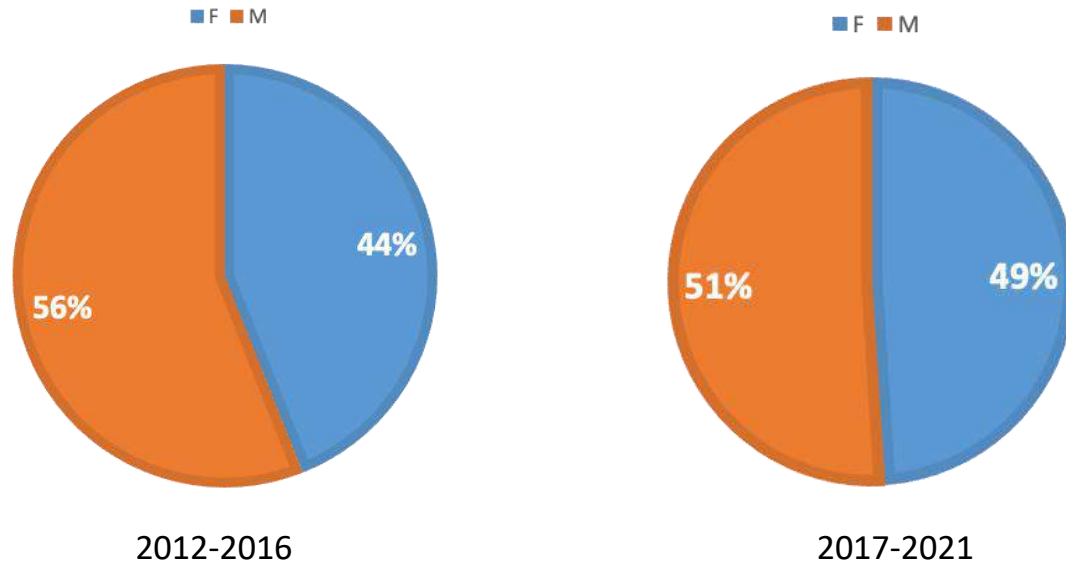


From TCD Strategic Plan:

— ● ● — 5.9 Achieve an Athena SWAN Silver award by 2025. [AS]

— ● ● — 5.10 Integrate the SAGE Charter for gender equality into our policies and practices by 2021. [AS]

FAHSS Publications by Gender



The number of publications by women increased by 19% in the past 5 years

Source: TCD RSS

www.tara.tcd.ie/handle/2202/35637

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TARA
Trinity's Access to Research Archive

TARA / School of Histories and Humanities / History / History (Scholarly)

Search

Search TARA
This Collection
Advanced Search

BROWSE

All of TARA

Academic/Research Units & Collections

Titles

Authors

Date of Publication

Subjects

Sponsor

This Collection

Titles

Authors

1641 Depositions: Sh

OPEN ACCESS

TRINITY COLLEGE DUBLIN

File Type:
PDF

Item Type:
Impact case study

Date:
2020

Author:
Christeffer, Jane
De Moura Rocha Lima, Giovanna
O'Siochru, Michael
Bowman, Sarah
Purten, Eve

Access:
openAccess

Research Impact Case Study



1641 Depositions: Sharing Our History, Building a Legacy

The 1641 Depositions provide the chief evidence for the bloody sectarian slaughter that the 1641 Rebellion began with a massacre of Protestant settlers in Ireland. As some of the most controversial documents in Irish history, the depositions have been regarded by propagandists, politicians and historians, and the discrepancies surrounding them have never been satisfactorily resolved. As a result, they have been avoided or skimmed in the most published and talked about Irish histories.

The 1641 Depositions Project made publicly available, online, a unique and unparalleled source of information for the first and mainly non-academic, 1641 Rebellion web for the social, economic, cultural, religious and political history of seventeenth-century Ireland, England and Scotland. The project has revolutionised our understanding of how controversial events are recorded and remembered. In doing so, it has made a contribution to the on-going process of reconciliation in Ireland and become a topical digital humanities project for others to learn from.

This project showcases Trinity's expertise in writing and curating digital collections. Our research teams enhance workflows, ensuring the preservation and preservation of wisdom. We promote new research opportunities and encourage public scholarship to address societal challenges.

Trinity Long Research Arts Academics Research Institute

PROFESSOR ANDREW O'NEILL
Professor John O'Connell
Professor Michael J. Smith
Professor John Horrell
Professor Thomas Dalton
Professor John Clarke

TRINITY COLLEGE DUBLIN
School of Histories and Humanities, The Library of Trinity College Dublin

COLLABORATIONS
University of Cambridge, UK
University of London, UK
Trinity, ADP

FUNDING
Irish Research Council on the Humanities, Research & Innovation Office of Trinity College Dublin

SUBJECT AREAS
History, English, Geography, Library, Linguistics, Language and Literature, Computer Science, Information Science

IMPACT KEYWORDS
Cultural Heritage, Innovative Technologies, Paper Binding, Knowledge Exchange, Open Access



Add Impact information when adding/editing a publication or other research output

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The University of Dublin

Research Support System

Menu Portal Home Portal Help Log

Impact Page Home

Met	Thesis	UR/SSA	Supervisor	IMPACT	Keywords	Tags	Progress	Actions
Identifiers	Language	Source	Related File		Share	Tags	0 Publications	CV

[Next Step >](#) [Cancel](#)

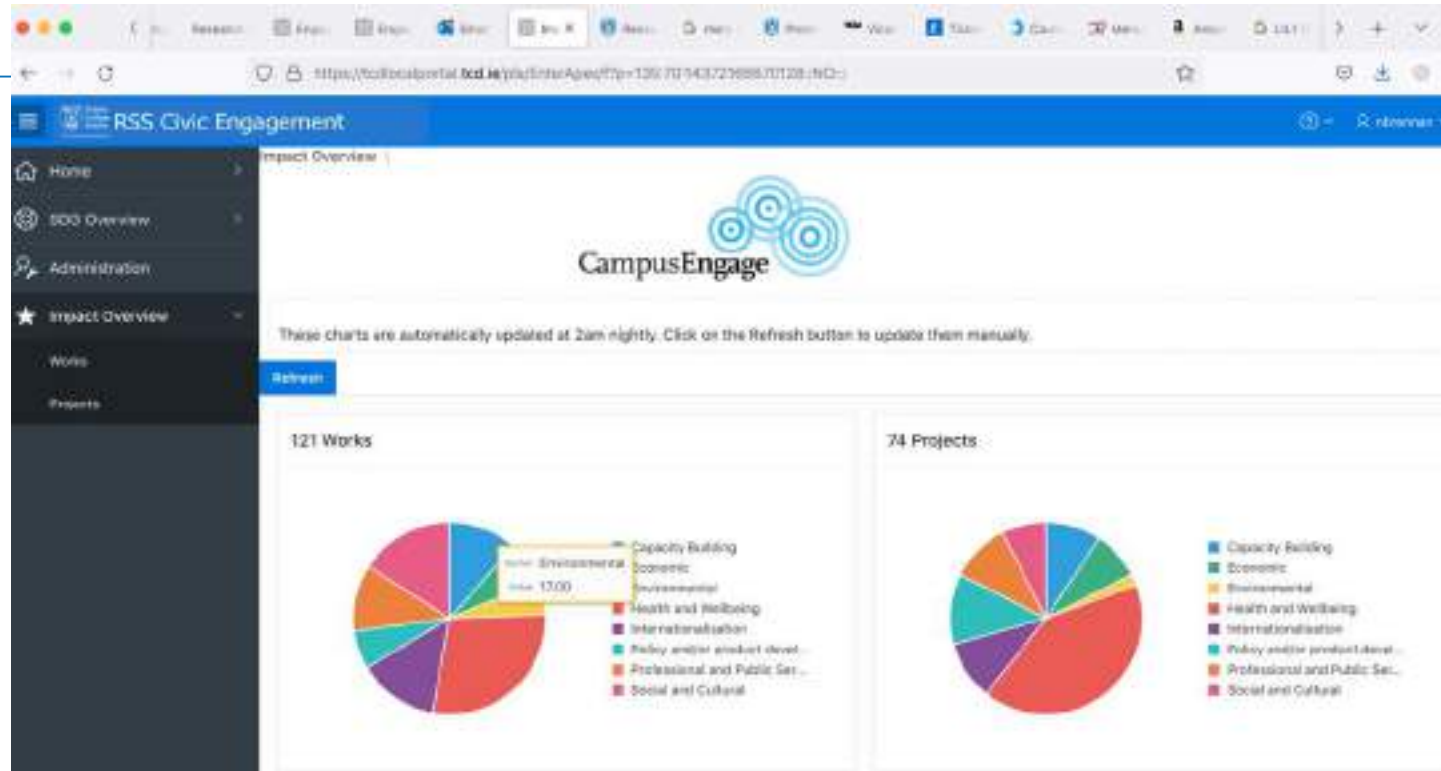
[Click here to access the Campus Engage Impact Framework](#)

Indicate how "xxx" aligns with the Campus Engage Impact Framework.

- Capacity Building benefits to individuals, organisations or communities through education, training, skills or social capital are positively affected
- Economic benefits relating to businesses or other organisations whose activity helps create jobs and revenue, in developing the conditions and environment to sustain productive economic activity or to advance long term cost savings due to improved practices and processes
- Environmental benefits to the natural and built environment with its ecosystem services, together with societies, individuals or groups who benefit as a result
- Health and Wellbeing benefits to individuals, groups or targeted populations whose health and wellbeing outcomes have been improved or enhanced, or where potential harm has been mitigated
- Internationalisation benefits to researchers or research stakeholders from improved international reputation and engagement and reputation
- Policy and/or product development benefits to individuals or groups from professional, governmental and non-governmental organisations and charities and groups through policy changes or behavioural practice
- Professional and Public Services benefits to public and private organisations or individuals involved in the development and delivery of professional services through policy changes or behavioural practice
- Social and Cultural benefits to individuals, organisations or communities whose quality of life, knowledge and/or equality is positively affected through creative practice, performance and increased cultural understanding

Description

TCD Impact Overview





Open Science Metrics

Open Science Metrics: beyond hits and downloads



Open Science metrics can track usage of research from:

- Other Universities
- Government depts;
- NGOs
- Industry
- Schools
- Citizen Scientists / the public

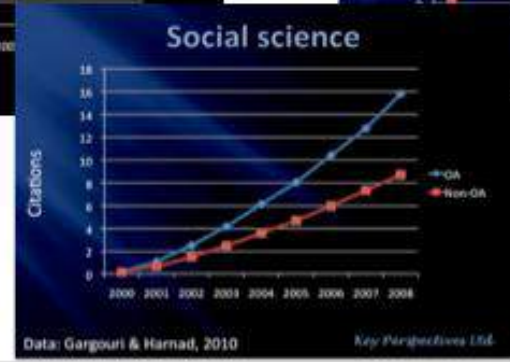
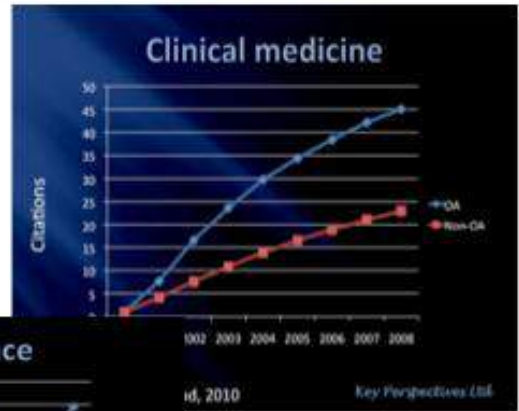
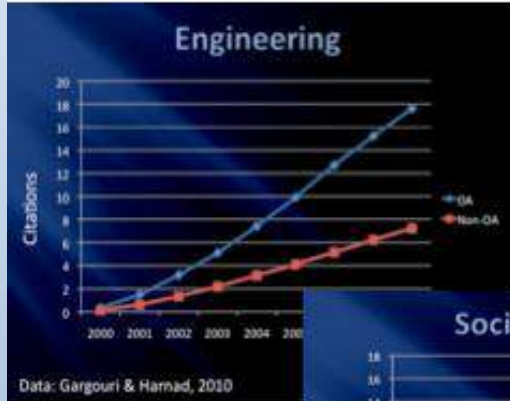
Components of the Open Access advantage

General OA advantage: the advantage that comes from citable articles becoming available to audiences that had not access to them before, and who would find them citable

Early Advantage: the earlier an article is put before its worldwide potential audience may affect subsequent citation patterns

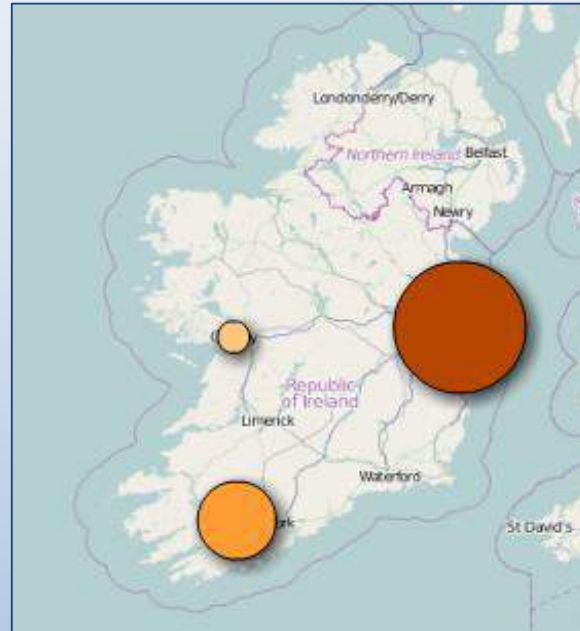
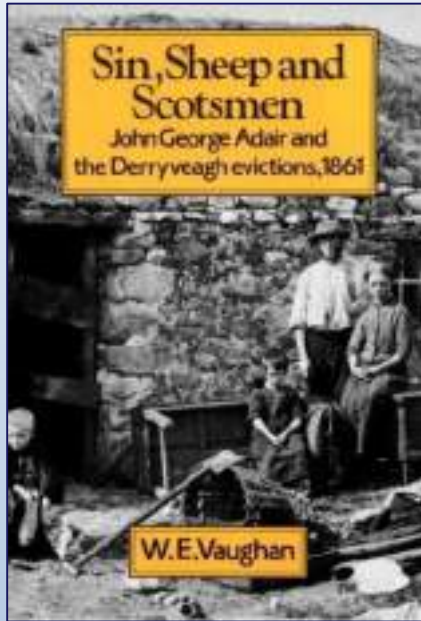
Selection Bias: authors make their better articles open access more readily than their poorer articles

Quality Advantage: better articles gain more from the General OA Advantage because they are by definition more citable than poorer articles



Key Perspectives Ltd.

Local 'Impact Intelligence' through Open Access

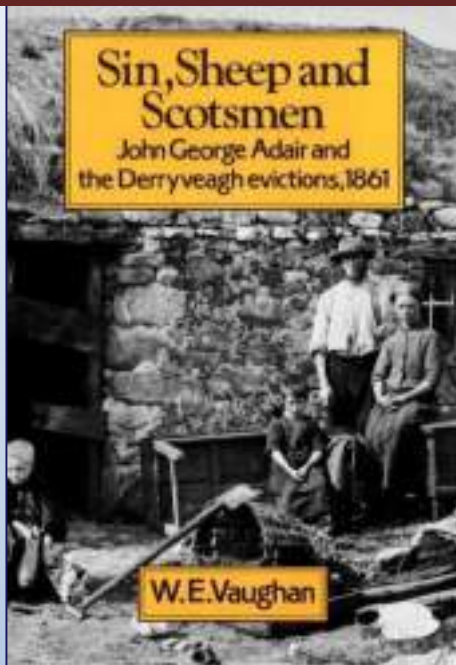


Web Analytics reveal the Irish *universities* using 'Sin, Sheep and Scotsmen'*

- TCD
- UCC
- NUIG

* Book available on Open Access through TARA: <http://www.tara.tcd.ie/handle/2262/39635>

Local 'Impact Intelligence' through Open Access



Web Analytics reveal the Irish *schools* using 'Sin, Sheep & Scotsmen'*

- Clondalkin, County Dublin
- Leixlip, County Kildare
- and...
- Letterkenny, Co. Donegal

* Book available on Open Access through TARA: <http://www.tara.tcd.ie/handle/2262/39635>



Evaluation of Research Careers fully acknowledging Open Science Practices

Rewards, incentives and/or recognition for researchers
practicing Open Science

Written by the Working Group on Rewards under Open Science
July - 2017

researcher
researcher

- What if you were to include Open Science metrics in your institutions's research reporting and staff assessment processes?
- What would those metrics look like?
- How feasible would they be to implement?

https://ec.europa.eu/research/openscience/pdf/os_rewards_wgreport_final.pdf

Open Science Career Assessment Matrix (OS-CAM)*Open Science activities**Possible evaluation criteria***RESEARCH OUTPUT****Research activity**

Pushing forward the boundaries of open science as a research topic

PublicationsPublishing in open access journals
Self-archiving in open access repositories**Datasets and research results**Using the FAIR data principles
Adopting quality standards in open data management and open datasets
Making use of open data from other researchers**Open source**Using open source software and other open tools
Developing new software and tools that are open to other users**Funding**

Securing funding for open science activities

RESEARCH PROCESS**Stakeholder engagement / citizen science**Actively engaging society and research users in the research process
Sharing provisional research results with stakeholders through open platforms (e.g. Arxiv, Figshare)
Involving stakeholders in peer review processes**Collaboration and Interdisciplinarity**Widening participation in research through open collaborative projects
Engaging in team science through diverse cross-disciplinary teams**Research integrity**Being aware of the ethical and legal issues relating to data sharing, confidentiality, attribution and environmental impact of open science activities
Fully recognizing the contribution of others in research projects, including collaborators, co-authors, citizens, open data providers**Risk management**

Taking account of the risks involved in open science

SERVICE AND LEADERSHIP**Leadership**Developing a vision and strategy on how to integrate OS practices in the normal practice of doing research
Driving policy and practice in open science

	Being a role model in practicing open science
Academic standing	Developing an international or national profile for open science activities Contributing as editor or advisor for open science journals or bodies
Peer review	Contributing to open peer review processes Examining or assessing open research
Networking	Participating in national and international networks relating to open science
RESEARCH IMPACT	
Communication and Dissemination	Participating in public engagement activities Sharing research results through non-academic dissemination channels Translating research into a language suitable for public understanding
IP (patents, licenses)	Being knowledgeable on the legal and ethical issues relating to IPR Transferring IP to the wider economy
Societal impact	Evidence of use of research by societal groups Recognition from societal groups or for societal activities
Knowledge exchange	Engaging in open innovation with partners beyond academia
TEACHING AND SUPERVISION	
Teaching	Training other researchers in open science principles and methods Developing curricula and programs in open science methods, including open science data management Raising awareness and understanding in open science in undergraduate and masters' programs
Mentoring	Mentoring and encouraging others in developing their open science capabilities
Supervision	Supporting early stage researchers to adopt an open science approach
PROFESSIONAL EXPERIENCE	
Continuing professional development	Investing in own professional development to build open science capabilities
Project management	Successfully delivering open science projects involving diverse research teams
Personal qualities	Demonstrating the personal qualities to engage society and research users with open science Showing the flexibility and perseverance to respond to the challenges of conducting open science

Open Science Activities	Possible Evaluation Criteria	Type	Indicator
RESEARCH OUTPUT			
Research activity	Pushing forward the boundaries of open science as a research topic	Qualitative	Peer review / Self-reporting via CRIS
Publications	Publishing in open access journals Self-archiving in open access repositories	Quantitative	Publication metrics: OA monitoring via selection of sources.
Datasets and research results	Using the FAIR data principles. Adopting quality standards in open data management and open datasets Making use of open data from other researchers	Quantitative	FAIR metrics tool (in development); Publication metrics: data citation.
Open source	Using open source software and other open tools. Developing new software and tools that are open to other users	Quantitative	Self-reporting via CRIS.
Funding	Securing funding for open science activities	Quantitative	OS classification of projects req'd . Reporting via CRIS/award management systems.
RESEARCH PROCESS			
Stakeholder engagement/ citizen science	Actively engaging society and research users in the research process. Sharing provisional research results with stakeholders through open platforms (e.g. Acxiv , Flashare) involving stakeholders in peer review processes.	Qualitative & quantitative	Self-reporting via CRIS Review / Peer review
Collaboration and interdisciplinarity	Widening participation in research through open collaborative projects Engaging in team science through diverse cross-disciplinary teams	Quantitative	'interdisciplinarity classification' of projects req'd . Reporting via CRIS/award management systems.
Research integrity	Being aware of the ethical and legal issues relating to data sharing, confidentiality, attribution and environmental impact of open science activities. Fully recognizing the contribution of others in research projects, including collaborators, co-authors, citizens, open data providers.	Qualitative	Accredited training undertaken. More?
Risk management	Taking account of the risks involved in open science	Qualitative	

Analysis* of the metrics from the Open Science Career Assessment Matrix.

Green = immediately implementable
Peach = may take longer

Analysis* of the metrics from the Open Science Career Assessment Matrix.

Green = immediately implementable
Peach = may take longer

Leadership	Developing a vision and strategy on how to integrate OS practices in the normal practice of doing research. Driving policy and practice in open science.	Qualitative & quantitative	Impact case studies (policy impact)
Academic standing	Being a role model in practicing open science. Developing an international or national profile for open science activities. Contributing as editor or advisor for open science journals or bodies.	Qualitative & quantitative	Publication metrics; editorships
Peer review	Contributing to open peer review processes. Examining or assessing open research.	Quantitative	Self-reporting via CRIS
Networking	Participating in national and international networks relating to open science.	Quantitative	Self-reporting via CRIS
RESEARCH IMPACT			
Communication and Dissemination	Participating in public engagement activities.	Quantitative	Self-reporting via CRIS
IP (patents, Biomas)	Sharing research results through non-academic dissemination channels. Translating research into a language suitable for public understanding. Being knowledgeable on the legal and ethical issues relating to IPR. Transferring IP to the wider economy.	Qualitative & quantitative	Training undertaken (certified & accredited)
Societal impact.	Evidence of use of research by societal groups. Recognition from societal groups or for societal activities.	Qualitative	Impact case studies (societal impact); Self-reporting via CRIS.
Knowledge exchange.	Engaging in open innovation with partners beyond academia.		Impact case studies (economic impact); Self-reporting via CRIS.
TEACHING AND SUPERVISION			
Teaching	Training other researchers in open science principles and methods. Developing curricula and programs in open science methods, including open science data management. Raising awareness and understanding in open science in undergraduate and masters' programs.	Qualitative & quantitative	OS classification of courses (2025); Reporting via CRIS.
Mentoring.	Mentoring and encouraging others in developing their open science capabilities.	Qualitative & quantitative	Self-reporting via CRIS.

Supervision.	Supporting early stage researchers to adopt an open science approach.	Qualitative & quantitative	Self-reporting via CRIS.
PROFESSIONAL EXPERIENCE			
Continuing professional development.	Investing in own professional development to build open science capabilities.	Quantitative	Training undertaken (certified & accredited);
Project management.	Successfully delivering open science projects involving diverse research.	Qualitative	Peer review
Personal qualities.	Demonstrating the personal qualities to engage society and research users with open science. Showing the flexibility and perseverance to respond to the challenges of conducting open science	Qualitative	Peer review.

Analysis* of the metrics from the Open Science Career Assessment Matrix.

Green = immediately implementable
Peach = may take longer

Responsible metrics are defined by the following key principles
(outlined in [The Metric Tide](#)):

- **Robustness** – basing metrics on the best possible data in terms of accuracy and scope
- **Humility** – recognising that quantitative evaluation should support, but not supplant, qualitative, expert assessment
- **Transparency** – that those being evaluated can test and verify the results
- **Diversity** – accounting for variation by research field, and using a range of indicators to reflect and support a plurality of research and researcher career paths across the system
- **Reflexivity** – recognising and anticipating the systemic and potential effects of indicators, and updating them in response



[https://www.at2oa.at/en/Report%20\(AT20A-OA-Monitoring-Workshop,%202018%2004%2009\).pdf](https://www.at2oa.at/en/Report%20(AT20A-OA-Monitoring-Workshop,%202018%2004%2009).pdf)

Re

Keep it as simple as possible!

Recommendations

In the early stage of the deployment of a national Open Access monitoring strategy, it is crucial not to be overambitious and to keep the scope of the project as simple and unpretentious as possible. Hence, a strategy only covering publication data that

1. can be identified unambiguously via a DOI;
2. has been published in a journal;
3. is peer-reviewed;
4. is not a contribution to a conference

has been consented on as a viable option in the early stage of development.

Open Access Monitoring – Approaches and Perspectives

2-Day-Workshop, 09–10 April 2018, Vienna

Open Science Activities	Possible Evaluation Criteria	Type	Indicator
RESEARCH OUTPUT			
Publications	Publishing in open access journals Self-archiving in open access repositories	Quantitative	Publication metrics: OA monitoring via selection of sources.
Research Integrity	Being aware of the ethical and legal issues relating to data sharing, confidentiality, attribution and environmental impact of open science activities. Fully recognizing the contribution of others in research projects, including collaborators, co-authors, citizens, open data providers.	Qualitative & quantitative	Certified, accredited training undertaken. More?
SERVICE AND LEADERSHIP			
Leadership	Developing a vision and strategy on how to integrate OS practices in the normal practice of doing research. Driving policy and practice in open science	Qualitative & quantitative	Impact case studies (policy impact)
Academic standing	Being a role model in practicing open science. Developing an international or national profile for open science activities. Contributing as editor or advisor for open science journals or bodies.	Qualitative & quantitative	Publication metrics: editorships
Peer review	Contributing to open peer review processes. Examining or assessing open research.	Quantitative	Publons; HRB Open Research; Other sources. Methodology to be established.
RESEARCH IMPACT			
Societal impact.	Evidence of use of research by societal groups Recognition from societal groups or for societal activities.	Qualitative	Impact case studies (societal impact); Altmetrics Self-reporting via CRIS.
Knowledge exchange.	Engaging in open innovation with partners beyond academia		Impact case studies (economic impact); Possibly Altmetrics ; Self-reporting via CRIS.
PROFESSIONAL EXPERIENCE			
Continuing professional development.	Investing in own professional development to build open science capabilities.	Quantitative	Certified, accredited training



Further analysis of the metrics from the 'Open Science Career Assessment Matrix'. Showing only elements implementable now .

What we can monitor now (and how we can do it)

- Publication metrics % of OA journals, defined;
 - Certified, accredited training, CPD Research Integrity; FAIR Data Principles ...
- Then ...*
- Impact Case Studies Leadership/Policy Impact; Societal Impact; Knowledge Exchange.
 - Altmetrics; Usage statistics Leadership/Policy Impact; Societal Impact; Knowledge Exchange
- Possibly:*
- Reporting: DMP deposit; Shared data; Data citations

Conclusions on Next Generation & Open Science Metrics

- > Next Generation metrics and Open Science metrics are relatively new, appear 'messy', and are by no means fully accepted by the research community (= cultural change).
- > They have a strong correlation with societal impact monitoring.
- > They need to be defined and implemented by employers and funders.
- > It is not currently possible/feasible to easily implement all of the Open Science Career Assessment Matrix metrics ...
- > ... **but** it is possible, right now, to report on some of them, using existing resources and methodologies.
- > These include publication metrics, impact case studies and training certification and reporting.
- > Institutions and funders need to build these into their recruitment, training, promotion and reward practices – and keep it simple!





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