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Open research data sharing and use by means of
infrastructural and institutional arrangements

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TUDelft

1. Welcome
2. Imaginary situations
3. Data sharing in practice
4. Infrastructural and institutional arrangements
5. Arrangements in practice
6. Conclusions

Outline

- Imaginary situations
- Open research data sharing in practice
- Infrastructural and institutional arrangements
- Arrangements in practice
- Conclusions & discussion

1. Imaginary situations

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Imaginary situation 1

- You're a PhD researcher
- Study on how people interact
- Considering openly sharing data
- Situation:
 - No institutional data repository, no policy
 - No support from supervisor or colleagues
 - Lack of time

Imaginary situation 1

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- Would you openly share your research data in this situation?



Imaginary situation 2

- Considering openly sharing data
- Situation:
 - Supportive institutional open data policy
 - Dedicated and helpful data steward
 - Useful institutional data repository
 - Supervisor and colleagues openly share data

Imaginary situation 2

- Would you openly share your research data in this situation?



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Imaginary situation 3

- Collected data related to the COVID-19 crisis
- Research on physical interactions between people and how people socially distance from each other might → useful for policy making

Imaginary situation 3

- Would you openly share your research data in this situation?



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Imaginary situations

- To share or not to share?
- Purpose of imaginary situations:
 - Illustrate infrastructural and institutional arrangements that stimulate or discourage researchers to share and use open research data (e.g. policies, support, data repository)
- To discuss more later in this presentation

Practical situations

- Questionnaire concerning factors influencing research data sharing
- Preliminary findings
 - Disciplinary differences in openly sharing data
 - Existing arrangements to stimulate data sharing
 - Data sharing in times of COVID-19

2. Openly sharing research data in practice

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Questionnaire

- 119 responses
- Largely disseminated across researchers from difference research disciplines

What is your age?

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Age	Percentage (frequency)
20 or younger	0% (0)
21-30	28% (33)
31-40	34 % (40)
41-50	24% (29)
51-60	11% (13)
61-70	3% (4)
70 or older	0% (0)
Total	100% (119)

What is your gender?

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Gender	Percentage (frequency)
Female	54% (64)
Male	45% (54)
Prefer not to say	1% (1)
Other	0% (0)
Total	100% (119)

In what country do you reside?

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Country	Percentage (frequency)
Netherlands	34,5% (41)
Indonesia	8,4% (10)
Italy	5,0% (6)
United Kingdom	5,0% (6)
United States of America	5,0% (6)
Other countries	42% (50)
Total	100% (119)

Respondent's position

- 99/119 are researchers
 - 71% academic
 - 12% non-academic
- Results on next slides concern these 99 researchers

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Respondent's position

- 99 researchers, mainly:
 - PhD candidates (28%)
 - Associate professors (12%)
 - Assistant professors (10%)
 - Full professors (9%)

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Experience

- Experience with practicing open science & open research data → very divers
- 41 / 99 respondents openly shared research data in the past few months

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Research disciplines

- Large diversity
- 25 / 99 respondents worked in a COVID-19 related discipline

Positive attitude towards research data sharing

- *“It would be good if I would openly share my research data”* (supported by 88 / 99)
- *“Other people in my environment would approve it if I would openly share my research data”* (supported by 78 / 99)

Support from supervisor & colleagues

- *“My supervisor / colleagues encourage(s) me to openly share research data”*
(supported by 34 / 35 out of 99)
- *“Most people like me in a position as a researcher openly share research data”*
(supported by 35 out of 99)

Data sharing in relation to COVID-19

- Imaginary situations
- *“The COVID-19 crisis **increased my willingness to openly share research data**”*
(supported by 38% - rejected by 62%)
- Crisis may make researchers more aware of importance of open data

Data sharing in relation to COVID-19 – disciplinary differences?

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	Social sciences and the humanities	Other research disciplines	Total
Yes – COVID-19 crisis increased my willingness to openly share data (to a large, medium or small extent)	18% (18)	20% (20)	38% (38)
No – COVID-19 crisis did not influence my willingness to openly share data	35% (34)	27% (27)	62% (61)
Total	53% (52)	47% (47)	100% (99)

Data sharing in relation to COVID-19 – disciplinary differences?

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	COVID-19 related research discipline	Non-COVID-19 related research discipline	Total
Yes – COVID-19 crisis increased my willingness to openly share data (to a large, medium or small extent)	24% (24)	14% (14)	38% (38)
No – COVID-19 crisis did not influence my willingness to openly share data	51% (50)	11% (11)	62% (61)
Total	75% (74)	25% (25)	100% (99)

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Questionnaire

- Thanks to all respondents!
- Ongoing research: you can still complete the questionnaire here:
<https://tinyurl.com/yagh9wln>
- Underlying research data will be shared openly



Institutional and infrastructural arrangements

Think back of imaginary situations...

- The willingness to openly share research data may be reduced because of:

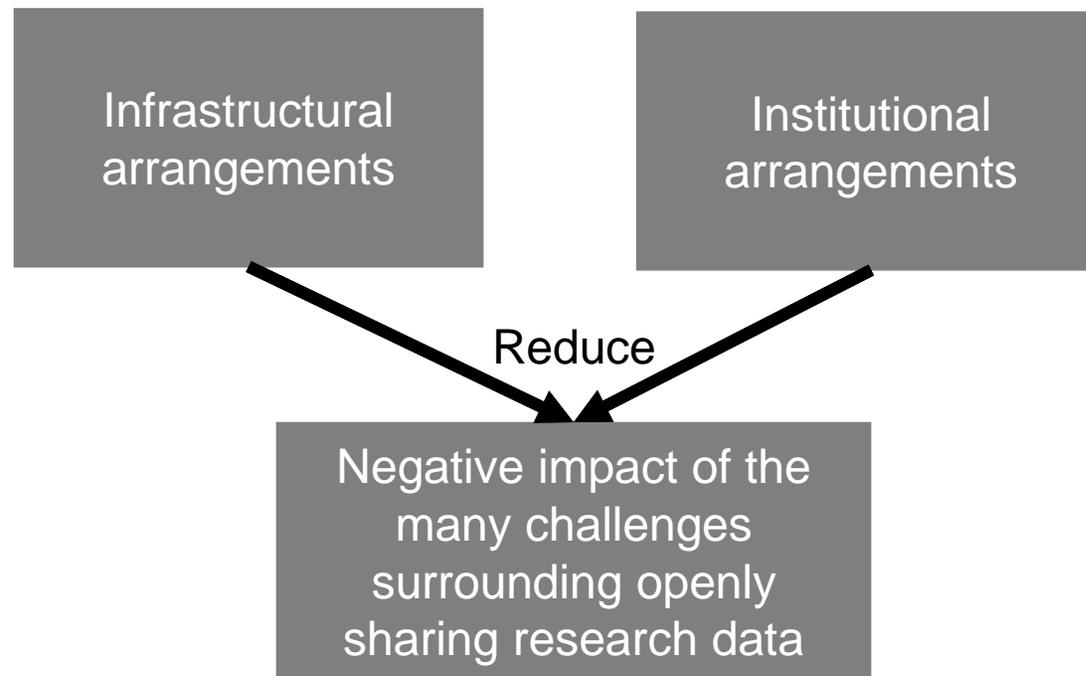
the lack of appropriate institutional and infrastructural arrangements

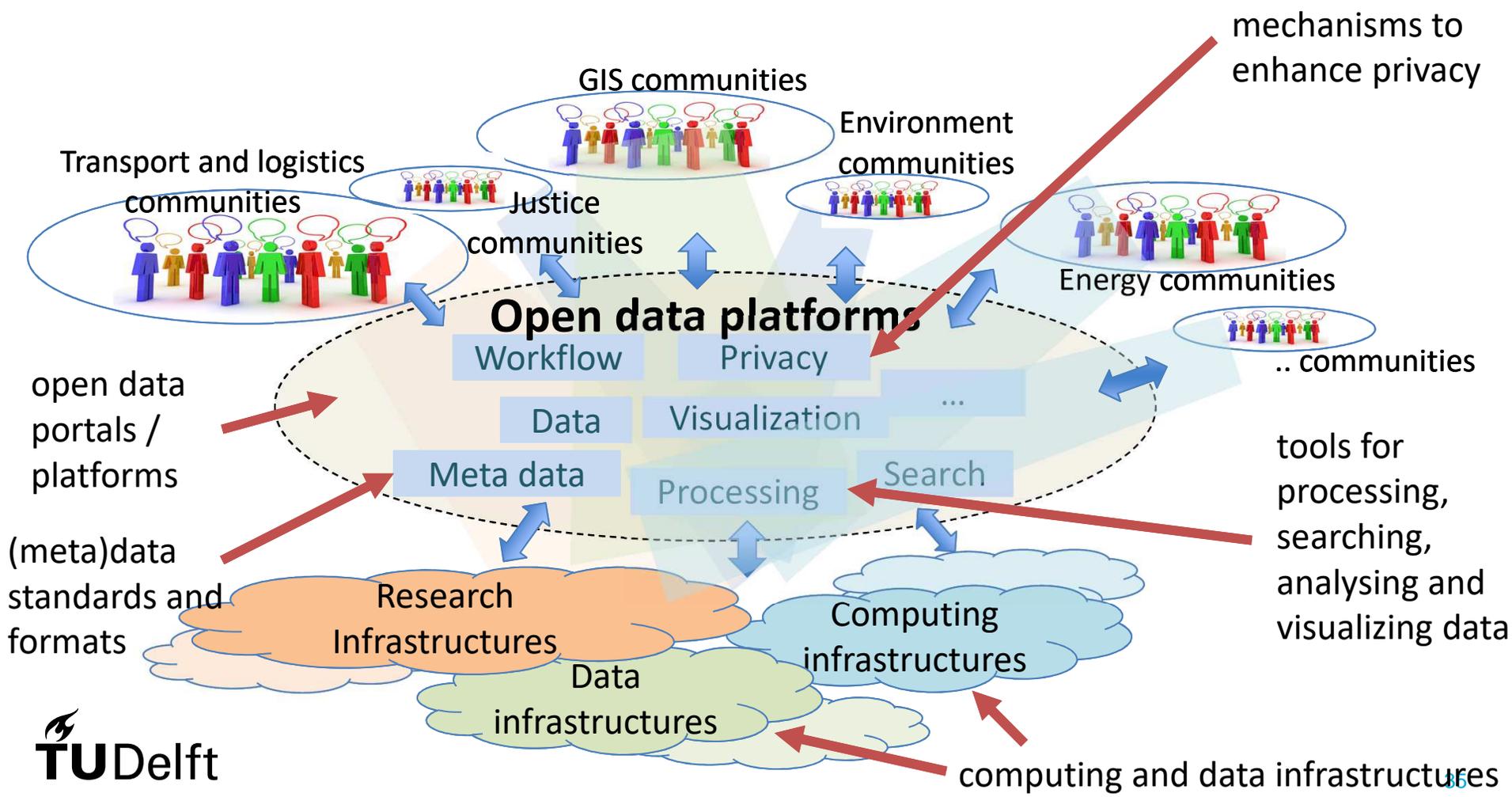
Lack of infrastructural and institutional support

- Majority of respondents disagrees with the statements:
 - “My institution provides sufficient support for openly sharing research data”
 - “My institution provides a useful infrastructure for openly sharing research data”

Expected effects of infrastructural and institutional arrangements

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Institutional arrangements



- The combination of:
 - formal structures (e.g. university policies, processes)¹
 - informal structures (e.g. norms, culture)^{1,2}
 - enforcement characteristics or operational mechanisms of institutions to incentivize ORD sharing and use^{1,2}
 - governance elements (e.g. mechanisms to enhance privacy, trust and interaction between data providers and users)³

¹ North, D. (2005). *Understanding the process of economic change*. Princeton: Princeton University Press.

² Williamson, C. (2009). Informal institutions rule: institutional arrangements and economic performance. *Public Choice*, 139(3-4), pp. 371-387.

³*Zuiderwijk, A. (2015). Open data infrastructures: The design of an infrastructure to enhance the coordination of open data use.

<https://repository.tudelft.nl/islandora/object/uuid:9b9e60bc-1edd-449a-84c6-7485d9bde012>

Institutional arrangements



- Various types*
 - Hierarchy-based
 - e.g. authority, rules
 - Market-based
 - e.g. competition, exchange, interaction between actors
 - Network-based
 - e.g. cooperation, trust, mutual dependencies, responsibilities

* Crompvoets, J. & Ho, S. (2019). Developing a Framework for National Institutional Arrangements in Geospatial Information Management. *Sustainable Development Goals Connectivity Dilemma: Land and Geospatial Information for Urban and Rural Resilience*, p. 141.

Infrastructural and institutional arrangements

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- I just presented arrangements found in the literature
- How about arrangements *in practice*?
 - Research with TU Delft student Thijmen van Gend



Institutional and infrastructural arrangements *in practice*

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Examining arrangements in practice – research approach

- Policy documents
- Website university library*
- 7 interviews in May-June 2020
 - 4 policy makers
 - 3 service/support providers
 - 1 researcher actively engaged in sharing data
 - 2 researchers less actively engaged in sharing data
- Note: research in progress

*<https://www.tudelft.nl/en/library/current-topics/research-data-management/>

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Infrastructural arrangements in practice - categories

- Discovering infrastructures
- Choosing an infrastructure
- The 4TU Data Repository

Infrastructural arrangements in practice – discovering infrastructures

- Uploading data
 - researchers often select the first data repository that find that seems to work well – not looking further
- Downloading data
 - researchers struggling with finding suitable data and repositories



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Infrastructural arrangements in practice – selecting an infrastructure

- Not always easy to select an institutional, disciplinary and generic research data repository
- Data stewards may also be puzzled sometimes

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Infrastructural arrangements in practice – 4TU Data Repository

- 4TU data repository
 - Sometimes perceived as *the* institutional repository
- To select an institutional or disciplinary data repository?
- Support by front-office / back-office

4TU.Centre for Research Data



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Institutional arrangements in practice - categories

- Institutional policies
- Data management education
- Community support
- Research Data Management support
- Financial support
- Guidelines

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Institutional arrangements in practice – institutional policies

- University-wide framework and faculty-specific policies in place
 - Limited impact (yet another administrative or regulatory burden)
 - Policy designers are aware of this – no coercive instrument

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Institutional arrangements in practice – data management education

- MOOC: Open Science: Sharing your Research with the World*
- Workshops:
 - Software Carpentry
 - Data Carpentry
 - Code Refinery
- New Research Data Management Course

* <https://online-learning.tudelft.nl/courses/open-science-sharing-your-research-with-the-world/>

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Institutional arrangements in practice

– community support

- Open Science Community Delft (including ‘Data Champions’)
 - Network
 - Answer data-related questions of researchers from their department
- Not consulted much
- Not necessarily a bad thing
 - Learning from other ‘data champions’
 - Perhaps data steward is approached instead

Institutional arrangements in practice – RDM support (1)

- Requirement of Data Management Plan (DMP)
 - forces researchers to think about data sharing and reuse
 - Not completed by every researcher, usually only when this is an obligation

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Institutional arrangements in practice – RDM support (2)

- Faculty Data stewards
 - Need to be consulted for DMPs
 - improve data sharing and reusing practices

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Institutional arrangements in practice – RDM support (2)

- Data Managers employed by university library
- Can be hired by research groups
- Impact not clear yet

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Institutional arrangements in practice – financial support

- Data refinement fund
- Data paper fund
- Funds currently have a minimal impact
 - Requires researchers to estimate RDM costs, which is difficult
 - Funds are barely known among researchers



Institutional arrangements in practice – guidelines

- Multiple RDM Guidelines on the university website*
- Seem to have a low impact
 - Navigation through many web pages
 - Information overload
 - Jargon

* <https://www.tudelft.nl/en/library/current-topics/research-data-management/>

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Promising arrangements for data sharing and use: short-term

- Policy (documents)
 - Practice first, policy last
 - Not a coercive instrument
 - Change of responsibilities & informal policy information sessions
 - Renegotiate limitative contracts with companies
- Support options
 - Informal support
 - Data stewards

Promising arrangements for data sharing and use: short-term

- Data Management Plans
 - Sometimes official requirement (e.g. by funder or ethics committee)
 - Universal request
 - Create awareness, despite being perceived as cumbersome and administrative
 - Appropriate DMP template
 - Experimental workflow
 - Talk about data!
 - Straightforward and simple
 - Consider personal data

Promising arrangements for data sharing and use: short-term

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- Infrastructures
 - Institutional repository as a ‘last resort’ – domain-specific repositories may be more appropriate
 - Version control for updates in datasets
 - Peer review (anonymization)

Data preservation and archiving

re3data.org
REGISTRY OF RESEARCH DATA REPOSITORIES

The research data repository provides additional information on its service.



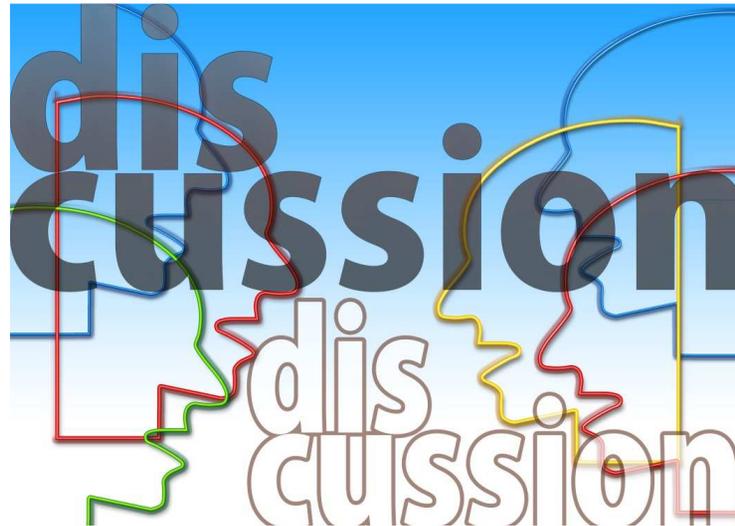
The terms of use and licenses of the data are provided by the research data repository.



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Promising arrangements for data sharing and use: short-term

- Communication
 - Community, peer-to-peer, or education
 - Central RDM course



Promising arrangements for data sharing and use: long-term

- Machine-actionable DMPs
 - Size → message sent to IT department
 - Reminders of dates mentioned in the DMP
- DMPs as a *service* rather than an *obligation*
- Increase awareness of arrangements
- Integrate and standardize different infrastructural elements

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Questionable arrangements for data sharing and use

- Open Science Communities
 - not so well-known among non-participants
- Library's role
 - not so well-known among researchers
- Data paper fund & data refinement fund
 - does not meet requirements & not so well-known
- Data managers
 - not yet in place, but barely requires researchers to still learn RDM-skills
- Library / university website
 - information overload

Pilot

- To be expanded

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Conclusions & discussion

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Main takaways

- Willingness and ability of researchers to openly share their data depends a lot on the context
- Factors influencing openly sharing research data are highly interconnected
- Many researchers do not receive sufficient institutional and infrastructural support for data sharing and use
- Some arrangements are promising and may reduce the negative impact of challenges surrounding open data sharing and use

Open questions

- Differences between:
 - Universities / countries / cultures
 - Research disciplines
- Mimicking?

