



Human-Centric Open Science

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(COMING UP: PUBLIC SCIENCE LAB !)

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Setting the scene: Troubled research



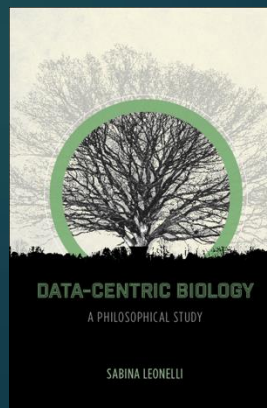
- ▶ Problems with commodified scientific publishing and funding
- ▶ Failures of Big Data mythologies
- ▶ Risks and worries around genAI
- ▶ Serious concerns around quality and reliability
- ▶ Long shadows of colonialism, racism and various other forms of discrimination and power inequity

Setting the scene: Troubled research

- ▶ Problems with commodified scientific publishing and funding
 - ▶ Counter-productive incentive systems
 - ▶ Data, models, methods, samples, software remain second-tier output
 - ▶ Short-term understanding of research benefits: projectification and lack of investment in long-term infrastructures and venues for transdisciplinary exchanges
 - ▶ Hyperspecialisation, opacity and lack of engagement: loss of intelligibility and public trust
 - ▶ Commodification of results, technologies and methods: “closed science” as inscrutable and unaccountable (Gold OA and genAI as latest blatant examples)
- ▶ Failures of Big Data mythologies
- ▶ Risks and worries around genAI
- ▶ Serious concerns around quality and reliability
- ▶ Long shadows of colonialism, racism and various other forms of discrimination and power inequity

Setting the scene: Troubled research

- ▶ Problems with commodified scientific publishing and funding
- ▶ Failures of Big Data mythologies:
 1. Favoring conservatism over innovation
 2. Building on unreliable data
 3. Eroding expertise and methods
 4. Making bias invisible
 5. Prioritising commercial interests
 6. Encouraging research that is irrelevant for or damaging to society and the planet
 7. Ignoring injustice
- ▶ Risks and worries around genAI
- ▶ Serious concerns around quality and reliability
- ▶ Long shadows of colonialism, racism and various other forms of discrimination and power inequity



Setting the scene: Troubled research

- ▶ Problems with commodified scientific publishing and funding
- ▶ Failures of Big Data mythologies
- ▶ Risks and worries around genAI
 - ▶ AI tools require continuous monitoring and calibration
 - ▶ Selection of sources is hugely controversial (no unique answer to “what is most relevant”)
 - ▶ No tracking of data provenance when profiling individuals, groups or environments
 - ▶ Massive data absences
- ▶ Serious concerns around quality and reliability
- ▶ Long shadows of colonialism, racism and various other forms of discrimination and power inequity

Setting the scene: Troubled research

- ▶ Problems with commodified scientific publishing and funding
- ▶ Failures of Big Data mythologies
- ▶ Risks and worries around genAI
- ▶ **Serious concerns around quality and reliability:**
 - ▶ Rise of deep fakes and synthetic data
 - ▶ Application of general principles requires expert (case-by-case) judgement
 - ▶ Scientific review is underresourced, undervalued, labour-intensive
 - ▶ Scarce investment in evaluating comp/stat models (e.g. OSR Code of Practice)
 - ▶ Misuses of “transparency”: does not constitute a solution (Leonelli 2023)
 - ▶ Reproducibility: also not a solution [Leonelli 2018]
 - ▶ Fertile terrain for misinformation and disinformation campaigns
- ▶ Long shadows of colonialism, racism and various other forms of discrimination and power inequity

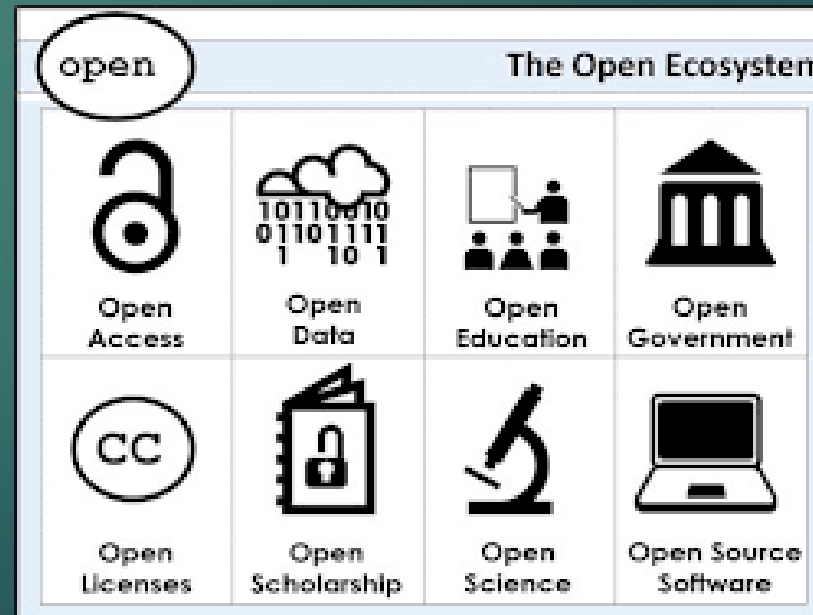
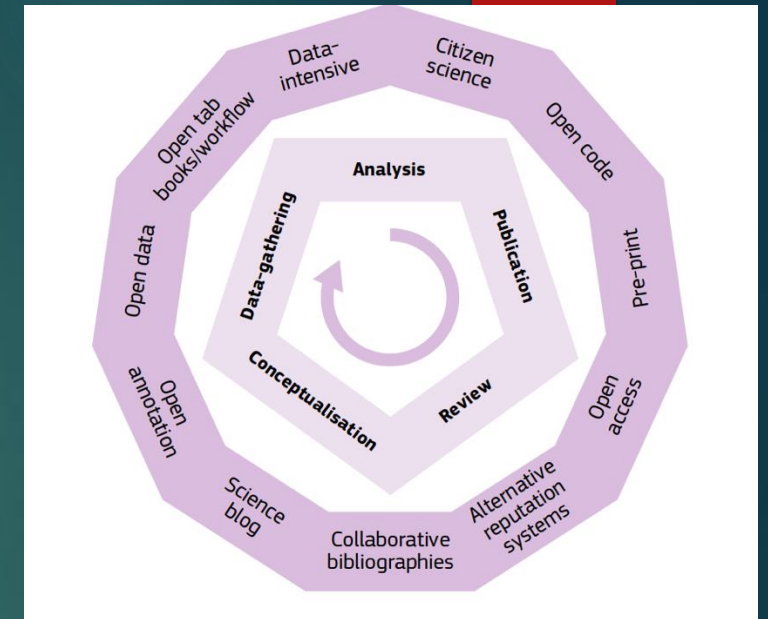
Setting the scene: Troubled research

- ▶ Problems with commodified scientific publishing and funding
 - ▶ Failures of Big Data mythologies
 - ▶ Risks and worries around genAI
 - ▶ Serious concerns around quality and reliability
-
- ▶ Long shadows of colonialism, racism and various other forms of discrimination and power inequity:
 - ▶ Political and socio-economic conflict: heightening inequity and hampering transnational collaboration and scrutiny
 - ▶ Endemic inequity and digital divide worsened by environmental crisis

Open Science: A Solution?

Variously defined by

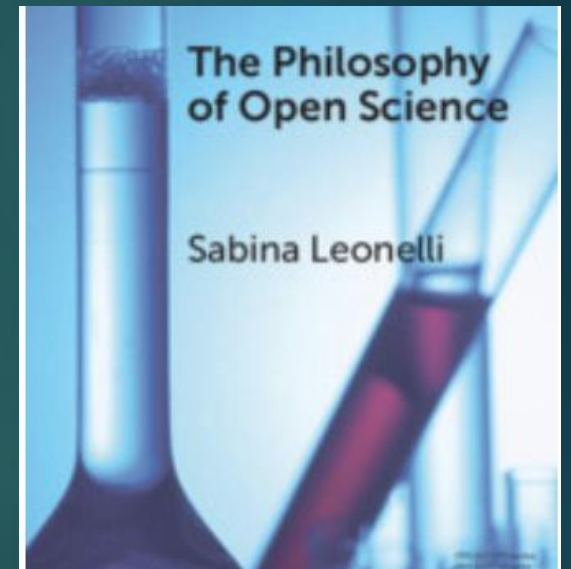
- ▶ The use of new digital tools
- ▶ A set of values
- ▶ Specific practices of collaboration and sharing
- ▶ A specific view of the research workflow and related governance



Object-Oriented Open Science

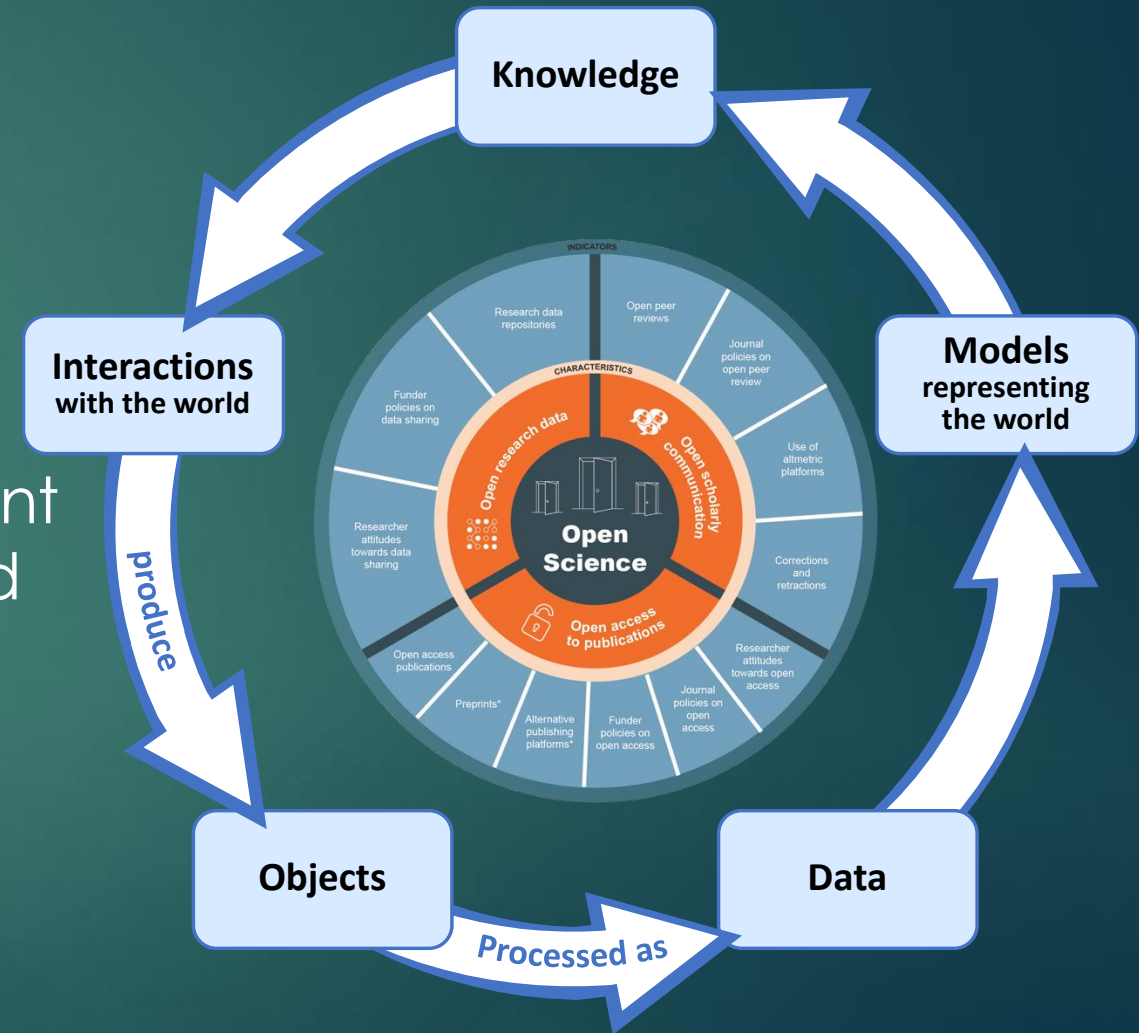
Openness as “sharing resources”

- ▶ about **unlimited access**: making any research element available at any time for everyone
- ▶ about the **digital transformation**: it is a novel phenomenon and completely dependent on ICTs
- ▶ always **good**: it automatically improves the content of science as well as researchers' working conditions
- ▶ **global**: it can reach everybody with an interest in research, no matter where they are based
- ▶ facilitating **equity** in research production and consumption: it makes previously inaccessible resources available to those who may wish to use them



Is this version of OS living up to its promise?

- ▶ How to check and frame the meaning and implementation of openness in research?
- ▶ What impact on established and new methods?
- ▶ How to support diverse sites with different backgrounds, resources and goals (and communication across them)?
- ▶ What repercussions for research and assessment cultures and practices, and their relation to society?



PHIL_OS (21-26): A Philosophy of Open Science for Diverse Research Environments

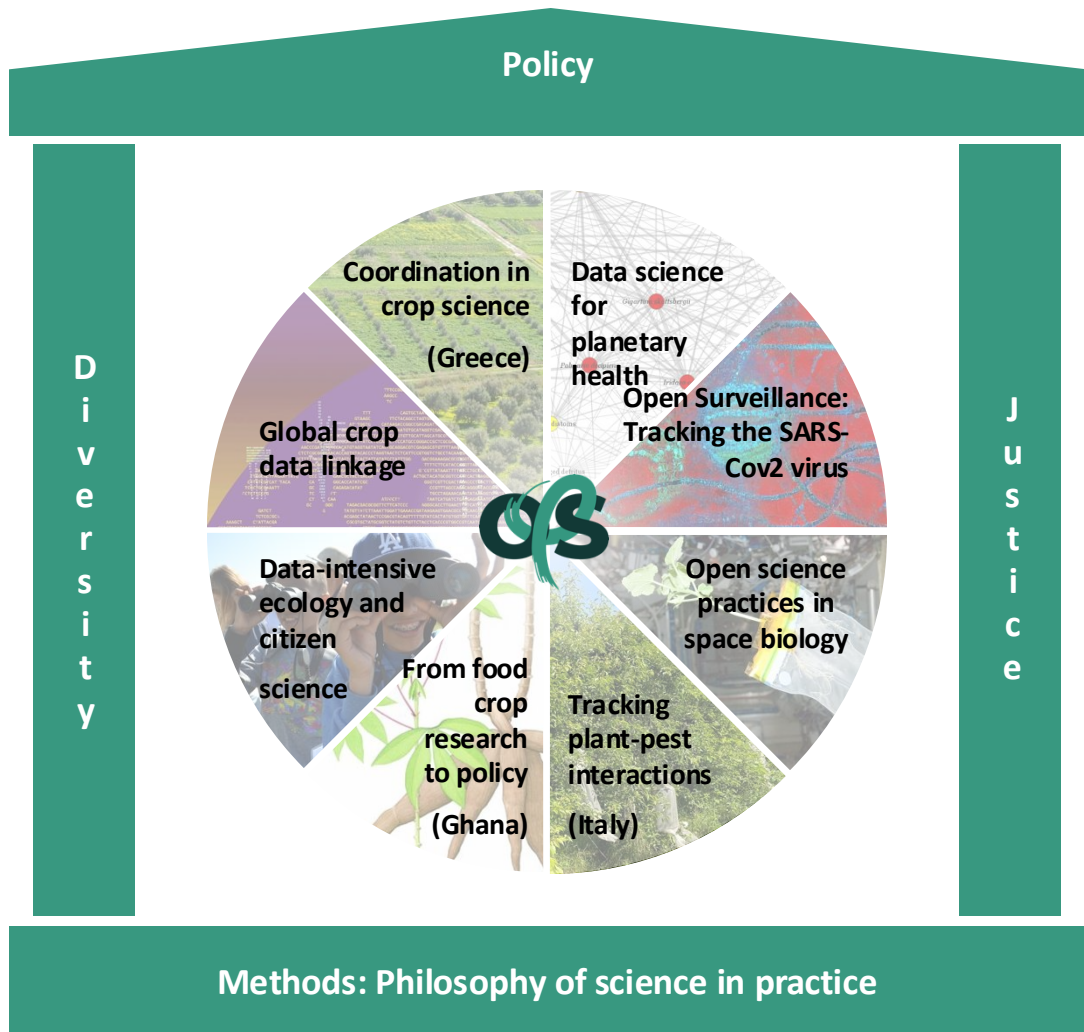














Situating research processes

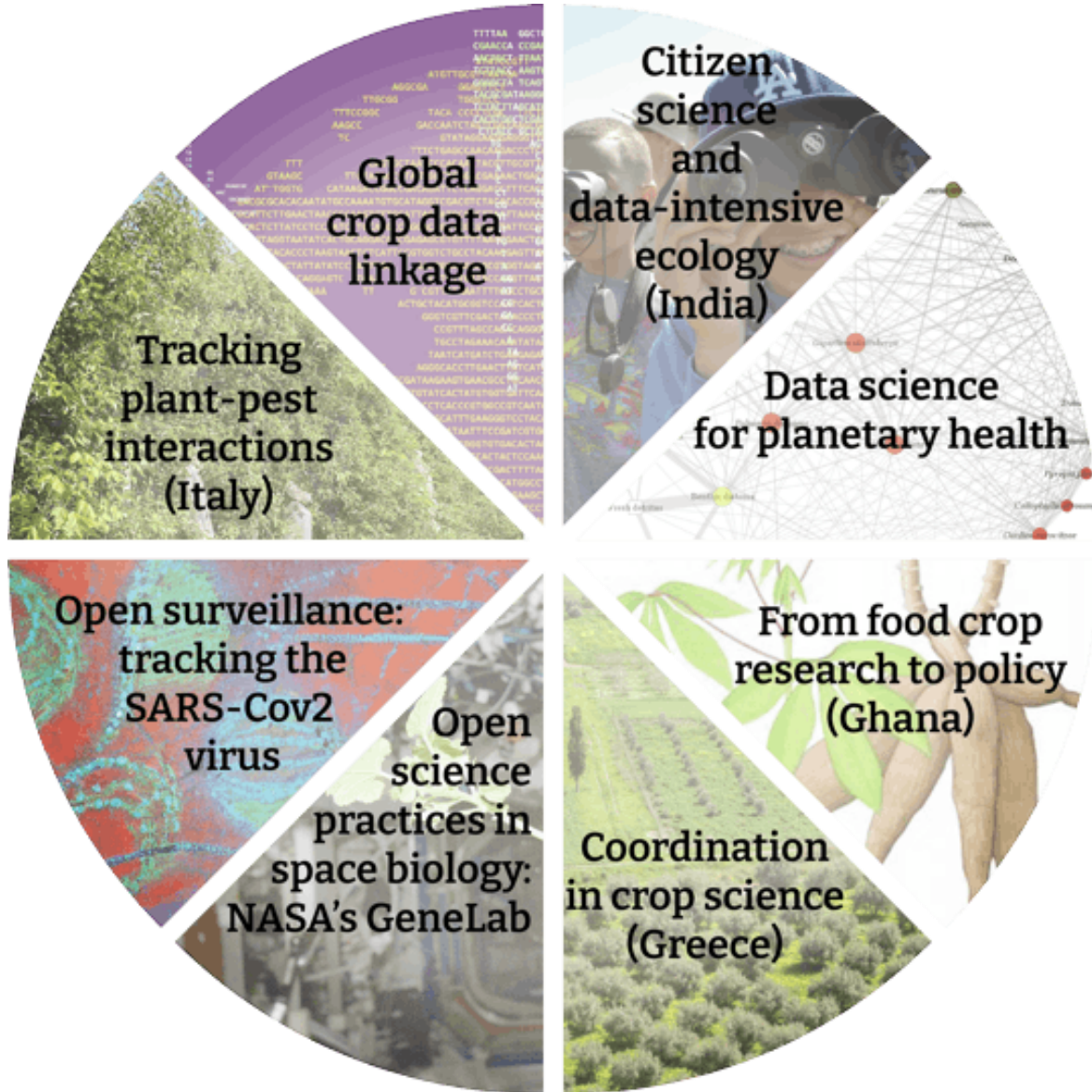
To understand how inferential practices relate to characteristics of research environments, epistemic diversity and (in)justice

- **Approach:** *co-produced* philosophy, history and social studies of science (with scientists, OS infrastructures and policy-makers)
- **Focus:** interpretations of openness as a window on the epistemic implications of
 1. **Diversity** in research environments
 - Backgrounds and skills
 - Resourcing: material, human, conceptual, institutional, infrastructural
 - Grounds for reasoning around “best practice”
 2. **Inequity** between research environments
 - Constraints on methods, resourcing and networks
 - Reputational cycles and epistemic injustice





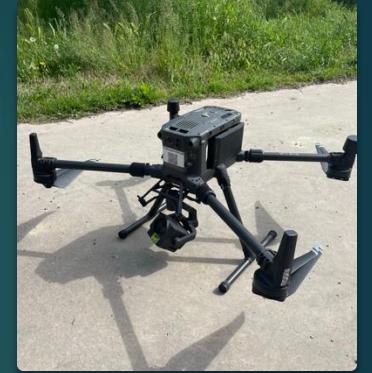
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Case 1: Pest-plant interaction research on *Halyomorpha halys* (Italy & EU)



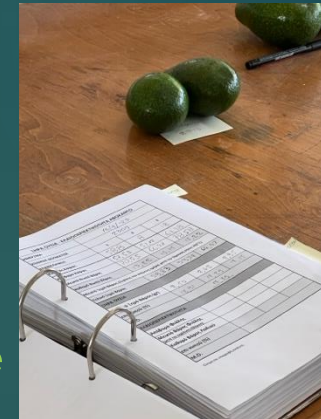
- ▶ Research and publications on AI / drones trump pest-plant interactions
 - ▶ Resources dependent on development of AI methods, NOT on their application to specific biological challenge
- ▶ Labor precarity of postdoctoral researchers, enhancing self-perception as 'servicing' specific short-term projects, with key biological ideas/understanding left aside in favor of 'immediately publishable' results
- ▶ Many results of relevance to local ecology and future environmental science are obtained by non-academic researchers working for public agencies → no incentives for academic publishing, instead appear in local bulletin for farmers (not visible part of scientific scholarship, little credit for people involved, OA in principle but *unfindable*)
- ▶ Little opportunity to continue collaboration and deepen biological research as political/research attention moves elsewhere



Work with
Emma Cavazzoni

Case 2: Agronomic research on local crops (Ghana, Greece)

- ▶ Most substantive funding comes from international agencies / sources
- ▶ International projects and funding focus on crops and methods of relevance to mass cultivation and global markets
- ▶ Uneven distribution of resulting skills and resources, with training dependent on projects rather than institutionalized locally
 - ▶ E.g. Reports on data management in Greek and Ghanaian crop research institutes: no capacity for centralized training
- ▶ Publications on tech and methods tend to drive biological results
- ▶ Greece: Field research on local trees and crops has comparatively little resource and visibility
- ▶ Ghana: Much more attention to local crops and production processes (including agricultural transfer), but explicitly “translational” research
- ▶ Either way, little scientific credit for the people involved and very limited scientific visibility internationally, OA yes but unfindable, Open Data unfeasible



Work with Joyce Koranteng-Acquah and Fotis Tsiroukis

Three varieties of structural injustice

Forms of structural injustice associated to disparities in scientists'

- ▶ Access to resources
- ▶ Opportunity to use such resources to further their scientific goals

.. with important implications for OS implementation

Three varieties of structural injustice

- (1) Inequity in resourcing: allocation, access and deployment**
- (2) Misalignment between resourcing and scientific goals**
- (3) Misalignment between scientific goals and labor conditions**

Three varieties of structural injustice

(1) Inequity in resource allocation, access and deployment

- ▶ Resource: 'anything that can serve as a source of power in social interactions' (Giddens 1979, cited in Haslanger 2024; e.g. technology, infrastructure, training, institutions)
- ▶ Resourcing not grounded on merit or scientific relevance
 - ▶ whether and how science is recognised as worthy of investment, the availability of training in research and related digital skills, whether scientific investigations intersect with the activities of commercial-military enterprise (and how), national income, socio-economic disparity between rural and urban areas, institutional support
- ▶ Short-term availability privileged over capacity-building
- ▶ Post factum training and tech adoption – little if any involvement in design and governance

(2) Misalignment between resourcing and scientific goals

(3) Misalignment between scientific goals and labor conditions

Three varieties of structural injustice

- (1) Inequity in resource allocation, access and deployment**
- (2) Misalignment between resourcing and scientific goals**
 - ▶ Local constraints, practical exigencies, socio-political agendas shape research directions, sometimes in tension scientific interests
 - ▶ Digital divide is also a *divide in epistemic power*: those who can shape the research agenda vs those who cannot
- (3) Misalignment between scientific goals and labor conditions**

Three varieties of structural injustice

(1) Inequity in resource allocation, access and deployment

(2) Misalignment between resourcing and scientific goals

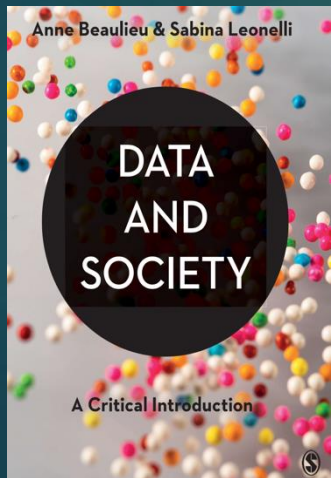
(3) Misalignment between scientific goals and labor conditions

- ▶ Divide sharpened by constraints and expectations on what counts as credit for whom and within which system (local, national, global)
 - ▶ Publishing, patenting, outreach to various publics
- ▶ Goals shaped by expectations around future employment, including expected and valued outcomes (often NOT those associated with academic excellence)

Implications

1. shifts in research content: research directions are picked to comply with existing constraints, resulting in lack of research effort spent on topics, domains and goals most relevant to the most vulnerable scientists and their contexts
2. exclusion of researchers: substantive portions of scientific community are unable or unwilling to contribute to internationally recognized body of knowledge to the best of their abilities
3. exclusion of methods/data: significant methods and sources of evidence are undermined or excluded from global scientific discourse
4. diminished research quality: loss of quality and reliability in processes and outcomes of inquiry
5. ineffective Open Science: sometimes implemented, yet no increase of visibility and findability of research

Diversity rules within scientific practice



**Progress on Open Science:
Towards a Shared Research
Knowledge System**

Final Report of the Open Science Policy Platform

- ▶ Standardizing drive underpinning sharing efforts in Open Science
 - ▶ Crucial for interoperability, reproducibility and re-use
- ▶ Yet very good scientific reasons for domain-specific, system-specific methods, standards, evaluative criteria
 - ▶ Not just culture wars – specialized knowledge and widely different ways of knowing..
 - ▶ .. grown from a long history of engagement with phenomena within specific institutional and social settings
- ▶ How to build OS with diversity as a starting point, rather than an obstacle?

Beyond Object-Oriented Sharing: Communication and Engagement as Central to Scientific Practice

- ▶ Scientific inquiry as quintessential case of **collective agency**
- ▶ Makes research scrutinizable
- ▶ Makes research into a common good
- ▶ Anchors relationship between science and society

Discovery as skilled, distributed
interaction with the world

Openness
as judicious
connection:
A process-
oriented
philosophy
of OS

Focus on social agency: creating new
intimacies, facilitating trust and
collaboration

Epistemic justice and diversity as crucial
conditions for inquiry

Connection needs to be *judicious*:

Situated and responsive to context

Identifying what constitutes relevant
context is key part of any investigation

Openness and vulnerability

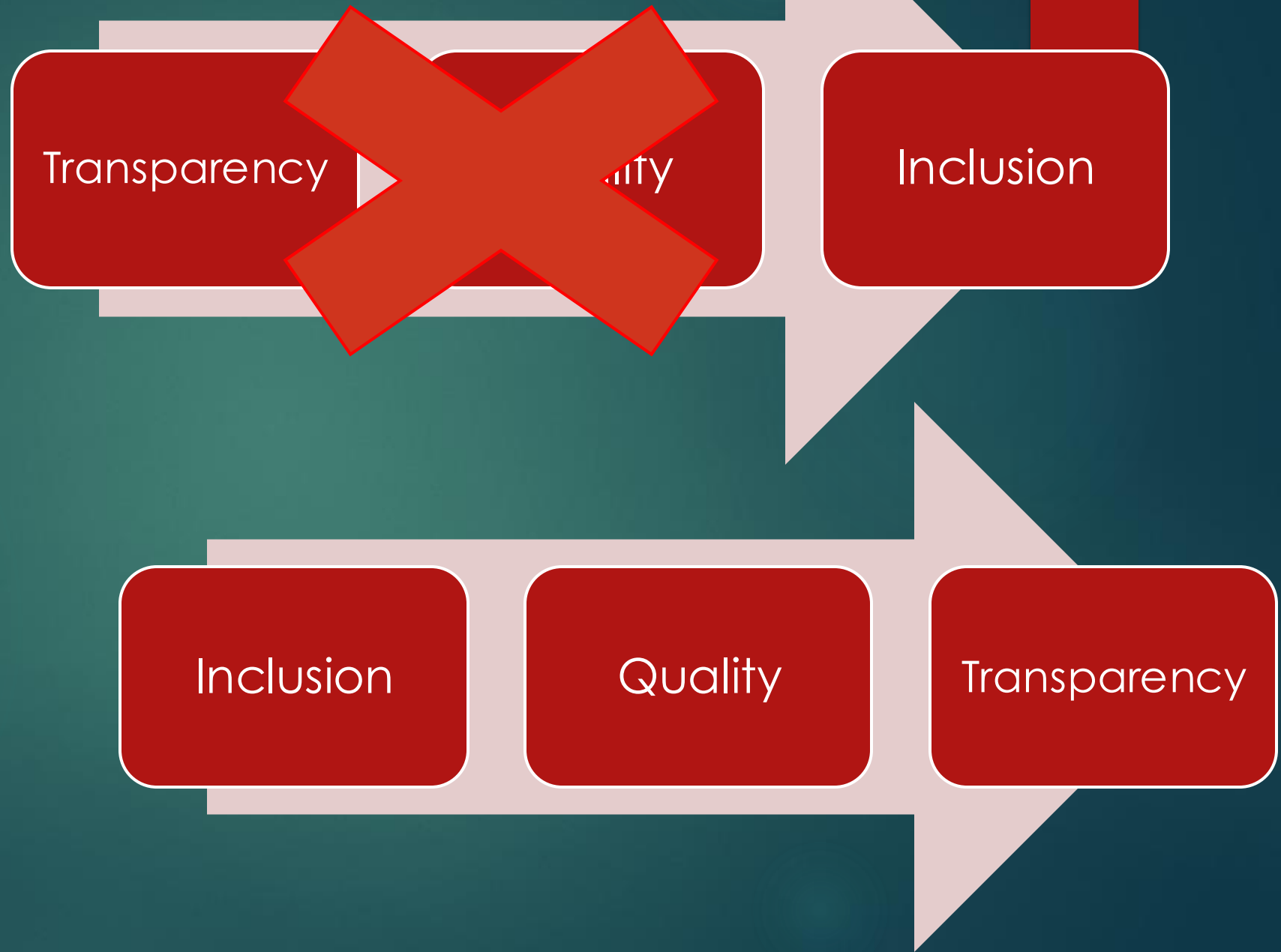
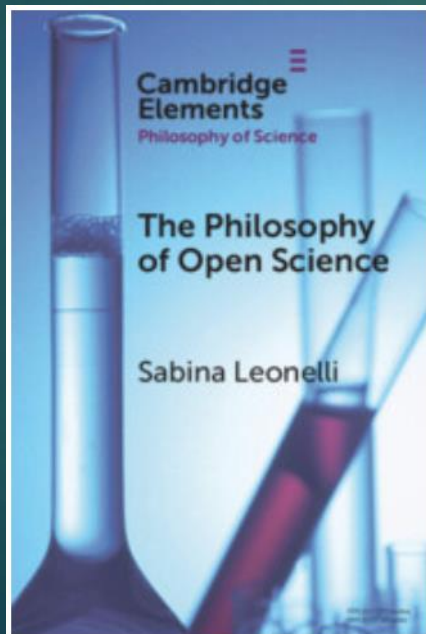
Openness as capacity for *novel meaning-making*:

identifying, receiving and assimilating information in ways that increase ability to think and act

Openness requires vulnerability:

- Can't ensure 100% safety, trustworthiness and reliability
- Need to allow for change and learning
- This involves admitting fallibility, need and weakness (in conceptual as well as material and social resources)
- Schiff (2024): vulnerability both as “precarity” (weak resourcing) and as “fragility” (difficulties in adapting to dynamic landscape)

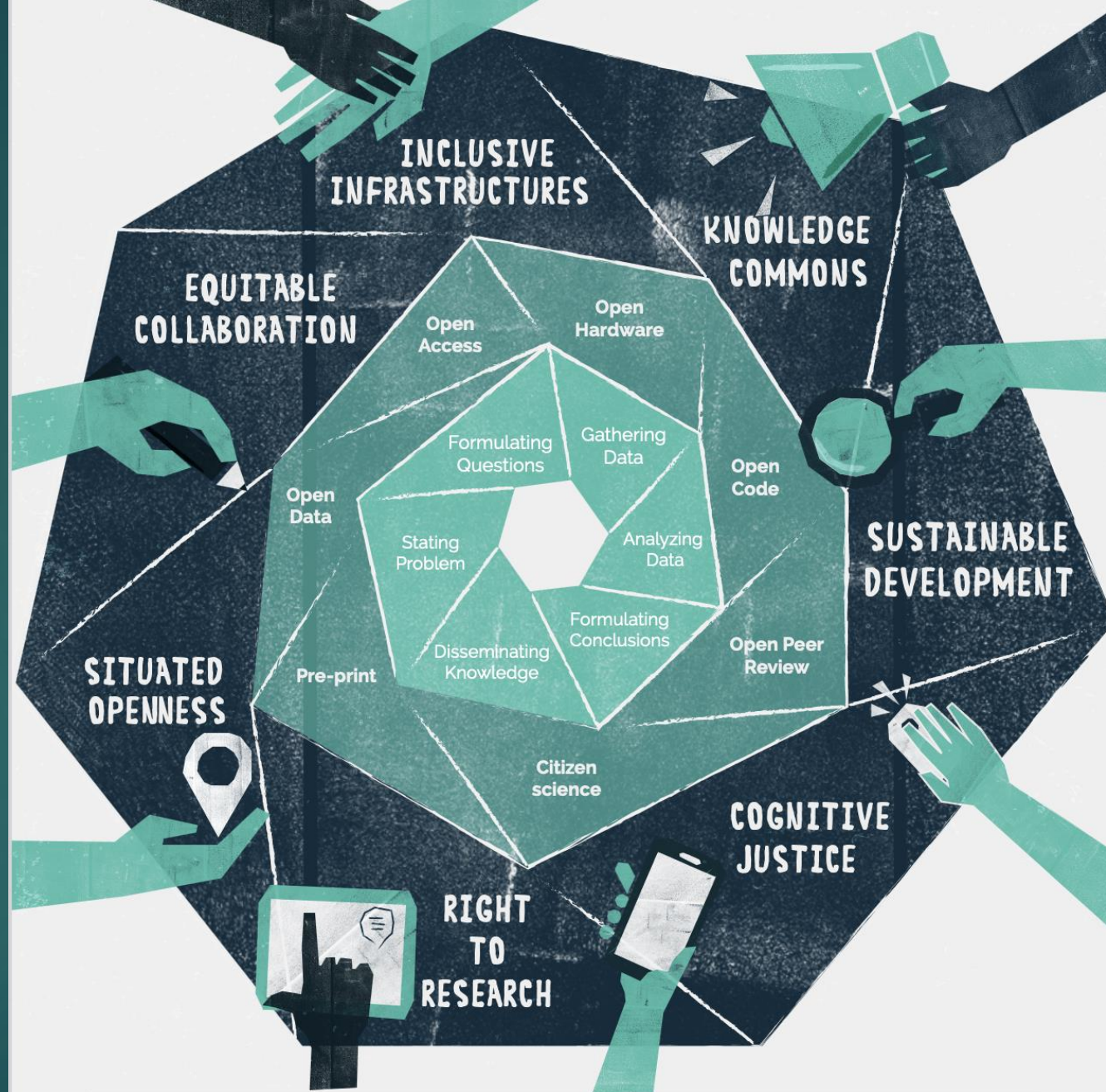
Prioritising inclusion



Towards Engaged and Inclusive OS



- ▶ about **responsible use**
- ▶ about the critical and constructive scrutiny of how **digital platforms** can support existing and future work
 - ▶ Encouraging development of relationship that can sustain and nurture scientific research in the long term
- ▶ **good for some and not others**: value-judgements and choices are unavoidable when developing open research and infrastructures
- ▶ **accessible to some and not others**: transparent criteria for which users are privileged can be a platform for trustworthiness
- ▶ facilitating **equity** in research production and consumption: it makes previously inaccessible resources *more easily* available to those who may wish to use them *for specific purposes* (whose social and scientific value has been explicitly evaluated)



Diversity as a starting point



- ▶ Acknowledging multiple perspectives and well-established (but diverse) cultures of openness: beware of centralized assessment criteria
- ▶ Support openness across publicly and privately funded institutions, taking care not to single out publicly funded institutions as the only conceivable target for OS policies and assessment
- ▶ Invest in understanding scientific motivations for specific habits and preferences, beyond conformity to problematic assessment / credit systems (a 'culture problem' is not necessarily a 'people problem')
 - ▶ Attention to ECRs is key, e.g. Global Young Academy activities in this space since 2012

Diversity as a starting point

- ▶ Support researchers' transition to OS: cannot simply be delegated down, especially as researchers are already overwhelmed by admin and management
- ▶ Don't buy into 'novelty' narrative relating to OS: openness has long been a constitutive value for scientific research, with many different ways of operationalizing it over the last few centuries
- ▶ Beware of attempts to interpret openness as disregard for expertise and know-how
 - ▶ Build in methods to identify and value expert knowledge

Example: Fostering Findability over (immediate) Accessibility

- ▶ Share metadata, require human contact for data sharing (including agreement around conditions for re-use) [e.g. some biomedicine-oriented data infrastructures]
- ▶ Foster direct contact between data creators/holders and users
 - ▶ Increase of trust
 - ▶ Opportunity for better contextualization and future collaboration
 - ▶ Visibility and credit for data creators
- ▶ Encourage long-term Communities of Practice

Conclusions

Addressing structural injustice means fostering structural change: reparation beyond affirmative action

Structural change requires more than mitigation strategies: **reframing the conceptual and institutional grounding of empirical inquiry**

Embracing vulnerability and community action as paths to open, reliable, equitable knowledge-making

Concrete pathways to reform:

Engagement across local communities and beyond professional science **(Public Science Lab)**

Reform of institutional and material/digital infrastructures to serve widely diverse capabilities and goals **(Ethical Data Initiative)**

Lobbying to reform education and labor markets, funding for transdisciplinary research **(Pianeta)**



pianeta

Humanities, Arts and Social Sciences as alternative models of OS practice

- ▶ In all these ways, HASS subjects can act as a role model
- ▶ Shift of gears: emphasis on relations, situatedness of knowledge claims and research processes, contextualization and historicity
- ▶ Reflexivity at the heart of openness as engaged empirical inquiry
- ▶ Case-based metrics and analysis, revaluing of qualitative methods
(see LSE Impact Blog post “*To monitor the development of open science we need to do more than count outputs*” in collaboration with Ismael Rafols, UNESCO Chair in OS – forthcoming next week!)

Thank you for your attention



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- Leonelli, S. and Lewandowsky, S. (2023) *The reproducibility of research in Flanders: Fact finding and recommendations - KVAB Thinkers' report 2022*.

Abstract: Open Science is often presented as a solution to the multiple problems afflicting contemporary scientific practices, ranging from lack of reproducibility to dubious review procedures, inefficient communications and lack of transparency around methods and circumstances of research. Much of the debate around Open Science and how it should be implemented verges, however, on the natural sciences – and particularly physics and biomedicine – as a reference point and model for research practice. In this talk, I challenge this assumption, propose an alternative understanding of the ideas of openness and transparency, and suggest ways to value a much wider diversity of research settings and domains – including agricultural research, marine and environmental science, and the humanities, arts and social sciences - as key interlocutors and precious models for Open Science implementation.

► Reference: Leonelli, S. (2023) *Philosophy of Open Science*. Cambridge University Press, available Open Access.

<https://www.cambridge.org/core/elements/philosophy-of-open-science/0D049ECF635F3B676C03C6868873E406>