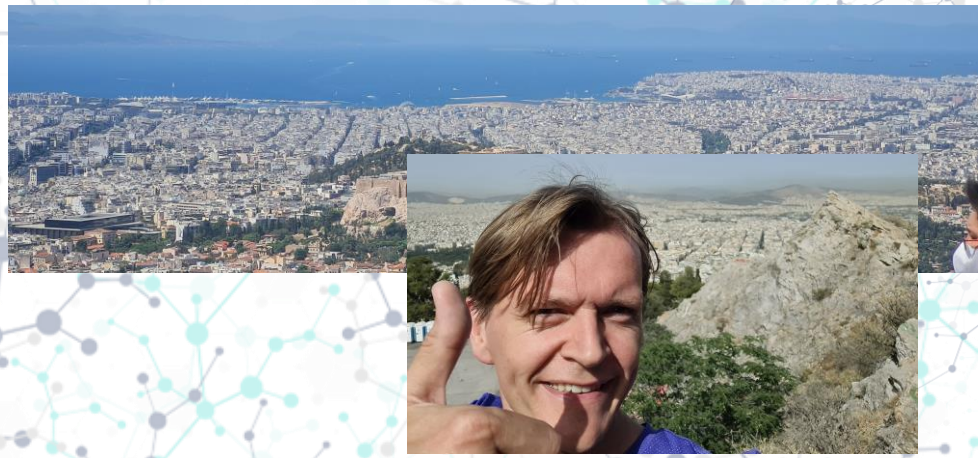
Enhancing Trust, Integrity and Efficiency in Research through next-level Reproducibility

The Future(s) of reproducibility

Joeri Tijdink, AmsterdamUMC

TIER2 Project



WCRI2024, June 2024

Funded by the European Union.
Views and opinions expressed are those of the author(s) only and do not necessarily reflect those of the European Union or the European Commission.
Neither the EU nor the EC can be held responsible for them.

Content

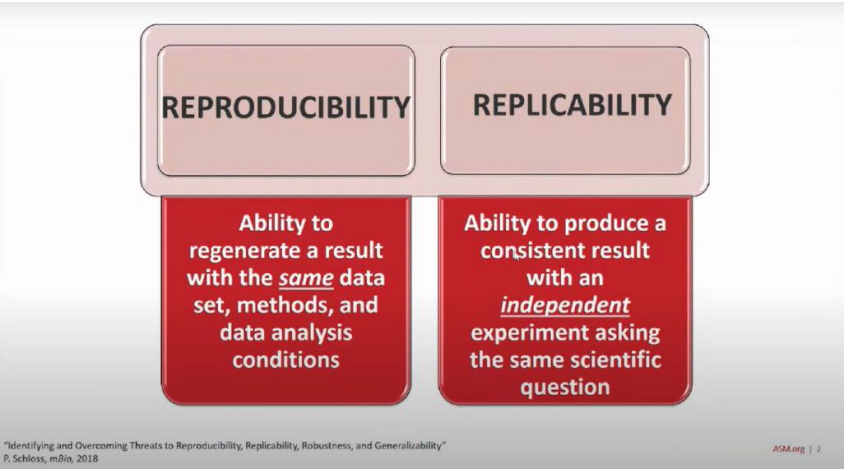
- TIER2
- The value of epistemic diversity
- Stakeholders commitment
- The futures of reproducibility
- Behaviour change
- What is next?

TIER2: enhancing Trust, Integrity And Efficiency In Research through next-level Reproducibility

- Investigate reproducibility in social, life, computer sciences, plus funder and publisher contexts
- Co-creative approach to creating and evaluating 8 new reproducibility tools and practices
- Partners from across Europe

What is reproducibility?

What is reproducibility?



What is reproducibility?

- Cornerstone of the *research endeavour*
- Definitions vary (a lot) => What a mess
  - Same words for different things
  - Complexity: various elements of research can be reproducible
- At its highest level, obtaining consistent results when repeating experiments and analyses
- TIER2 proposes two main characteristics to define different types of reproducibility and replication: the ***practices*** and the ***functions***
- Practices are distinguished between ***redoing*** and ***enabling***

TIER2 Strategic Priorities

1. Frame reproducibility as a reformation, not a crisis
2. Center “epistemic diversity”
3. Systematize evidence for informed policy across contexts
4. Work together to boost capacity at all levels

See also: Ross-Hellauer T. (2023). Strategic priorities for reproducibility reform. PLOS Biology 21(1): e3001943. https://doi.org/10.1371/journal.pbio.3001943

Why epistemic diversity?

- Value different epistemic contexts
- Include diverse perspectives on reproducibility
  - Knowledge Production Modes
- Tailor 8 tools and practices to different contexts
- Include publishers and funders

Ulpts & Schneider, 2024

Why should we care?

- Reproducibility is the cornerstone of research quality
- Reproducibility connects with RI-practices
  - Open science
  - Research methods
  - Data management
  - Transparency
  - …

Credits: Fotor AI

What is next?

Why Futures Studies?

Why employ futures studies?

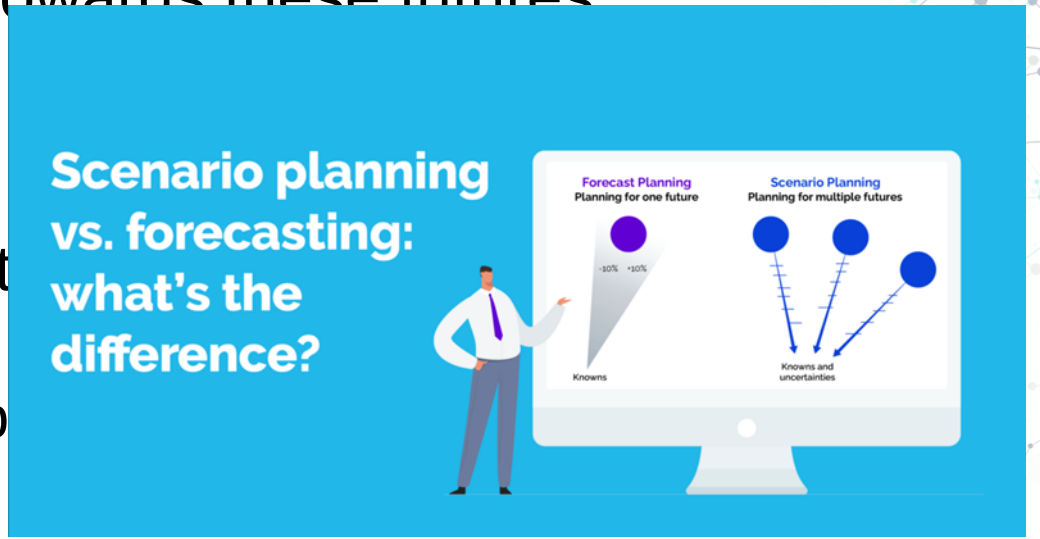
- Exploring possible preferred futures
- Discussion on the future of reproducibility
- Applicable to diverse disciplinary fields
- “Are we moving in the right direction?”
- Enablers and barriers for reproducibility in research?

Futures Studies

- Objectives
  - Scope the ideal future of reproducibility for different stakeholders
  - Explore the roadmap towards these futures
- Methods
  - Scenario planning
  - Backcasting methods to explore the preferred future of reproducibility
    - Identify drivers and barriers

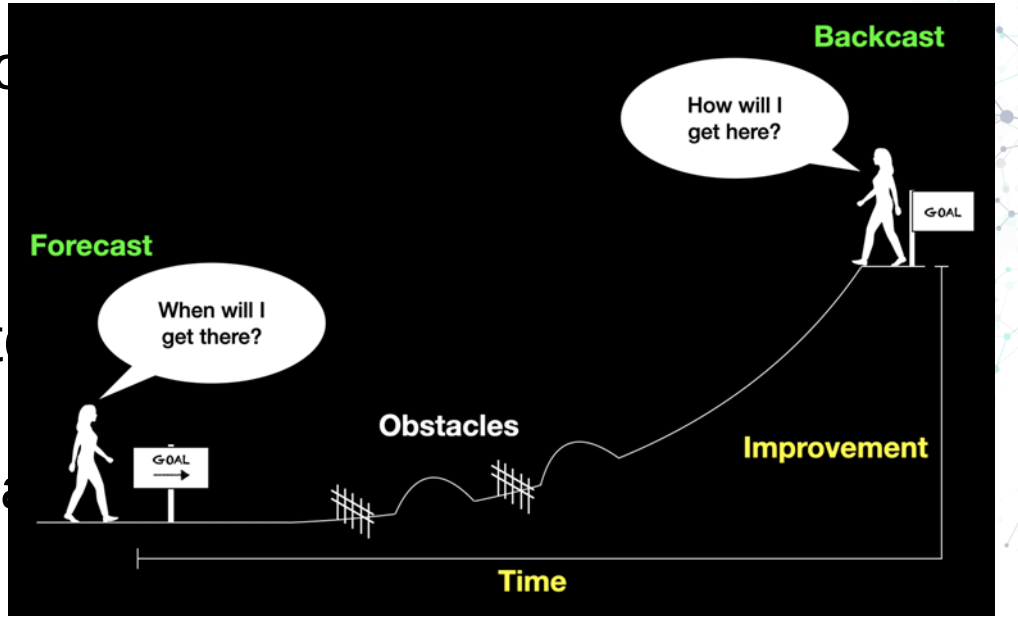
Futures Studies

- Objectives
  - Scope the ideal future of reproducibility for different stakeholders
  - Explore the roadmap towards these futures
- Methods
  - Scenario planning
  - Backcasting methods t
    reproducibility
    - Identify drivers and b



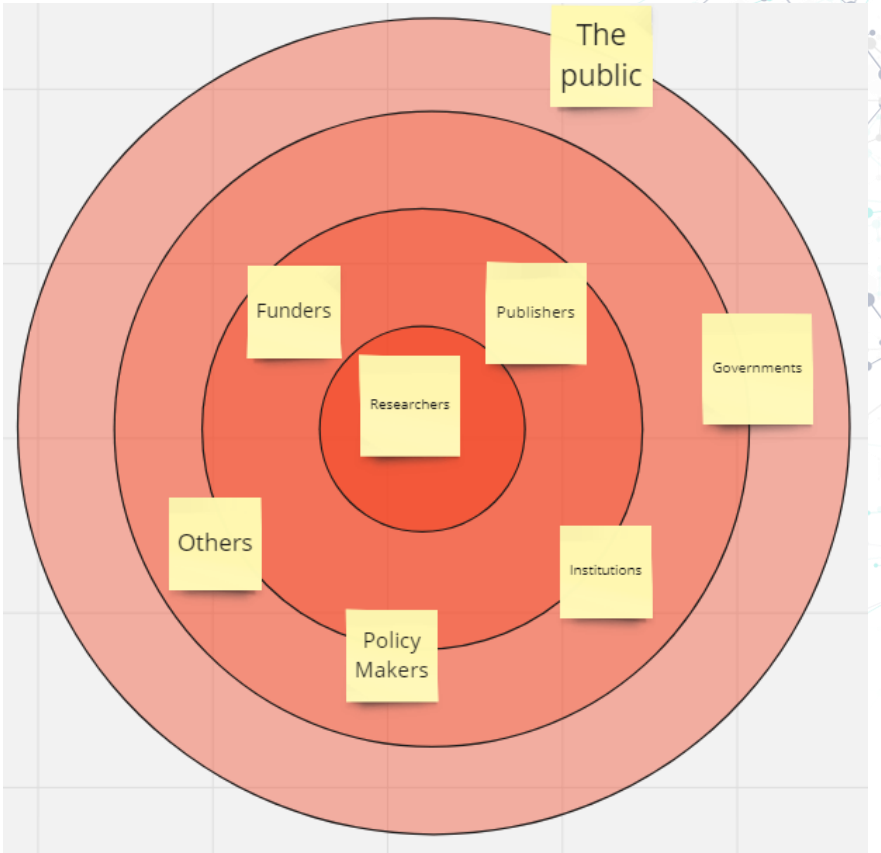
Futures Studies

- Objectives
  - Scope the ideal future of reproducibility for 4 different stakeholders
  - Explore the roadmap to
- Methods
  - Scenario planning
  - Backcasting methods to reproducibility
    - Identify drivers and ba



Futures Studies – Stakeholder mapping

Who has influence on the future?



Futures Studies – Preferred futures

- *Research culture*
  - Quality over quantity is the norm (also in assessment)
  - Reproducibility is introduced during master's and PhD - education

- *Definitions and standardization*
  - A solid definition of reproducibility with enough adaptability to account for differences in disciplines and methodologies
  - Definition and standards are used and applied by funders, journals and conferences

Futures Studies – Preferred futures

- *Guidelines, infrastructure and policy*
  - Public infrastructures are available and usable
  - Clear guidelines are available for what is required from researchers
- *Incentives and costs*
  - Recognition of different stakeholders' reproducible actions and practices are recognized
  - Researchers are rewarded for alternative research outputs
  - Reproducibility will spur the opportunity for collaboration

The enablers and barriers

What are the Enablers?

- Research culture
- Technology and infrastructure
- Training and education
- Policy
- Funding

What are the barriers?

- Cultural and social issue
- Motivation
- Systems and institutions
- Tools and infrastructures
- Costs (finance/resourses)
- Lack of policy
- Lack of know-how

Elements of research culture change (from Nosek, 2019)

- Treat reproducibility as a “full stack” problem
- Joined-up approaches for coordinated change at all levels
- Building on the great strides already made
  - Reproducibility Networks
  - **Open** infrastructures, e.g., OSF, EOSC
  - Research assessment reform (COARA)

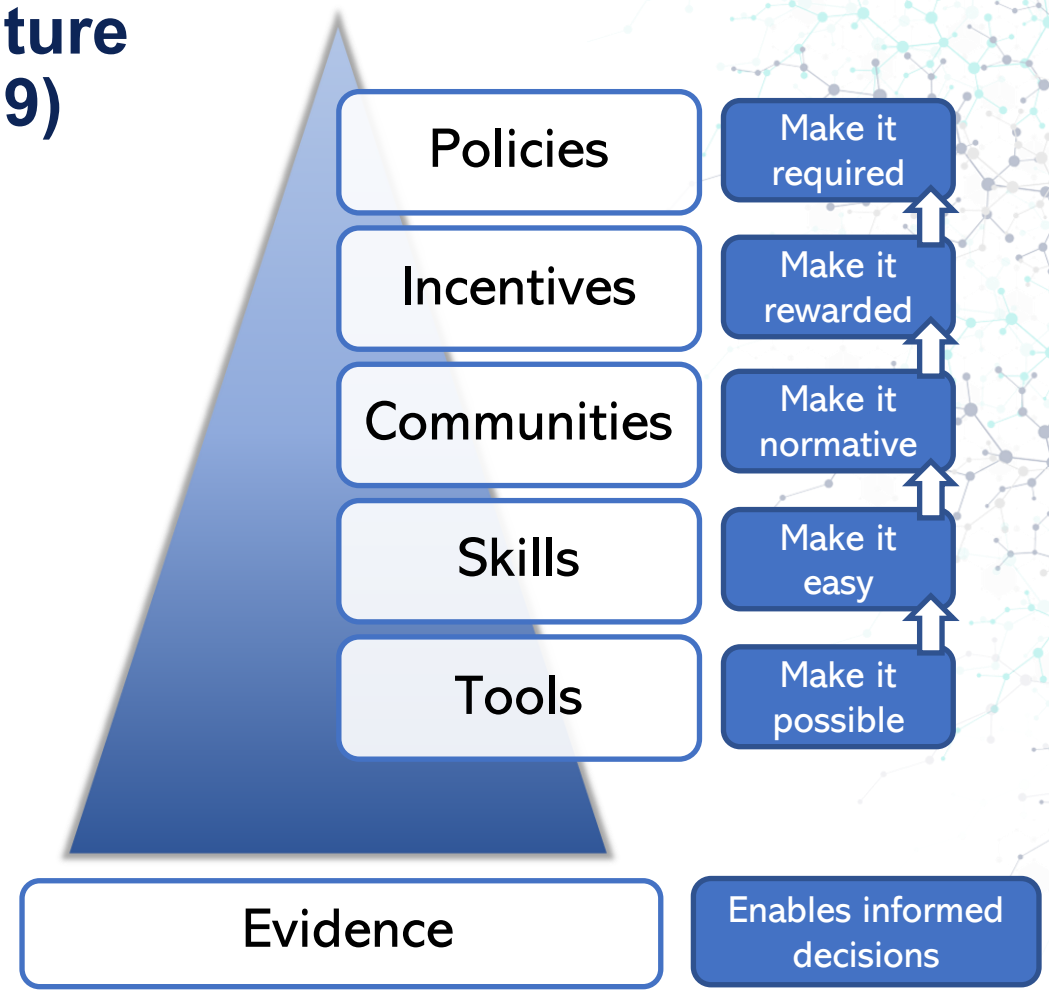
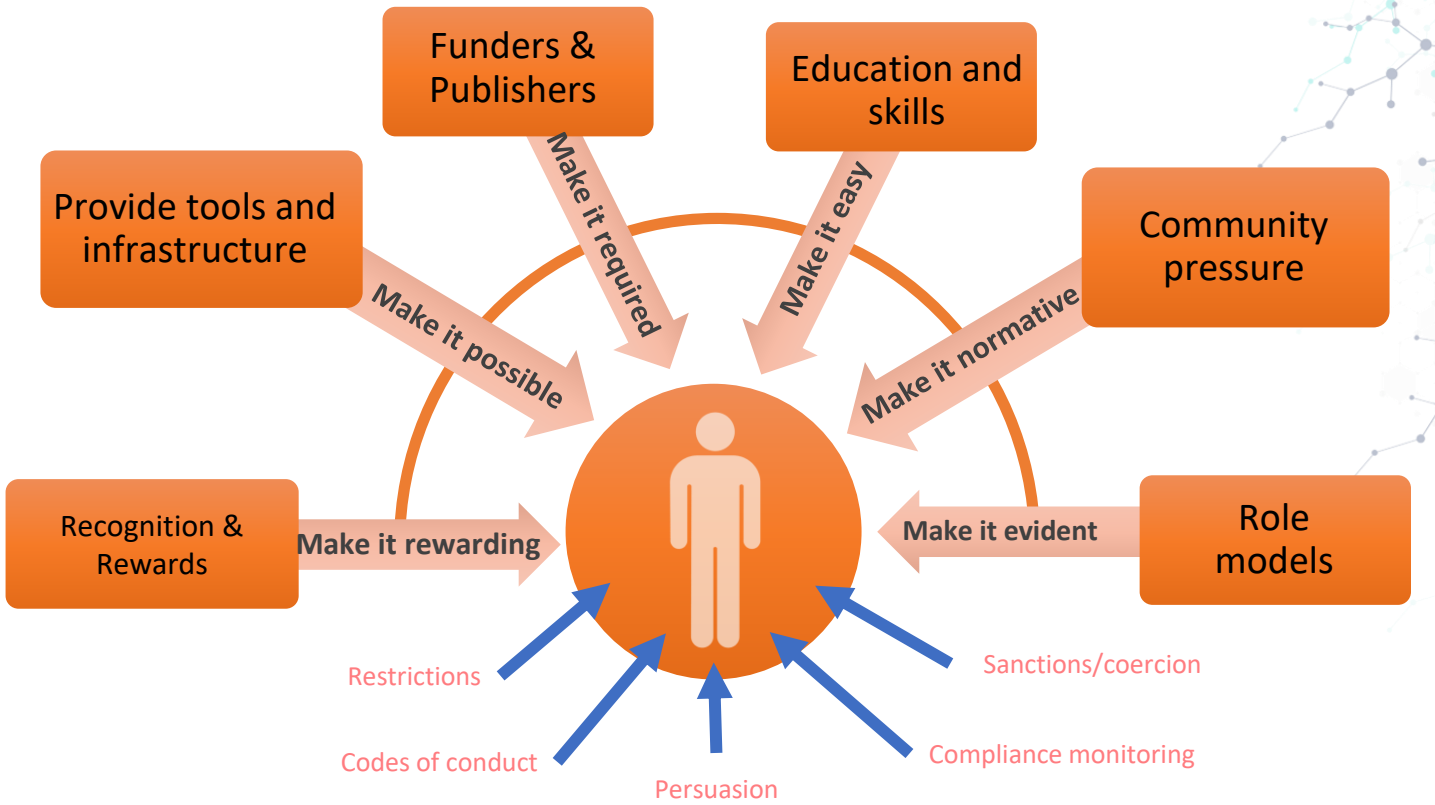


Figure adapted from CC BY figure in: Nosek, B. 2019. “Strategy for Culture Change.” 2019. https://www.cos.io/blog/strategy-for-culture-change.

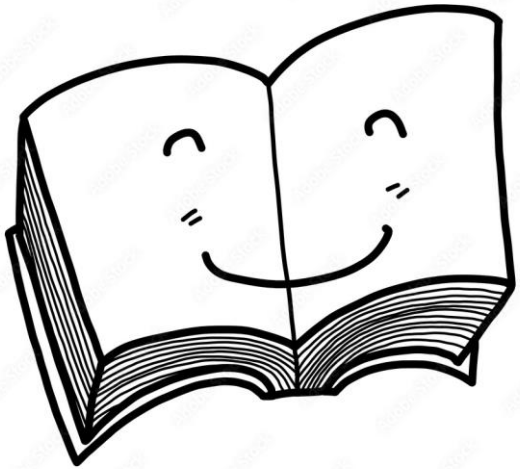
How can we change behaviour?

- Change through:
  - Rewards
  - Active communities
  - Infrastructures
  - Tools
  - Skills and education
  - Policy



Research Culture impact researchers' motivation

(adapted from Stroobants, Aubert Bonn 2022, inspired by Osborne et al 2024)



What do we need?

- Easy to use interventions/tools => TIER2
- Different stimulating actors (funders and publishers)
- Value different epistemic contexts
- Behaviour change in different stakeholder communities
  - Wicked problem
  - Synergy cycle
- Rolemodels
- Implementation

And…

- Spread the word
- Behavioural change goes slow
- Preach to different choirs
- Be a role model

Thank you!

Thank you!

Contact:

Joeri Tijdink jk.tijdink@amsterdamumc.nl

Read more:

Ross-Hellauer, Klebel, Bannach-Brown, Horbach, Jabeen, Manola, Metodiev, Papageorgiou, Reczko, Sansone, Schneider, Tijdink, Vergoulis. 2022. TIER2: enhancing Trust, Integrity and Efficiency in Research through next-level Reproducibility. *RIO Journal*. https://doi.org/10.3897/rio.8.e98457