Common practices in transnational research, ICT case and challenges
Why do we need Open Science?
The researcher perspective
How does Science work today?
Berry’s World

“He didn’t publish, so he perished.”
Why do we spend public money to close the research results behind limited access subscriptions scientific journals?
Research Evaluation
Based on bibliometric indexes
number of citations
Impact Factor
H-index...
It’s all about Journals!
What are we missing?
… a great part of researchers work

Negative results
Data
Algorithms
Processes
Software
Methodologies
Educational Resources

Peer-review
Grey Literature
Project proposals
Leadership skills
Product development
…
Why do Researchers need Open Science?
# The Stick and the Carrot of Open Science

## Requirements
- Compliance with policies (funder, institutional)
- Journal publishers requirements
- Demonstrate responsible practice (improve integrity and validation of results)

## Benefits
- Keep research safe and secure (through the deposit in a trustworthy repository)
- Increase research efficiency
- Make research outputs more visible
- Enable collaboration (within or outside a specific discipline)
Current Open Science Practices in the ICT Domain
Software management tools

- GitHub is a development platform
- Based on collaborative environment (community)
- Allows to share software and collaborative develop projects, improve, request reviews, test, and share

GitHub is how people build software

We're supporting a community where more than 40 million* people learn, share, and work together to build software.

With Github you do not publish your software!

CHIST-ERA Workshop on Open Science in Transnational Research | Bern | 6 march 2020
What is missing?

GitHub does not allow to

- Publish your software (in the academic sense),
- Preserve your software,
- Make your software findable,
- Give attribution,
- Make your software citable.

To do all this a repository and a unique persistent identifier (DOI) are needed.
Zenodo

- Zenodo is a catch all repository developed thanks to a collaboration with CERN and OpenAIRE
- Zenodo provides free DOI to make the software citable and give credit to the developers/contributors
- By making the software citable, you make it findable
- Additional researchers can then use the same software for different purposes, leading to credit for the developers
- Citation of specific software used is necessary for reproducibility, although not sufficient.
What Else?
Software Heritage

An international initiative to preserve software
Software Papers

- Software papers are written to **describe** software and are based on the same principles of Data Papers.
- The DOI attached to the article makes it **citable**.
- **However the software itself should be cited on the same basis as any other research product.**
- If a software paper exists and it contains results (performance, validation, etc.) that are important to the work, then the software paper should also be cited (in addition to the software).
Software Reproducibility
An experiment is reproducible until another laboratory tries to repeat it.

Alexander Kohn
Reproducibility

Is (still) a principle of the Scientific Method!
Slide by Prof. Carol Goble, “Reproducibility and Scientific Research: why, what, where, when, who, how”

* Adapted from Mesirov, J. Accessible Reproducible Research Science 327(5964), 415-416 (2010)
You can download our code from the URL supplied. Good luck downloading the only postdoc who can get it to run, though #overlyhonestmethods
Make software FAIR

- ORCID to identify the authors/contributors
- Develop in a structured – and collaborative/open – way (GitHub)
- Deposit and preserve in a trustworthy repository: get a DOI! (Zenodo)
- Choose a clear license
- Deposit a (updated) README file with your code
- Use versioning
- Link to other research objects (articles, data, …)
A step into the Future
A new research evaluation is coming…

- Based on Open Science and all the **FAIR objects** researchers produce
- Based on the **reuse** that (other) researchers will make of the FAIR products
- Based on the **links** research objects enable
- Researchers (and Funders) need to **prepare** for this

Make your research **FAIR today** if you wish to be evaluated tomorrow
OpenAIRE
Open Access infrastructure for OA in Europe
Funded by the EC since 2009
OpenAIRE collects data coming from 17,000 data providers, and builds a graph connecting research results, projects, institutions, funders, …
Content Providers 17,000
Publications 40,000,000
Projects 3,000,000
Datasets 10,000,000
Software 230,000
Funders 21
National Open Access Desks (NOADs)

Facts
- Research is global, support is local
- Diversity in culture & maturity of national/local infras
- Not one size fits all in OA and open science

Our pan-European network
→ 34 countries

Key national organizations
→ 4 area coordinators

Moving to OS

Linked to infras around the world

Courtesy of Natalia Manola, OpenAIRE
How OpenAIRE can help

- Provide **templates** for RFO policy
- Provide **support** to the researchers
- **Train the trainers** programme for Institutions and Funders
- **Monitoring** compliance: dedicated funder service
- Dedicated **services** for researchers to

Deposit and Preserve  Link  Anonymise  Actionable DMP

[Icons for Zenodo, ScholeXplorer, Amnesia, and ARGOS]
My take away messages for a funder policy

• If it is an obligation, make it **easy** and **clear**
• **Guide** your researchers
• **Train and inform** your researcher: make them like Open Science
• **Monitor** the compliance and **sanction** when necessary
• **Build on** successful stories and **learn from** unsuccessful ones
• **Embed** Open Science in your evaluation and review process
• **Align** as much as possible with existing policies to avoid confusion and duplication of efforts
Thank you!

Emma Lazzeri
emma.lazzeri@isti.cnr.it

CHIST-ERA Workshop on Open Science in Transnational Research Bern | 6 march 2020