The Open and Citizen Science Multiple

How openness and participation challenge scientific practice, institutions and power-relations.

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Citizen Science Summer School 2021 Zurich

"What science becomes in any historical era depends on what we make of it"

Sandra Harding

Open Science and Citizen Science

Open Science is generally understood as the opening of research processes and scientific findings.

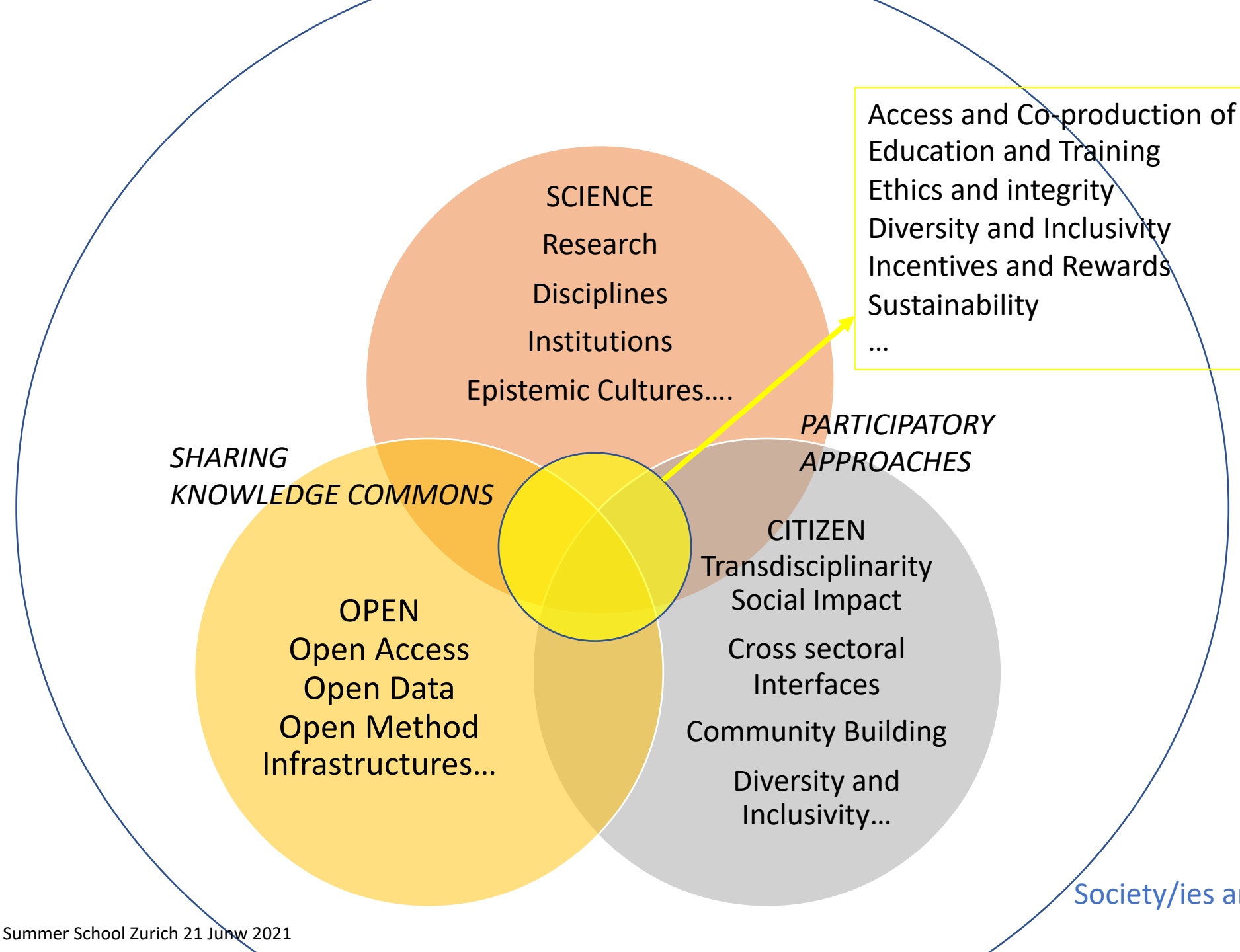
Citizen Science is a special form of opening science towards participation and deliberation.

https://eu-citizen.science

Open Science & Citizen Science as a Multiple

- The areas are not objectively defined and delineated, but are seen and negotiated differently by different actors, thus **defining different realities**. (Annemarie Mol 2002)
- As technologies of power that determine relations among humans, and nonhumans, scientific practices are not instances of neutral empiricism: they are **socially influenced and in turn affect social relations** (feminist STS)
- **Epistemic cultures**: diversity of scientific activities in different scientific fields, not only in methods and tools, but also in types of reasonings, ways to establish evidence, and relationships between theory and empiry, as well as hierarchies and power relations. (Karin Knorr-Cetina 1992)

Open and Citizen Science Multiple in Society



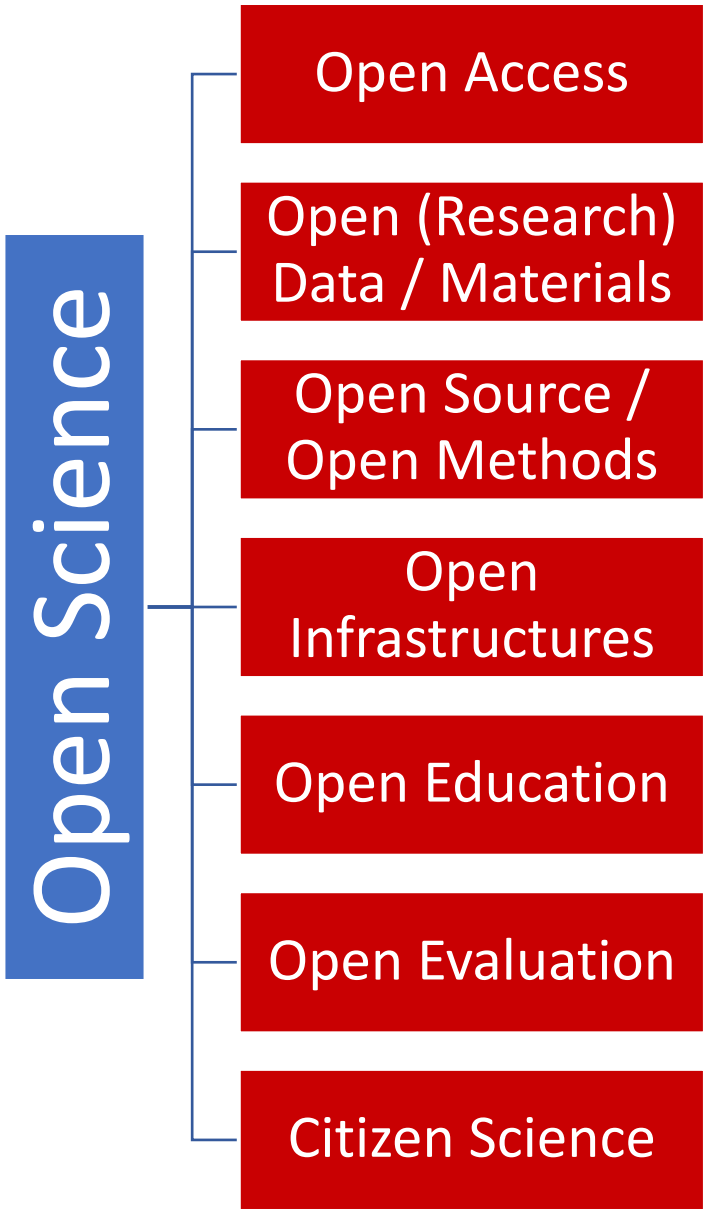
How openness and participation challenge scientific practice, institutions and power-relations…

The Open and Citizen Science Multiple

Why Open Science?

- Replication crisis
- Competitive and not cooperative practices
- Massification, competition, embargos, positivity bias → unproductivity
- Monopolized and expensive publication markets
- Privatization of infrastructures and problems of knowledge ownership / knowledge access
- Non-recognition of importance of knowledge commons outside of specialist communities
- Brain Drain and publish or perish...

Just some of the problems of the science system….



Open science is the idea that scientific knowledge of all kinds should be openly shared as early as is practical in the research process.

Open strategies in science share the following objectives

- sharing and collaboration
- transparency and reproducibility
- re-usability and new applications
- societal participation and feedback loops

How is openness envisioned and enacted in practices?

Sticker by Jon Tennant @protohedgehog and Melanie Imming @melimming

Open Science is not only **FOR** science
it is also **ABOUT** science

OPEN SCIENCE – OPEN CULTURE

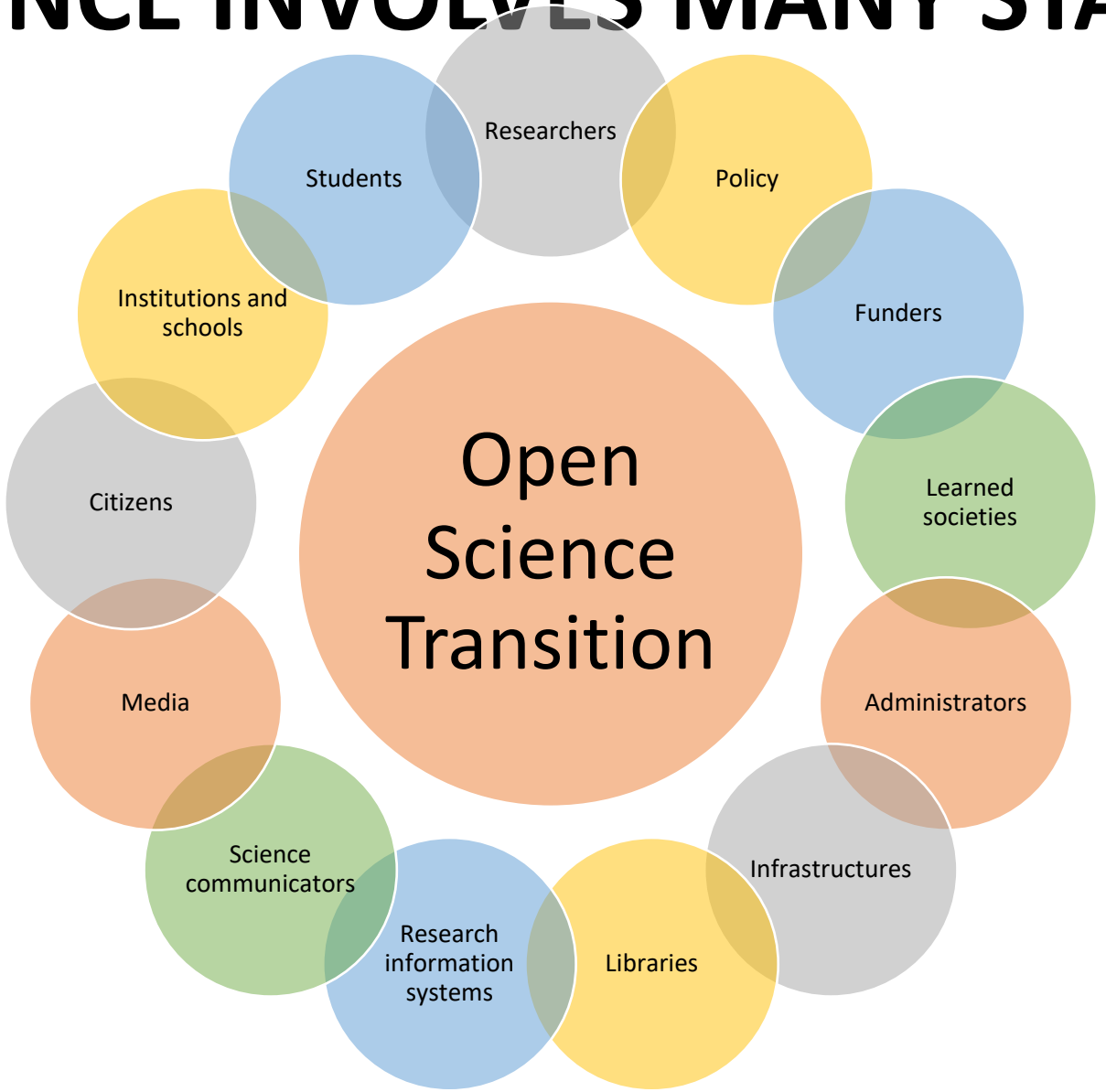
ORGANIZING OPEN SCIENCE

European Open Science Agenda

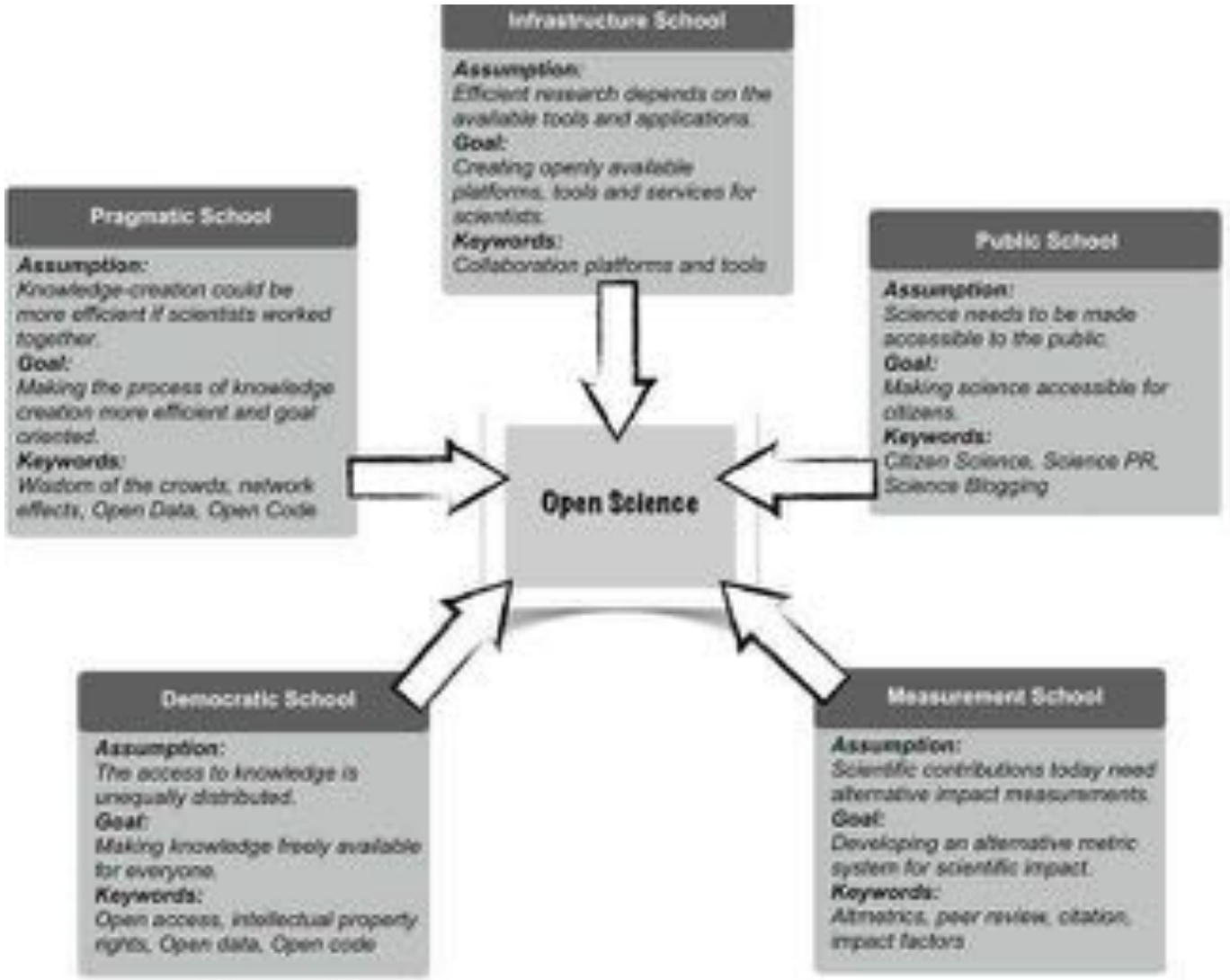
- Rewards and Incentives
- Research Indicators and Next-Generation Metrics
- Future of Scholarly Communication
- European Open Science Cloud
- FAIR Data
- Research Integrity
- Skills and Education
- Citizen Science

Taken from OSPP recommendations https://ec.europa.eu/research/openscience/pdf/integrated_advice_opspp_recommendations.pdf

DOING SCIENCE INVOLVES MANY STAKEHOLDERS



Open Science Schools of Thought



Fecher, B., & Friesike, S. (2014). Open science: one term, five schools of thought. *Opening science*, 17-47.

Vienna PRINCIPLES

a vision for scholarly communication

1 Accessibility
2 Discoverability
3 Reusability
4 Reproducibility
5 Transparency
6 Understandability
7 Collaboration
8 Quality Assurance
9 Evaluation
10 Validated Progress
11 Innovation
12 Public Good

https://viennaprinciples.org/

Open Science scepticism

Open for whom: balance and reciprocity

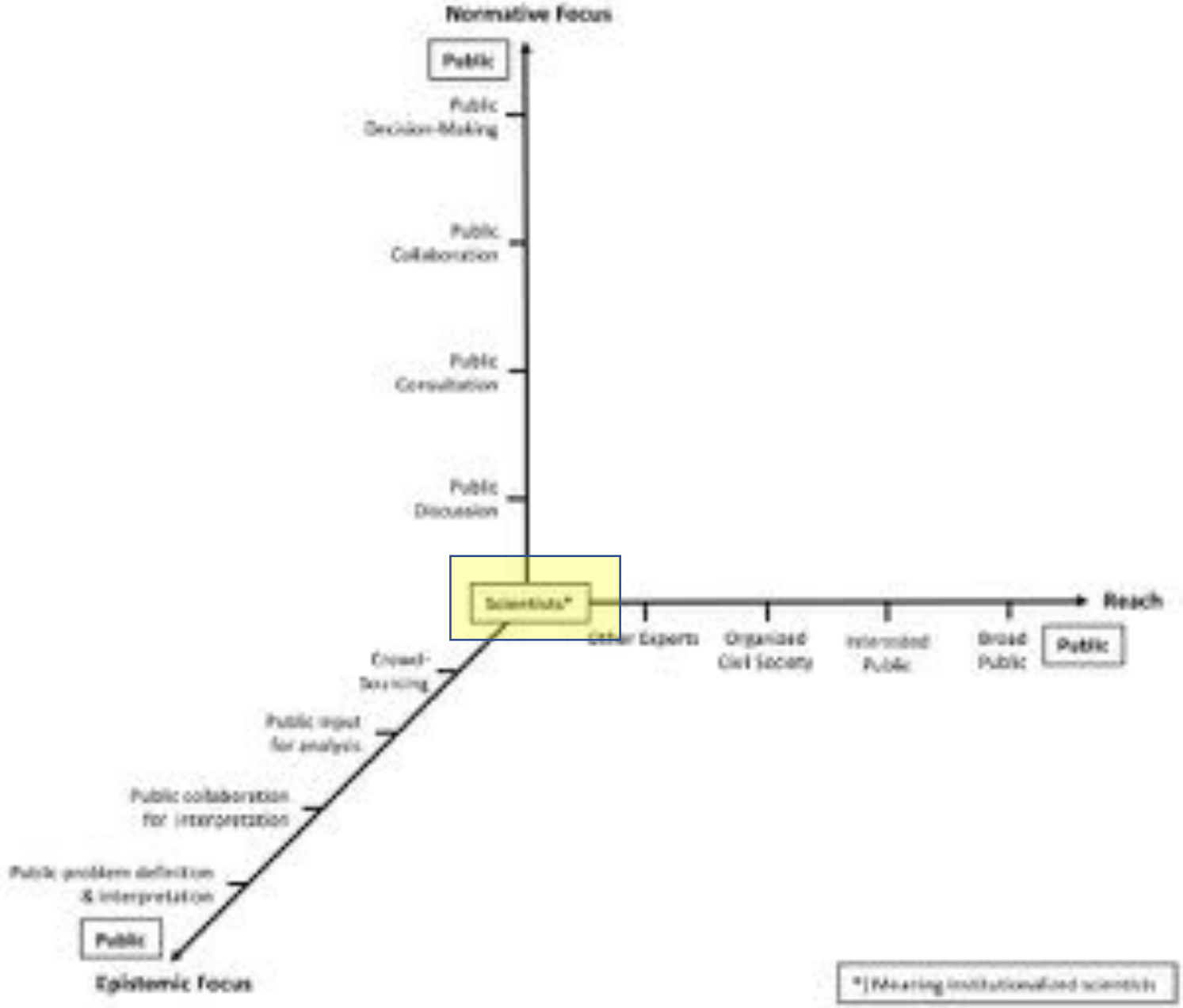
Re-engineering science along the lines of platform capitalism, under the misleading banner of opening up science to the masses (Mirowski 2018) “open washing”

Open is expensive: Open Access and Data as business models

Open data cemeteries, responsibilities, competition….

Open does not equal participatory, but it can become participatory….

Types of (traditional) participation in science



Schrögel, P. and Kolleck, A. (2019) "The Many Faces of Participation in Science: Literature Review and Proposal for a Three-Dimensional Framework", *Science & Technology Studies*, 32(2), pp. 77–99. doi: 10.23987/sts.59519

OPEN CULTURES

Open Science Dimensions

Amwayi, J., Okune, A., Chan, L., Hillyer, B., Albornoz, D., & Posada, A. (2018). Open and collaborative science in development network-final report: catalyzing open and collaborative science to address development challenges.

Challenges to scientific practices

Engaging with

Access and Co-production of knowledge

Education and Training

Incentives and Rewards

Ethics and integrity

Diversity and Inclusivity

Sustainability

….

Open Access

Open Access to publications means that research publications like articles and books can be accessed

- online,
- free of charge by any user,
- with no technical obstacles (such as mandatory registration or login to specific platforms).

At the very least, such publications can be read online, downloaded and printed. Ideally, additional rights such as the right to copy, distribute, search, link, crawl and mine should also be provided.

https://open-science-training-handbook.gitbook.io/book/open-science-basics/open-access-to-published-research-results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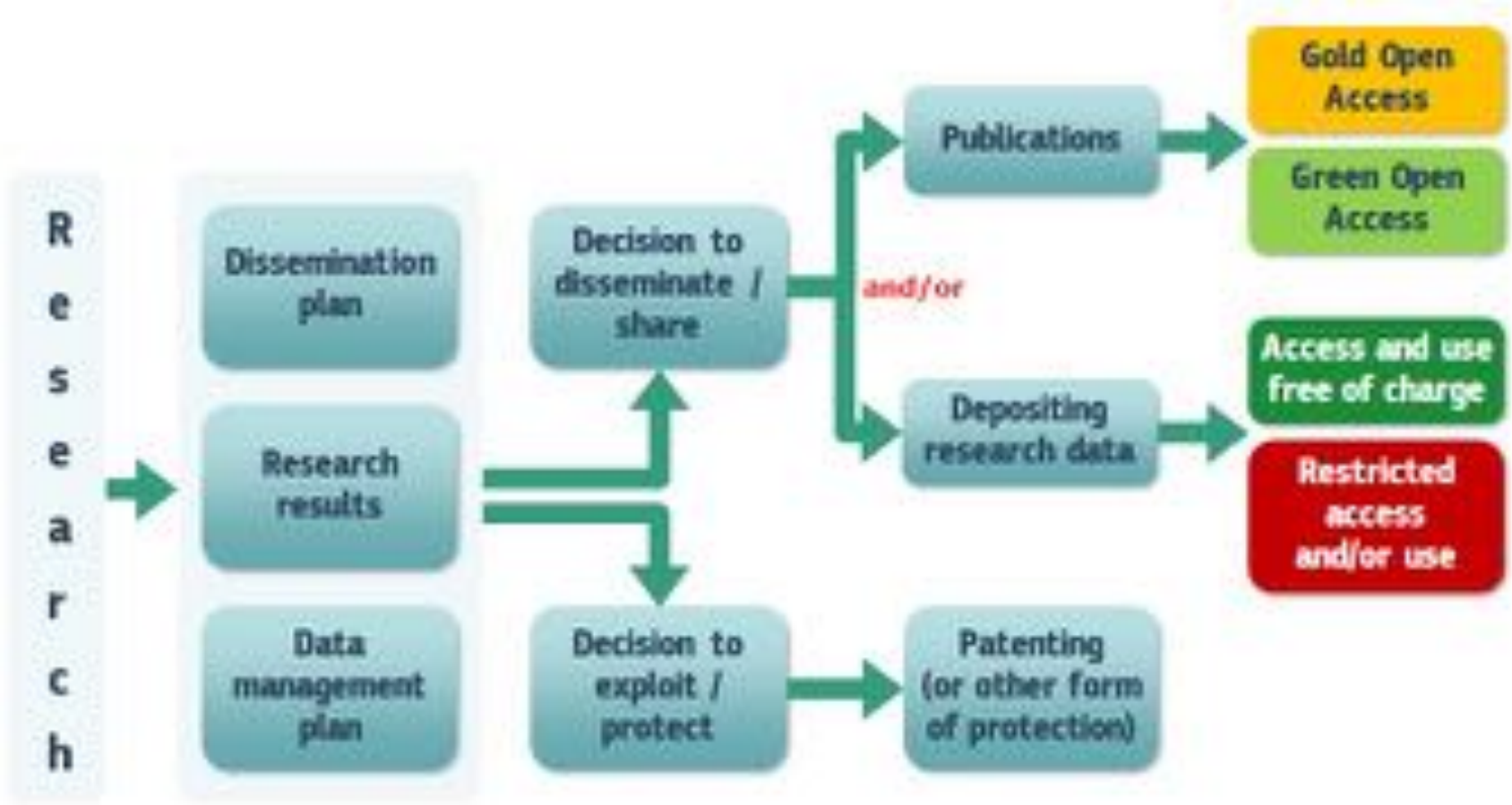
Seguir
#BigDealsReport: One billion euros per year is the amount paid in Europe for accessing scholarly publications, while the bulk of these costs fall on Europe's universities. EUA releases updated mapping of major publishing contracts bit.ly/2019BigDeals #scientificpublising
eua
EUROPEAN UNIVERSITY ASSOCIATION
2019 Big Deals Survey Report

OPEN ACCESS Pathways



www.imi.europa.eu

FIFTY SHADES OF OPEN ACCESS

Type	Subtype	Who pays?	Example
Gold	"Diamond"	Institution (subsidy)	
Gold	Gold, not for profit	Author (fee)	Int. J. of the Commons
Gold	Gold, for profit	Author (fee)	PLoS
Gold	Hybrid gold, for profit ✔	Author (fee) + Library (subscription)	in Nature
Green	Last author version in ✔ repository (embargo's)	Library (subscription)	in Igitur
Green	Pre-prints	Library (subscription)	ArXiv / SSRN / PeerJ preprints
Green	Working papers	Working paper archive (institutional subsidy)	in RepEc
Green	"Black" (sharing against copyright)	Publisher	via Academia

Jeroen Bosman:
https://www.slideshare.net/hierohiero/fifty-shades-of-green-and-gold-open-access-to-scholarly-information

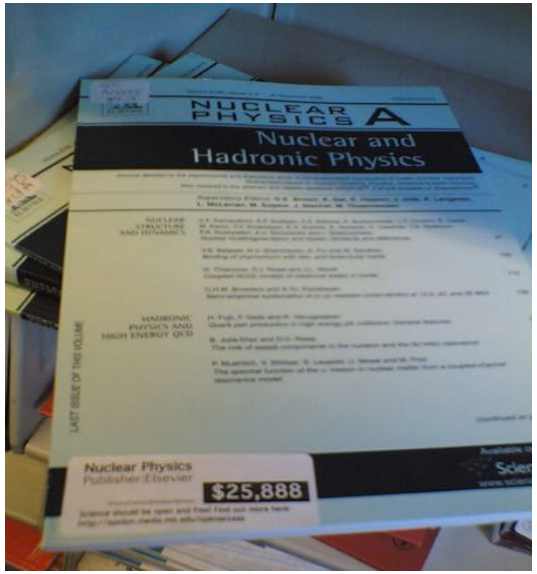
Open Access

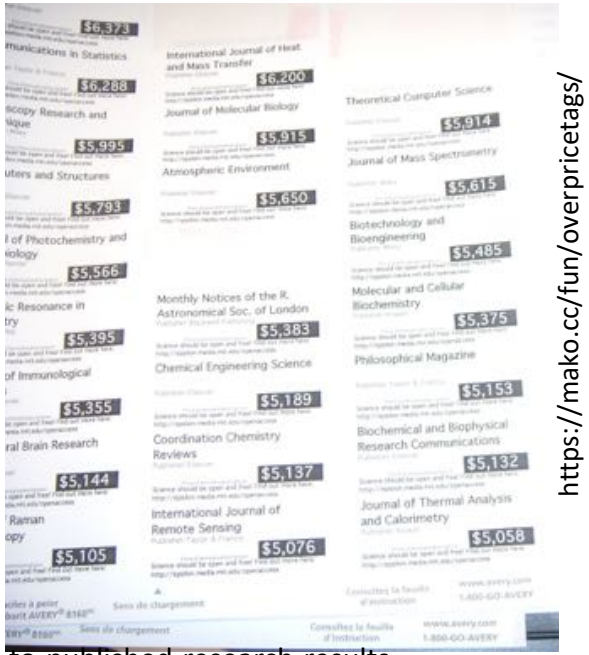
For Science

- Better access to and reusability of research
- Citation advantage
- Better services (if we demand it)
- Open Citation graphs
- And many many more.....

About Science

- Opportunity of decoupling publishing from quality metrics (such as the journal impact factor)
- After transition more money in the system
- Better monitoring (if we control the infrastructures or demand the services)



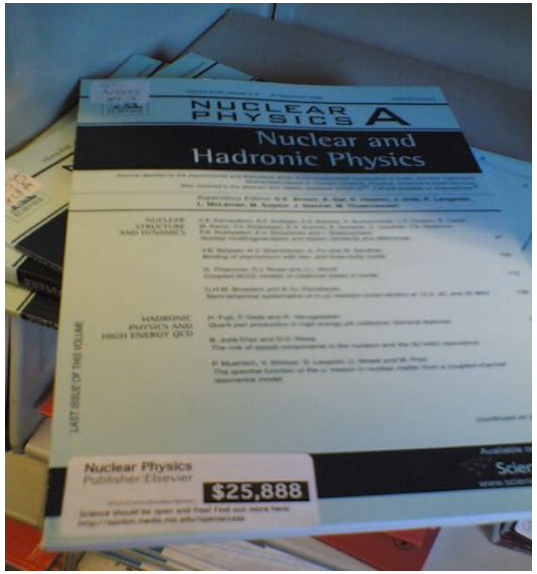


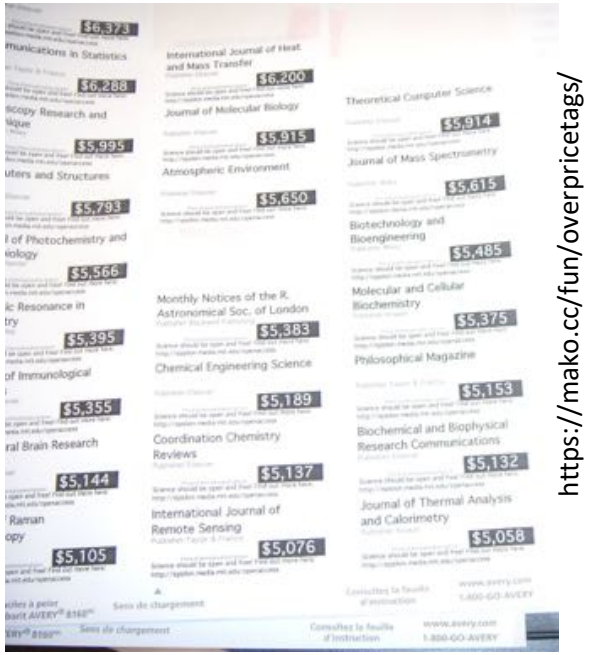
https://mako.cc/fun/overpricetags/

For more information: Open Science Training Handbook: https://open-science-training-handbook.gitbook.io/book/open-science-basics/open-access-to-published-research-results

Engaging with Open Access to research publications

- Find out which quality OA publication platforms there are for your domain and discuss the options of publishing there (e.g. costs for APCs, platform funding, or other models)
- Discuss what kind of services you demand in return for article processing charges
- Explore and share the cost of reading for your domain together with your librarians
- Reflect on the “impact” of the most important publications for Citizen Science
- Create and share a list of the best green OA repositories for you to store your preprints, postprints, or articles so that they are visible and findable online
- What other media and outlets are there, that are relevant for your communities?
- Explore Co-Authorship with co-researchers





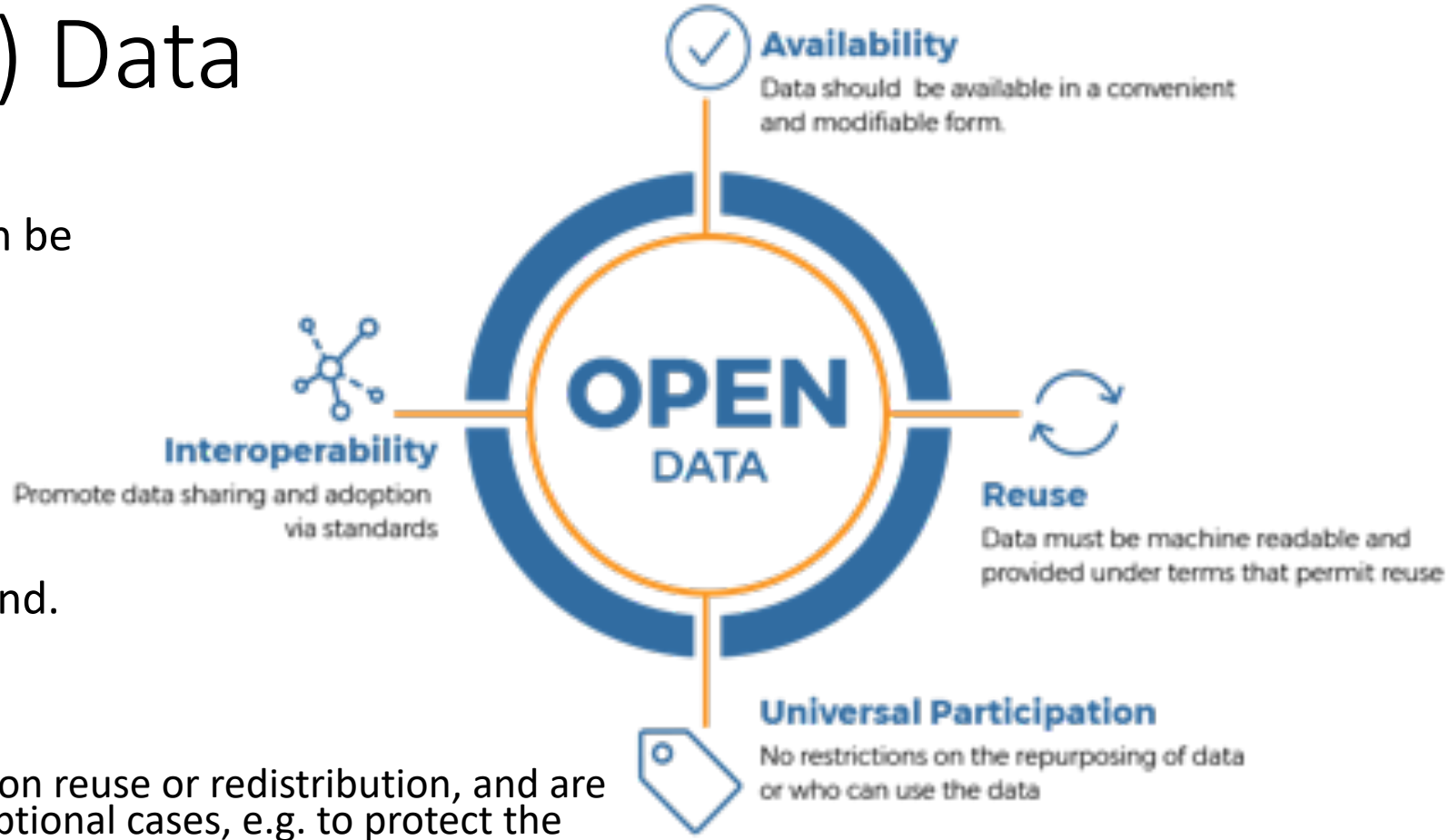
https://mako.cc/fun/overpricetags/

Further information: https://open-science-training-handbook.gitbook.io/book/open-science-basics/

Open (Research) Data

Open research data is data that can be

- freely accessed,
- reused,
- remixed and
- redistributed,
- for academic research and teaching purposes and beyond.



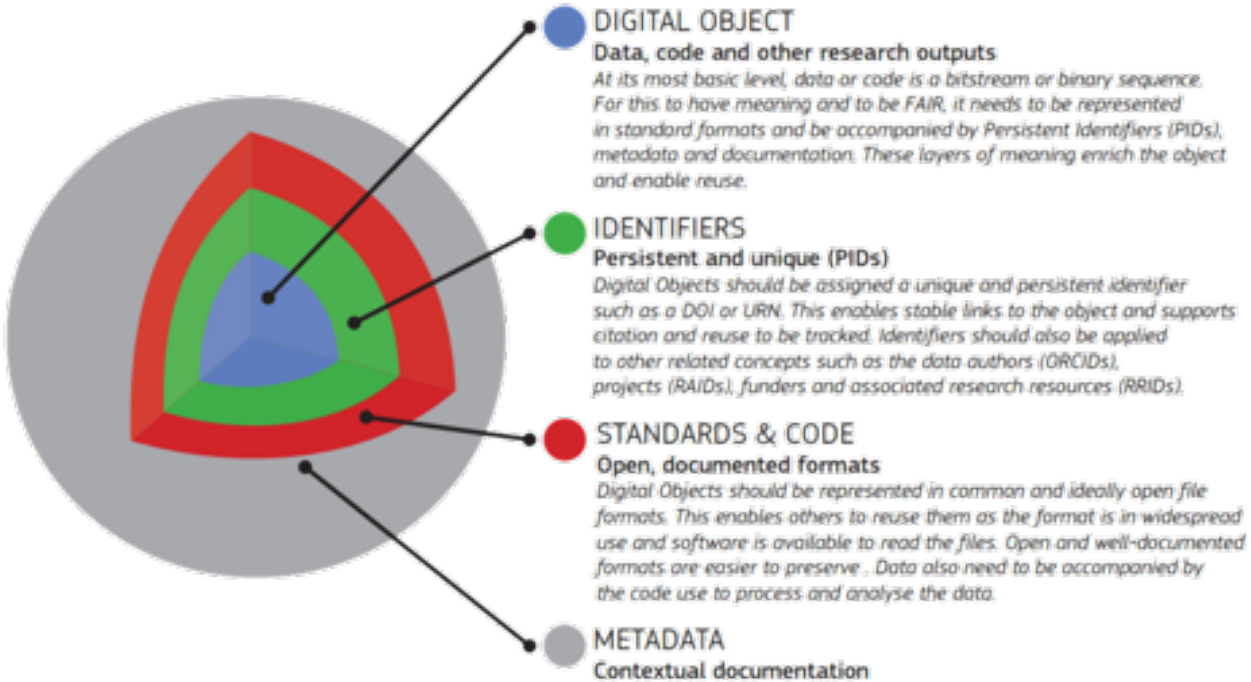
Ideally, open data have no restrictions on reuse or redistribution, and are appropriately licensed as such. In exceptional cases, e.g. to protect the identity of human subjects, special or limited restrictions of access are set. Openly sharing data exposes it to inspection, forming the basis for research verification and reproducibility, and opens up a pathway to wider collaboration. At most, open data may be subject to the requirement to attribute and sharealike.

https://opendata.info/

Open Data and methods and FAIR digital objects

Not all or nothing,
not open or
closed
as only options!

For Science **About Science**



https://doi.org/10.6084/m9.figshare.5627503
Bianca Kramer & Jeroen Bosman, Utrecht University Library Knowledge Exchange

https://twitter.com/simonhodson99/status/1065606239135170560/photo/1

Engaging with Open Data
Open Methods and FAIR digital objects

As open as possible, as closed as necessary!

- **Look for your institutional data policy, read or initiate a data policy on the level of lab or work group**
- **Use Data Management Planning as opportunity to engage with your data as broadly as possible: learn about data ownership, potential re-users, innovative informed consent procedures, ethical challenges, interoperability issues, meta data and standards**
- **If data is sensitive then think about other information that would make sense to be shared openly, like metadata, aggregated data, workflows, ...**
- **Use the FAIR principles for adequate packaging and documentation**
- **Explore options of long term preservation and data stewardship**
- **Explore the benefits of opening data for your co-researchers and co-design interfaces and informed consent procedures**
- **Explore different types of accessibility for sensitive data, including access to data for the data subjects**
- **Learn about the capabilities of new methods that enable open collaboration and sharing workflows, annotations, ...**
- **Compare different data repositories and data banks in terms of policy, responsibilities, ... And share your insights**
- **If you cannot share your data then share your methods and reflections!**

Further information: https://open-science-training-handbook.gitbook.io/book/open-science-basics/

Open Infrastructures

For Science **About Science**

Pic Taken at Scielo Conference 2018

#dontleaveittogoogle

Engaging with Open Infrastructures

- Explore the entanglements of infrastructures of publications and evaluation
- Discuss what is needed to create transparent and reproducible research (even if you work with sensitive data)
- Reflect on your own searching behavior when looking for knowledge and experiment with other types of search, e.g. visual search like Open Knowledge Maps https://openknowledgemaps.org/
- Discuss what is needed to document and monitor research activities, such as Research Information Systems, and if there are publicly owned or open sourced solutions for that
- Explore technical and governance issues of community infrastructures, knowledge commons
- Think about using Wikidata or Wikicite

Pic Taken at Scielo Conference 2018

#dontleaveittogoogle

Further information: https://open-science-training-handbook.gitbook.io/book/open-science-basics/

Open Evaluation

For Science

About Science

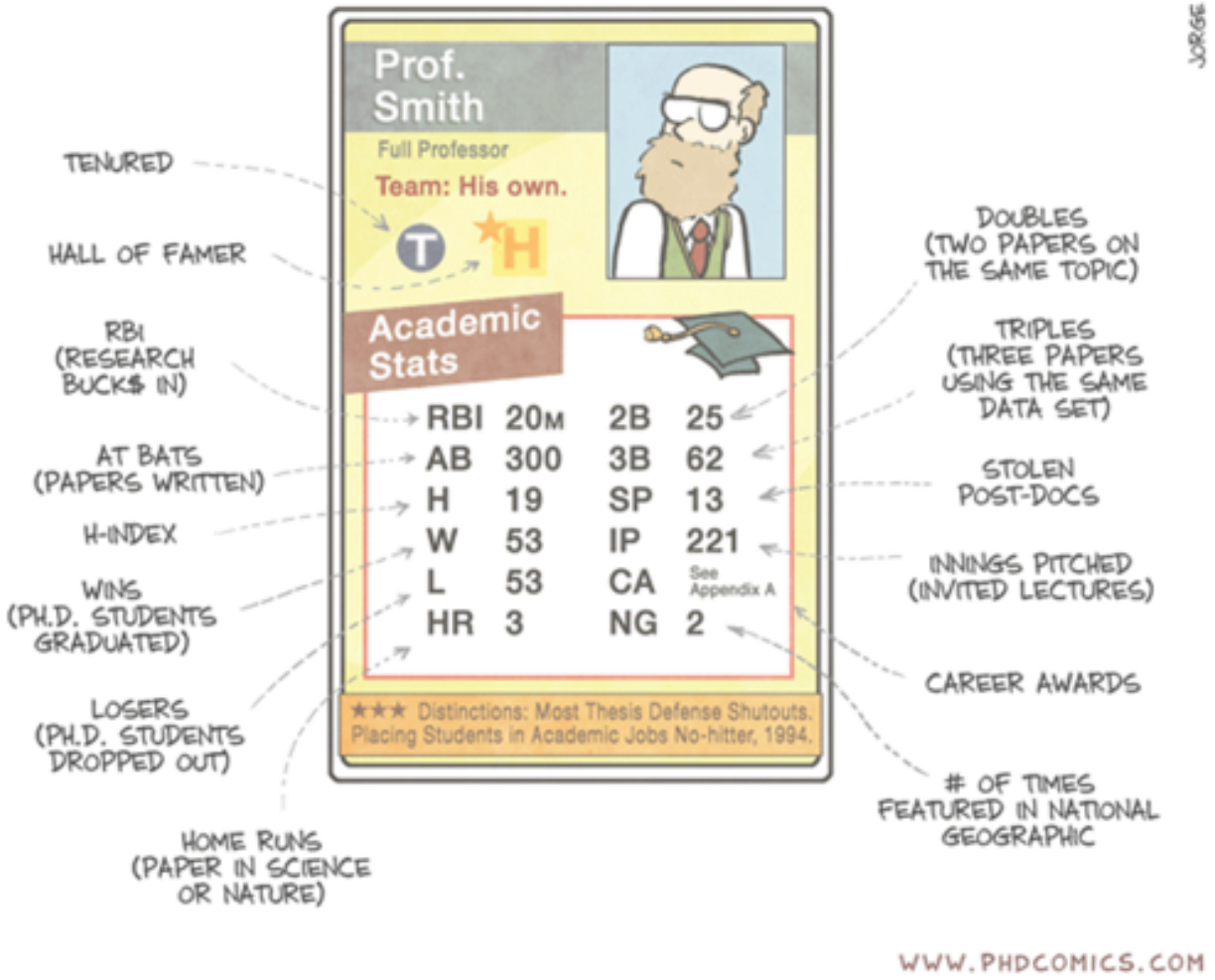
Open Science Career Assessment Matrix (OS-CAM)

Open Science activities	Possible evaluation criteria
RESEARCH OUTPUT	
Research activity	Pushing forward the boundaries of open science as a research topic
Publications	Publishing 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
Funding	
RESEARCH PROCESS	
Stakeholder engagement / citizen science	
Collaboration and interdisciplinarity	
Research integrity	
Risk management	
SERVICE AND LEADERSHIP	
Leadership	
Academic standing	
Peer review	
Networking	
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

https://ec.europa.eu/research/openscience/index.cfm?pg=rewards_wg

Engaging with Open and Participatory Evaluation

- Reflect on how evaluation schemes affect the ways in which scholarship is performed and how the relationship with citizens or co-researchers is formatted
- Understand the metrics commonly used to assess all kinds of quality and impact of scientific work and community engagement
- Train yourself and others in reviewing research outputs and compile skills needed to assess research in transdisciplinary settings, comparing open formats versus blind reviews types
- Compile a list of activities that should be monitored and rewarded besides journal article publication → social impact
- Think about implementing Co-Evaluation processes from the start of a project



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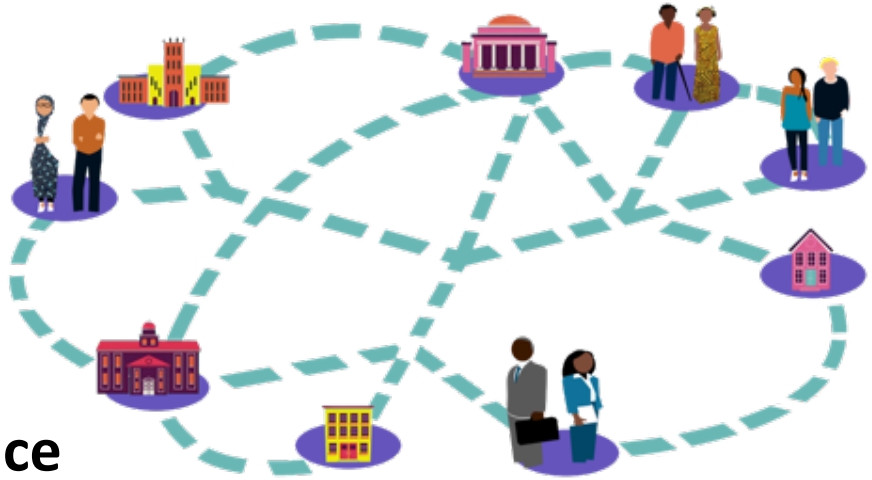
Open Education and Training



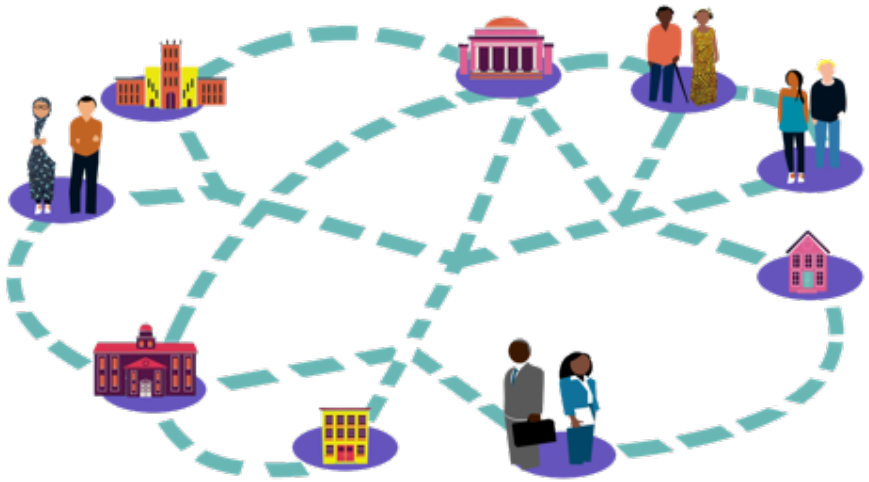
For Science

- Open skills mainstreamed in curricula
- Open Syllabi
- More emphasis on cooperative skills
- Spaces and time for Co-Creation
- New forms and formats of exertise

About Science

- Democratisation of educational materials (open text book initiative, open educational resources)
- Sustainability of teaching materials
- Internationalisation
- Localization and community engagement
- Governance of sources for teaching and training

Engaging with Open Education



- Reflect on the educational materials that you used in training in citizen science: are their open and accessible sources?
- What about interactive online teaching and communication infrastructures?
- Compile and share a list of high quality educational resources in your domain
- Open your own teaching materials (share your slides, exercises, ...)
- Learn about licensing options and how to combine Open Educational Resources
- Discuss what benefits and challenges openness bring to educational materials, e.g. with commenting and debating “facts”....

Further information: https://open-science-training-handbook.gitbook.io/book/open-science-basics/

Open Science: Incentives and Rewards

Enable a broad inclusive discussion on evaluation criteria and impact assessment – taking the opportunity to re-negotiate the role of publicly funded research and scholarship in society

Necessity to develop incentives for different stakeholders: researchers, research organisations, funders, national governments and policy makers

Broad institutional shift in support and evaluation structures necessary (including other types of outcomes, invisible work, outreach and OER)

Train reviewers and assessors

Radical transformation of hiring and promotion procedures (see OSCAM)

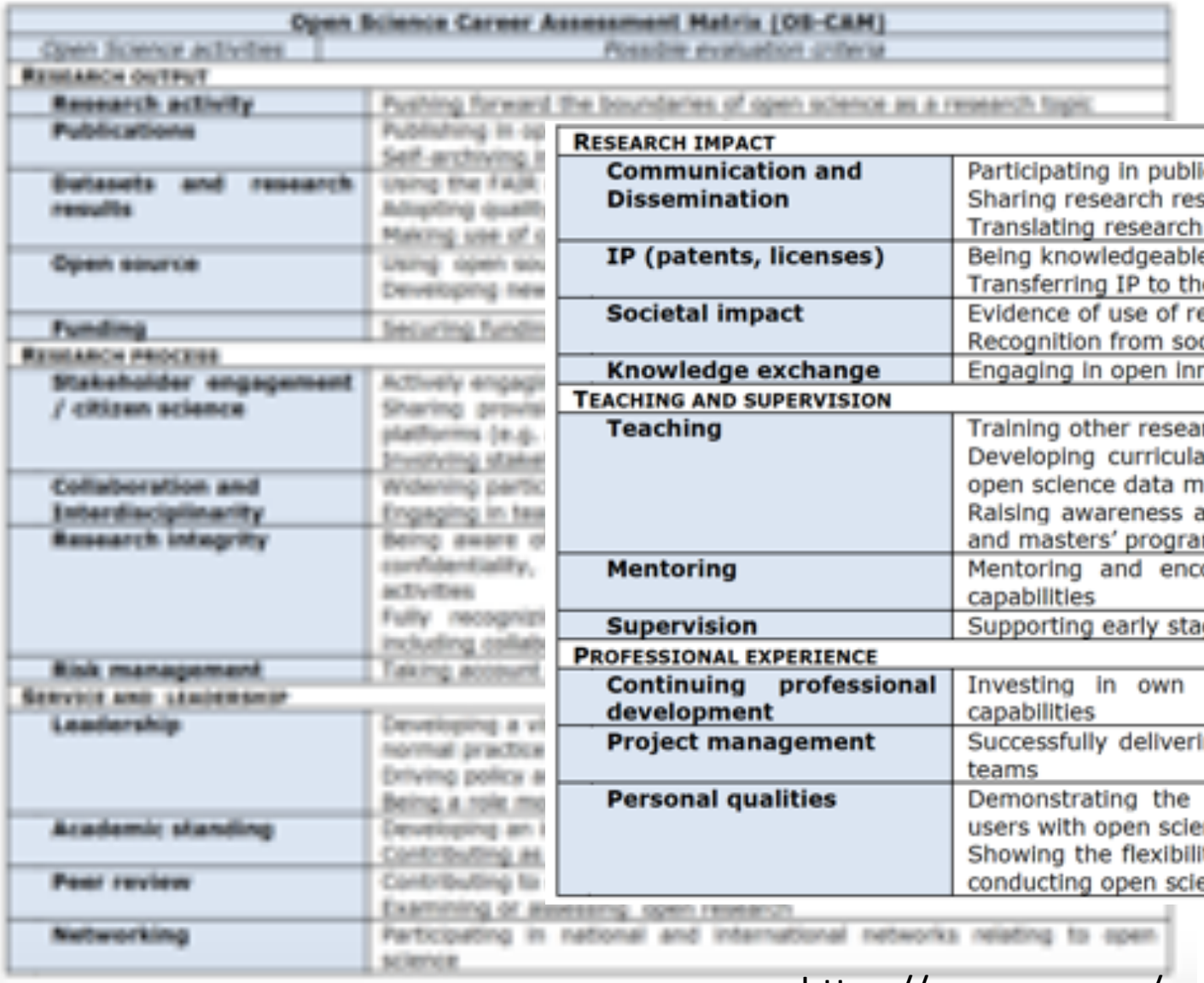
International cooperation and coordination crucial for successful transformation

Reviewing impact of incentives and adaptation

Support pilot programmes and new instruments for HR and science administration (CRIS)

https://rio.jrc.ec.europa.eu/en/policy-support-facility/mle-open-science-altmetrics-and-rewards

Incentives and Rewards for Open Scholarship



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Collaboration and interdisciplinarity	
Research integrity	
Risk management	
SERVICE AND LEADERSHIP	
Leadership	
Academic standing	
Peer review	
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
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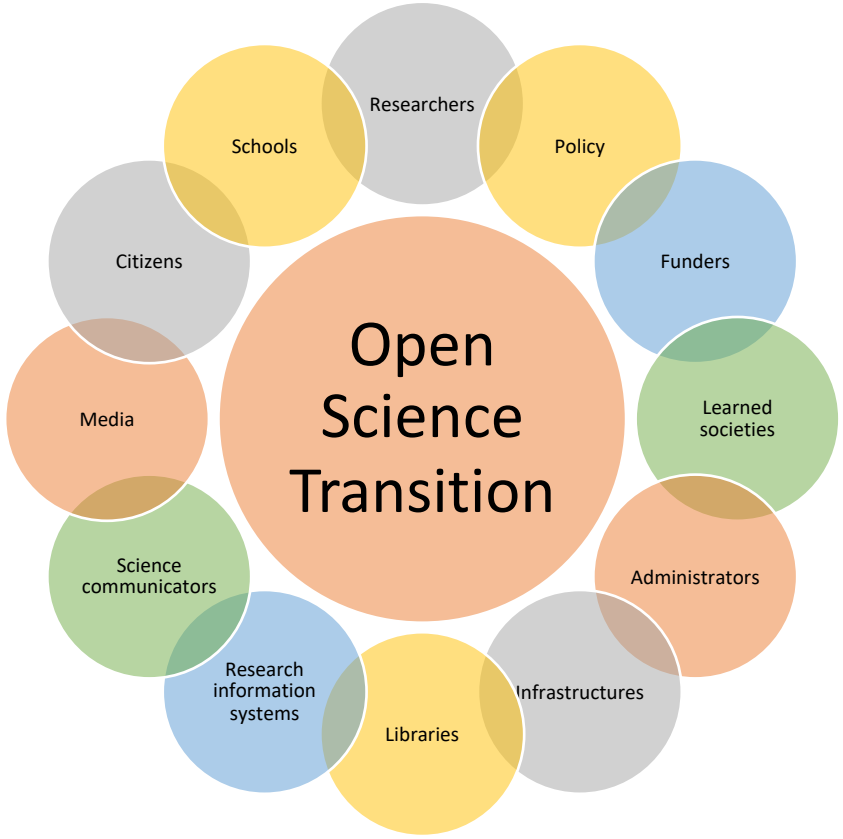
Creating open science friendly evaluation systems inline with the right incentive and reward structures is essential for Open Science / Citizen Science

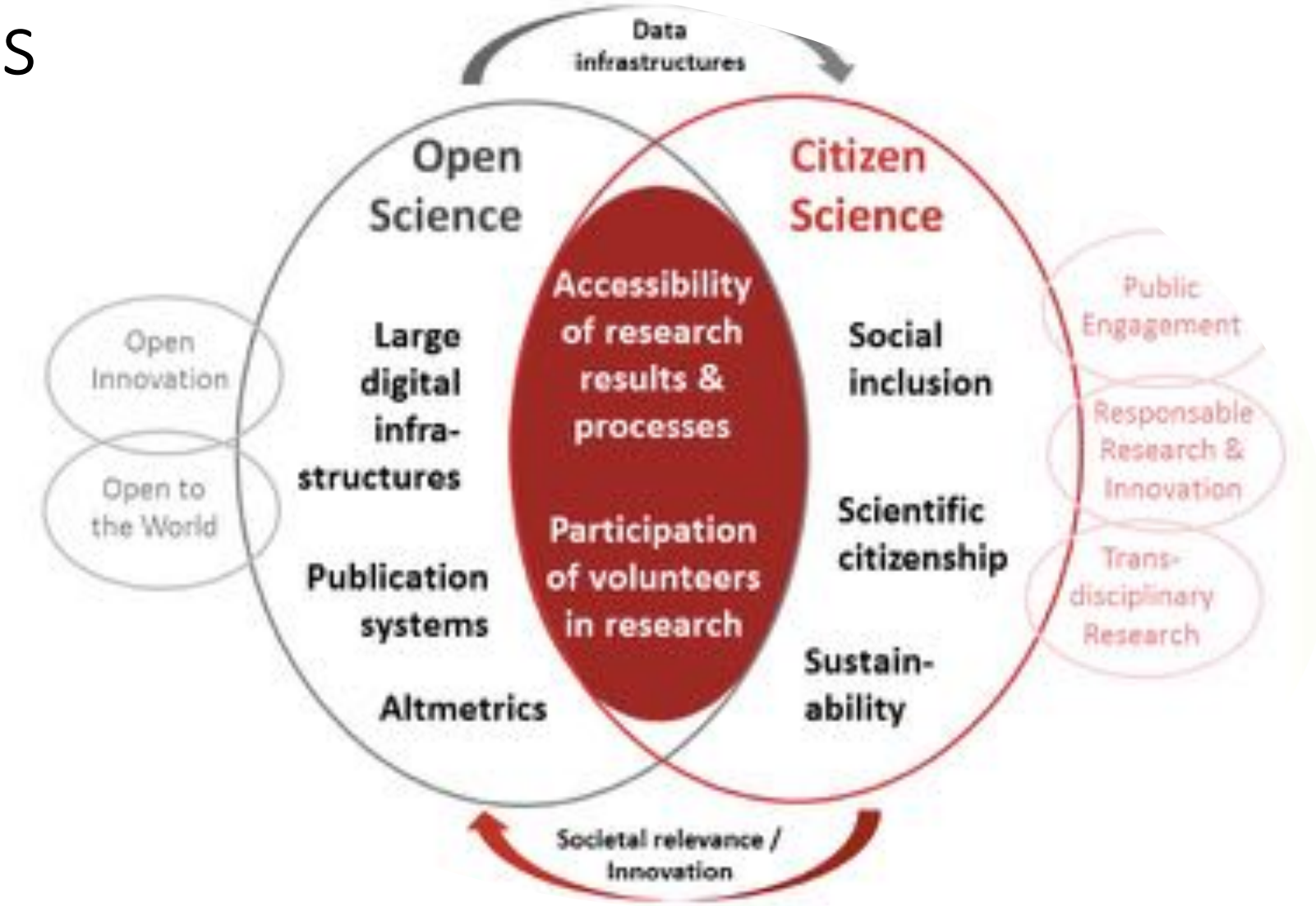


Constantly bring to attention that

- Open science is not ”all or nothing”
- Mainstreaming and rewarding OPEN in TEACHING is key
- OS and CS are opportunities to discuss broadly WHAT MATTERS
- Now is the right moment to change systems of measurement and optimize and open documentation systems
- It is important to have role models and broadly visible best practices

Mutual benefits

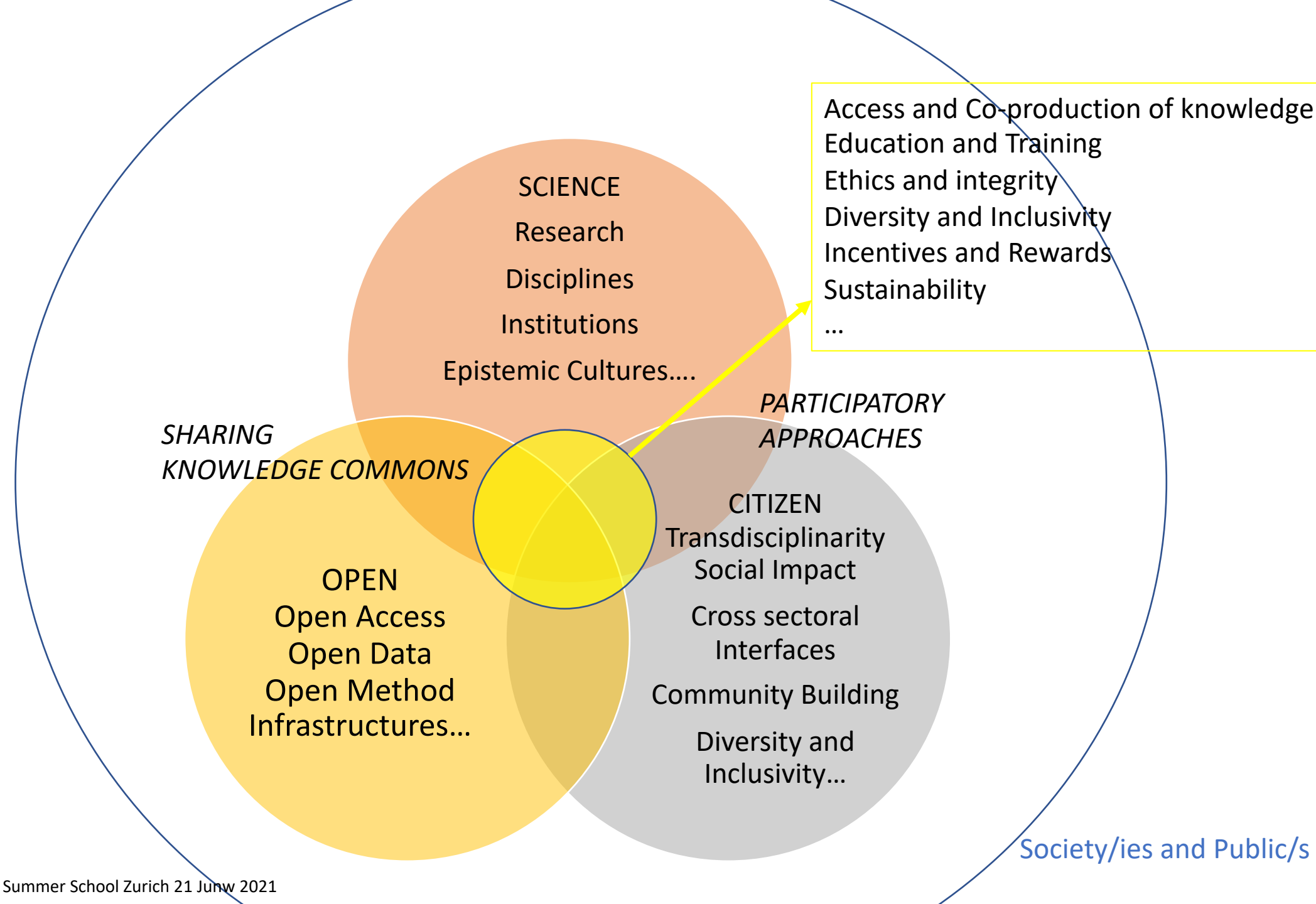
- What can Open Science do for Citizen Science?
- What can Citizen Science do for Open Science?



Citizen Science and Open Science Core Concepts and Areas of Synergy (Vohland and Göbel, 2017)

https://libereurope.eu/blog/2020/03/10/open-science-skills-diagram/

"Transforming research through (public) participation?"



CoAct
Citizen Social Science

CoAct - Citizen Social Science

… addressing social global concerns related to mental health care, youth employment, environmental justice and gender equality by engaging citizens as co-researchers.

… understanding Citizen Social Science as participatory research methodology co-designed and directly driven by citizen groups sharing a social concern.

The CoAct project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No. 873048

Thank you!

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www.coactproject.eu

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