



"Designing ecosystems to enable a *reformed research assessment*  
and *recognition of open science*"

...

"QUEST Seminars on Responsible Research" - QUEST

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# Measures based on bibliometrics

- Bibliometric indicators suppose that the **quality** of a particular article is **reflected by the frequency of its citations** in other articles
- **Citation-based** metrics are all recognized metrics, but they give a **partial view** of the research
- Impact factor/Citescore, Field-Weighted measures, ... it all boils down to **citations**

Technologies were created in the last decades to support citational measures

# Caveats for (bibliometric) indicators

- **Quantitative** evaluation should support **qualitative**, expert assessment: peer-review, not only data
- Variation in **fields** of research.
- Recognize the **systemic effects** of assessment and indicators.
- Actually, **similar criticism** can be made to **any kind of indicators**, not only bibliometric indicators!

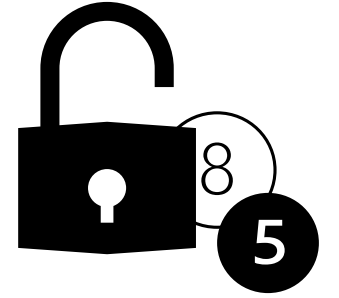


**Responsible indicators, transparent  
metrics and fair evaluation**

# Research assessment is changing

- National and international policies whose aim is a more **comprehensive research assessment**
- At many levels:
  - UNESCO Recommendation on Open Science RDA groups and initiatives
  - EU commission for Innovation, Research, Culture, Education and Youth, ...
  - Science Europe
  - European University Association
  - RDA groups and initiatives
  - COARA: Coalition for Advancing Research Assessment for research, researchers and research performing orgs.
  - ....
- Value **activities associated with openness**, among others.

# Responsible Research & Open Science indicators



- In the last years, there is a **growing interest** in Open Science in many scientific communities
- Open science has emerged as a **powerful trend** in research policies everywhere
- OS indicators **aim to provide data and insight needed to support the implementation** of these policies.
- Assess **the impact in OS in several ways** (FAIR data, reproducibility of experiments, sharing datasets, open access to publications, ...)

# New ecosystems

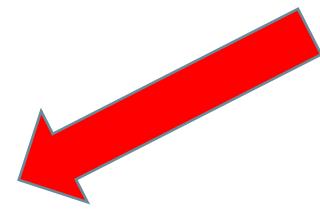
- Need of new **ecosystems** able to **embrace the many research aspects** that should be part of an assessment
- Need of new ecosystems that are made of both:
  - **governing aspects & policies**
  - **enabling technologies and infrastructures**



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**AS HAPPENED FOR  
CITATIONAL INDICATORS!**



# New ecosystem: *"policies & guidelines"*

- **Policies and guidelines:** needed by both management and researchers to understand the importance of responsible assessment, including OS and data/code sharing
- Scientists and institutional management need to be **personally involved**
- OS is not a bureaucratic burden or **yet another metric:** benefits and implication of OS for research

Uptake of OS practices and responsible approaches to (assessing) research



# New ecosystem: "*enabling technologies*"

- New measures means that **actual technologies and tools** to compute those measures are needed
- Understanding how OS data are collected and put together is key: which **metrics are relevant?**
- Designing a right ecosystem must consider which **metrics are computable** with the data, tools and systems at hand.
- Tools bring **benefits** also **beyond evaluation purposes**: scientists see and recognize the importance of OS

Recognition and monitoring

# Synergy among existing systems

A new ecosystem must **leverage from existing systems**:

- **Augment** paper's metadata in bibliographic databases and other sources of information (e.g., Open Science, Altmetrics, ...)
- **Metadata** of any kind should be accessible **programmatically**
- Follow solid implementation processes and grant **sustainability of the ecosystem**
- Rely on the **specific features** and tools of a given institutional environment



**...IT case study**

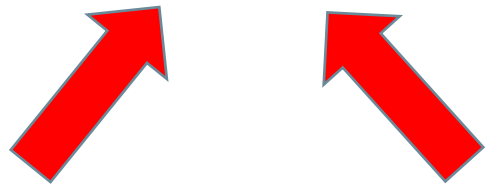
# Comprehensive approach in IIT

Recognition of many metrics: **not just** publications and bibliometrics! On our way to add OS metrics...

Peer review, panels of experts, evaluation procedures are **supported by several indicators**, including:

- Grants won and funding statistics
- Patents & Technology-transfer
- Industrial partnership and start-ups
- Awards, Editorship, Training courses, ....
- Dissemination activities
- Open Science metrics

IIT



# IIT enabling technologies

- Collective effort to **make institutional systems interoperate** (HR, Technology Transfer, Projects and Grants Office, publications' metadata repository, ...)
- **Development of a platform** to collect and show **all the research-related aspects**, similar to a CRIS (Current Research Information System): **SCIENTILLA**
- Effective **data mining and data visualization** of data from heterogenous sources



# Our CRIS: SCIENTILLA

- **Scientilla** - open source : ) - Tool developed to be **useful** to our researchers **AND** to the management
- Place to **keep track of and manage** research output (publications, fund raising, tech transfer, awards, dissemination, ...) and edit their **profile/group information** (HR infos, cv-like entries, ...).
- **Overview** of activities at several **aggregation levels**: researchers, research groups, .... and centres.

The screenshot shows a web browser window displaying the SCIENTILLA user profile for Ugo Moschini. The browser address bar shows 'scientilla.iit.it/#/profile'. The page header includes the SCIENTILLA logo, the user's name 'Ugo Moschini', and a 'Logout' button. The profile page is divided into several sections:

- Left sidebar:** Contains navigation options: 'Verified', 'Drafts', 'External', 'Accomplishments + Add', 'Projects', 'Patents', and 'Training modules + Add'.
- Profile header:** Features a circular profile picture, the name 'Ugo Moschini', and his roles: 'Research Administrative - Data Scientist | Data Manager', 'Data Analysis Office - Research Organization Directorate', and 'PHD, MSc'.
- About section:** Contains a biographical text: 'In 2010, I obtained a MSc in Computer Science from the University of Pisa, Italy. In 2009 - 2011, I worked at the European Space Agency Research and Technology Centre in The Netherlands (ESTEC) and the ESA Operations Centre in Germany (ESOC) supporting university satellite operations and developing a patented method to compress satellite housekeeping telemetry in real-time, now flying on-board of spacecraft missions. In 2016, I obtained a PhD in Computer Science at the Intelligent Systems group of the Johann Bernoulli Institute for Mathematics and Computer Science at the University of Groningen, The Netherlands, working on image and data analysis tools, with application to astronomical data sets. In 2017, I started to work at the Data Analysis Office of the Italian Institute of Technology (IIT). I carry out data analysis, visualization and modeling of the IIT research and administrative activities to gain insights about the scientific production and research performance, with a focus on Information Systems (CRIS), service'.
- Export section:** Lists exportable data types with checkboxes: 'Basic Information \*', 'Socials', 'About me', 'Experiences', 'Education', 'Certificates', 'Skills', 'Documents', 'Accomplishments', and 'Invited talks'. A note below states: '\* You can override the basic information with just text, therefore you have to go to "Edit profile" via "My profile" → "My profile" → "Export only".'

# Development of Scientilla-core application

- Scientilla code is [open-source](#) on Github
- However, Scientilla is very much [tailored to the IIT ecosystem](#) of tools (HR systems, Funding and Tech Transfer Offices, ...)



In the frame of a funded project with the Italian National Research Council, it is planned to [develop a “modular” Scientilla](#), *adaptable* to the systems an institute would have on its premises

# SCIENTILLA's strengths

- It contains **reliable** and **trusted** data (**certified** by the researchers)
- It contains **accessible** and **exportable** data and metadata, fetched (also) automatically from internal and external systems.
- Scientilla **charts and indicators** allow researchers to get acquainted with bibliometric indicators enabling **transparency**.
- Integration with the **IIT website** and **IIT People pages**.

**Next addition: keep track of OS aspects!**

# Our ecosystem wants to help the scientists

- Scientists **know** what the institute knows about them and can fix wrong information: **transparency**
- Thanks to RDM activities, the **scientist is not left alone** in dealing with OS and OA aspects: **training and courses** given about our tools together with **active support** for researchers for sharing dataset properly - according to the **FAIR** principles -, preparing DMPs,...
- Scientists **are involved** when **evaluation activities** takes place



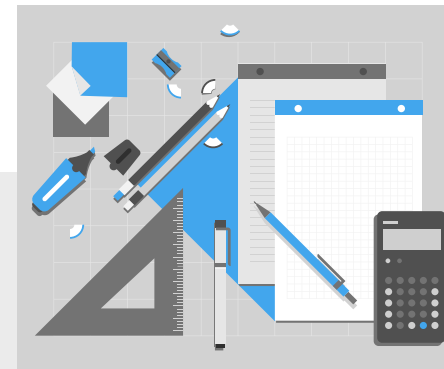
Next addition: keep track of OS aspects!





# Adding OS and OS measures

- **Ongoing work** to add Open Science measures in the current ecosystem
- Design dashboard first and foremost with an **informative purpose** for both management and scientists: raise awareness
- Try to consider all the **multifaceted aspects of OS**. Ideas: open access publications breakdown, show open data, link open code, FAIR assessment, breakdown of repositories used, open educational resources, ...
- Important to **link scholarly output to shared datasets**: it's all part of research activities, seeing them together helps!





# Integrating OA links

- Open Access versions of the **scientific papers are automatically fetched** using an integration with **OpenAIRE**
- Links to papers shown on **IIT public website**.



*Moschini U., Fenaldi E., Dan*  
**A comparison of three  
their citing papers**  
Scientometrics, vol. 125, (n  
DOI 10.1007/s11192-020-03

Article Journal 

 ZENODO  
 Crossref  
 UnpayWall



# Ideas for adding OS metrics into our systems

- Researchers should be able to link the scientific production stored in Scientilla with information about the **research datasets (and other products) shared in each paper**
- Design dashboards **tailored on the exact activity** of the research group/researcher, first and foremost with an *informative* purpose
- All the **multifaceted** aspects of OS are considered: OA publishing, the kind of datasets, the licenses used to share a dataset, ...
- Study of and participation in ongoing work about the **development of OS measures, OS dashboards, and ways to improve the assessment**



**...actions taken**

# Boosting the IIT ecosystem

1. IIT **joined** the **CoARA** (CoAlition for Advancing Research Assessment) and signed the Agreement
2. A **collaboration** started in early 2023 between **IIT and the QUEST Center for Responsible Research** at the Berlin Institute of Health.
3. **Skills4EOSC** - Horizon Europe - *Skills for the European Open Science Commons: Creating a Training Ecosystem for Open and FAIR Science:*
  - although not directly related with assessment, it will **contribute to the uptake of FAIR and Open Data practices** providing support, professionalization, and resources to a variety of stakeholders.

# New or adapted policies: CoARA and IIT

- **CoARA**: global coalition of research funding organisations, research performing organisations, national, regional assessment authorities, learned societies, ... to **advancing research assessment**
- IIT is a **signatory** also of the CoARA Agreement, based on **10 commitments**, establishes a common direction for research assessment (work of the European University Association and Science Europe, pushed by the EC).
- As member of CoARA, IIT is **defining its action plan** with milestones to enable systemic reform of assessment practices, implementing **mutual learning** with Working Group and National Chapters.
- **Charité, BIH** and **my institute** are **members** of CoARA :)



# Enabling techs: collaboration with QUEST

*Collaboration established in early 2023 under a [BUA fellowship for incoming Visiting Fellows](#) (collaboration with Evgeny Bobrov, Vladislav Nachev, Anastasiia Iarkaeva)*

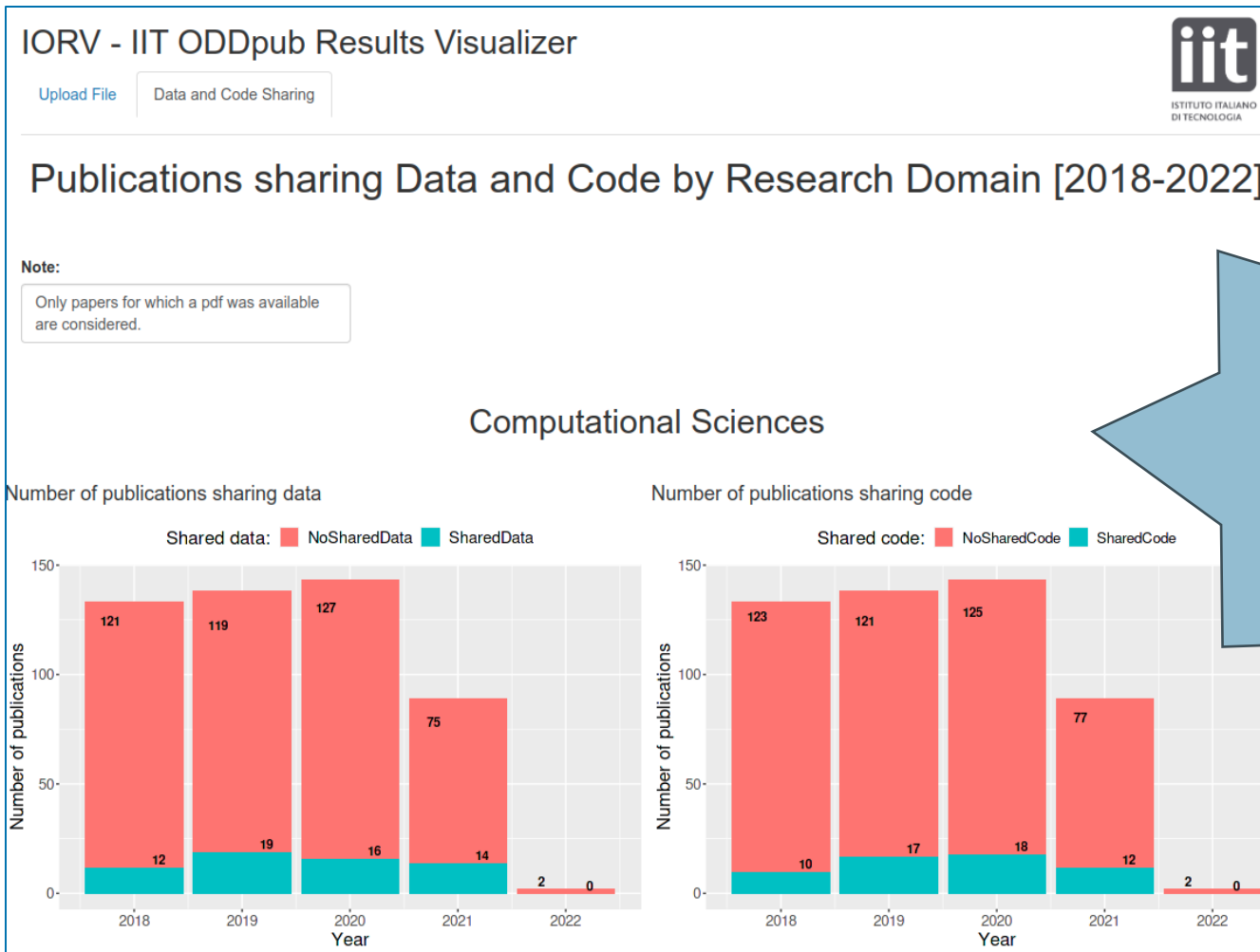
- Reusing workflows and codes ([ODDpub](#) in particular) developed at QUEST in a different scenario, applied on [my institute's scientific fields](#)
- [QUEST: transferability](#) of their knowledge and technologies – possibly leading to improvements of the methods
- [IIT](#): advancement in developing [pilot dashboards](#) related to data sharing/responsible metrics
- [Proof-of-concept](#) useful for both institutes

# Enabling techs: collaboration with QUEST

The [experiment](#) so far:

- The scientific activity of the Italian Institute of Technology is divided into [four Research Domains](#) (Computational Sciences, Lifetech, Nanomaterials and Robotics): breakdown by research area
- Used [ODDPub](#) to [screen publications](#) downloaded via the DOIs of the papers as extracted from Scientilla profiles of our Research Domains, looking for [shared datasets](#) and [shared code](#)
- The output of the ODDPub execution was [shown for consultation in a R dashboard](#)

# Enabling techs: collaboration with QUEST





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Next steps related to our collaboration:

- Acquire(d) a [larger set of papers](#) (+55%, thanks also to scripts provided by QUEST)
- Add(ed) more [data journals](#) to ODDpub, to find out those journals that usually publish datasets
- [Experiments](#) with the [updated ODDPub](#) source code on which QUEST worked on in the last weeks
- Expansion to [open code recognition](#) and [validation](#) of the results
- [Integrate](#) the output of the [ODDPub PDFs screening](#) in our CRIS [Scientilla](#)

# Conclusions

- A reformed assessment that includes adoption and recognition of OS measures and practices can only be achieved through **governing & policies aspects** and new **enabling technologies**
- Put forward ideas and plans for setting up **new institutional ecosystems** for research assessment
- Importance of **reaching out** and **participating in initiatives** (CoARA, RDA WGs, ...), working groups, national and european projects, networking, ...
- The experiments with **ODDPub**: the **first time that such kind of monitoring** is being tried at IIT.

Thank you for your time,  
the discussion can start!



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