iup Institut für Umweltplanung

Leibniz Universität Hannover

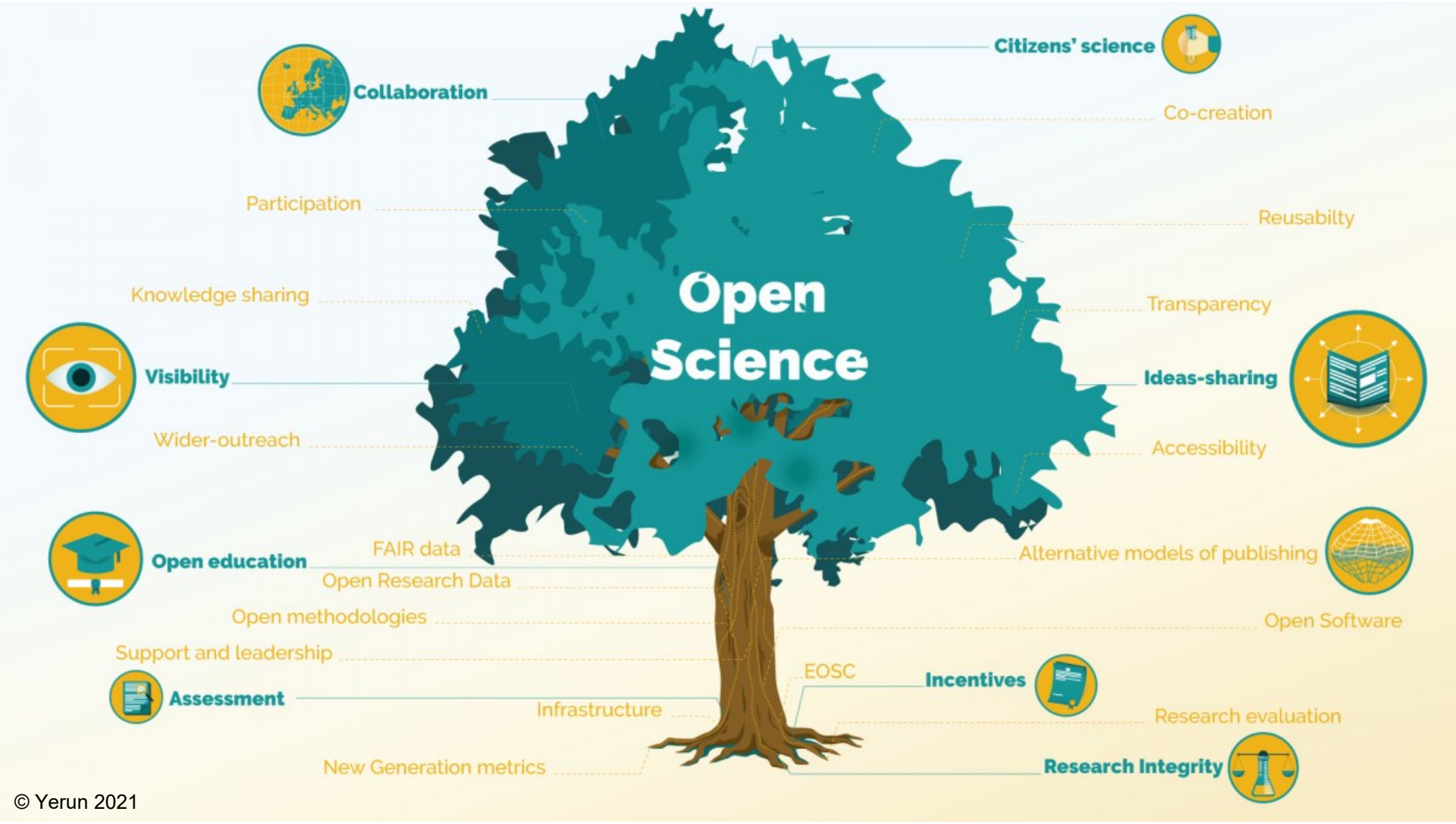
Barriers to Open Science
in Environmental Planning

OSCH
Open Science Community Hannover

Meetup
24 August 2023
innovercity

Johannes Hermes

What is open science?



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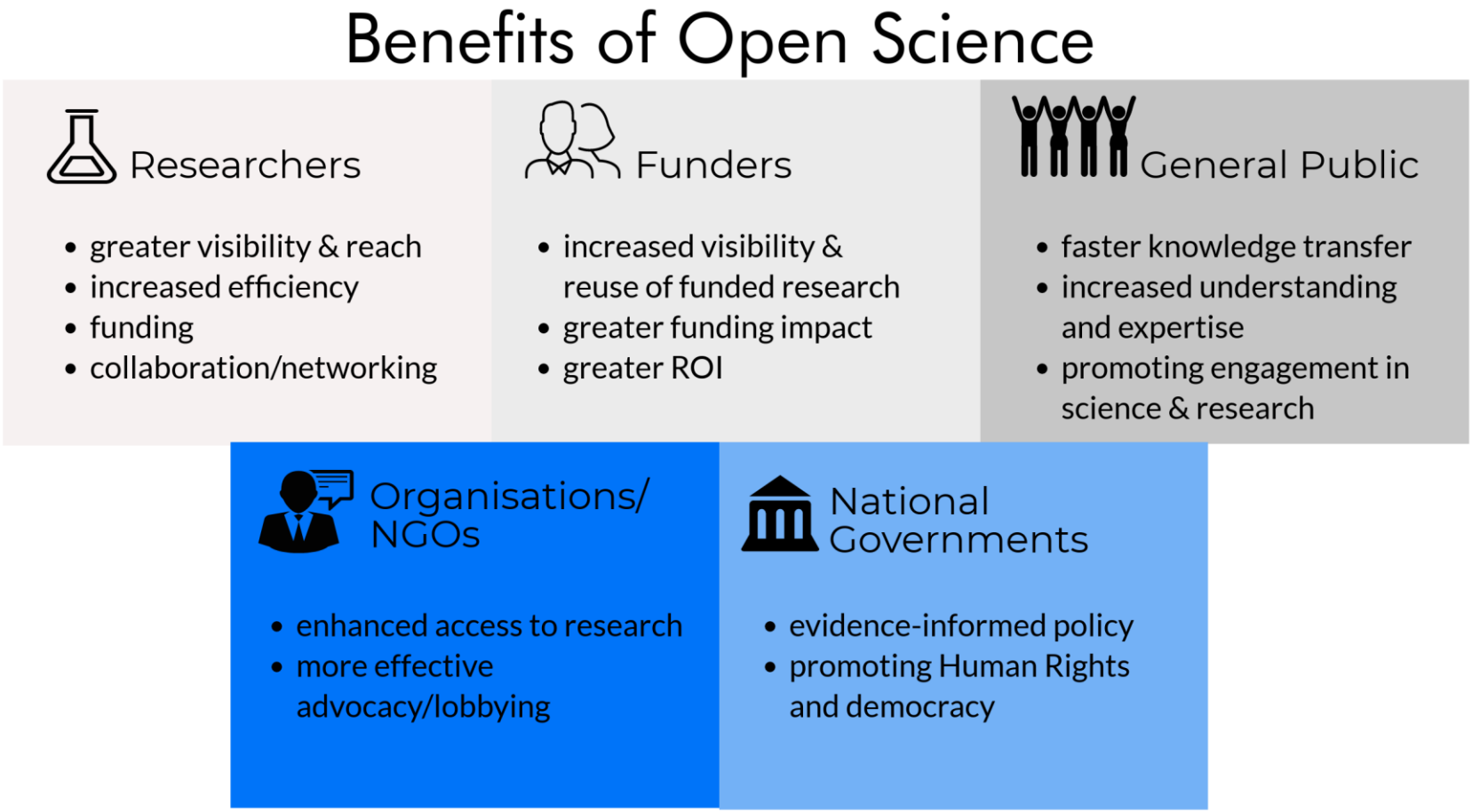

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Typical research output in Environmental Planning

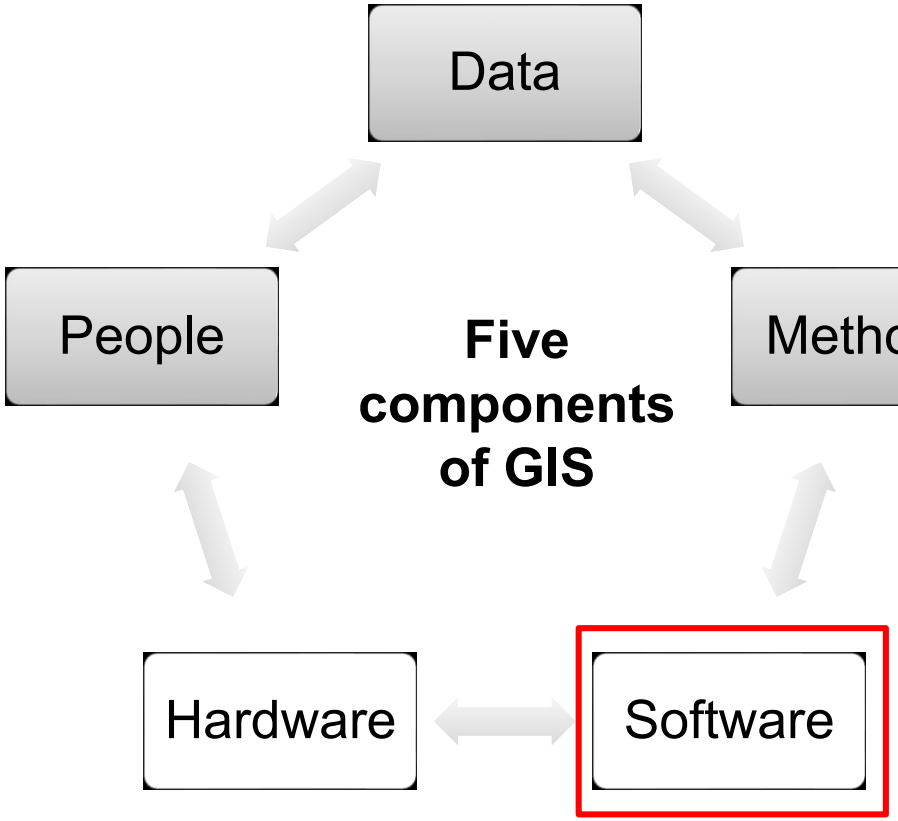
- Practice oriented (better informed decisions)
  - Administration, consultancies, NGOs, stakeholders, science
- Methodologies for assessing environmental goods and services
  - Original data
  - Existing data

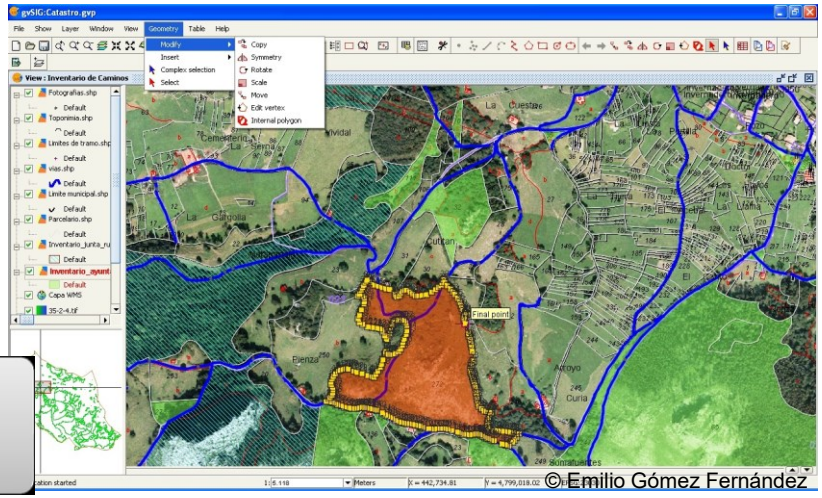
  → GIS-models → New information
- Resulting evaluation maps (case studies)
  - Often less important than methods / models
  - Specific for case study area and time
    - Need to be updated in regular intervals
    - Methods need to be adapted to planning contexts

→ We want methodologies and GIS-models to be open

Weapon of choice: GeoInformation Systems (GIS)

- What is a GIS?





Barrier I: Proprietary software

QGIS
- Open Source
- Volunteer driven
- Viable alternative in terms of power and usability
- Completely free to use

ESRI ArcGIS
- Proprietary
- Pioneer and still innovator
- Market dominator
- Full functionality is very expensive

- Dependence on proprietary software creates a paywall
  - Exclusive
  - Ties available funds
- Inefficient and hampering progress / innovation
- Move towards cloud computing has legal implications

Barrier I: Proprietary software

- A vicious cycle promotes the use of proprietary software

ArcGIS is widely used in science, teaching and practice

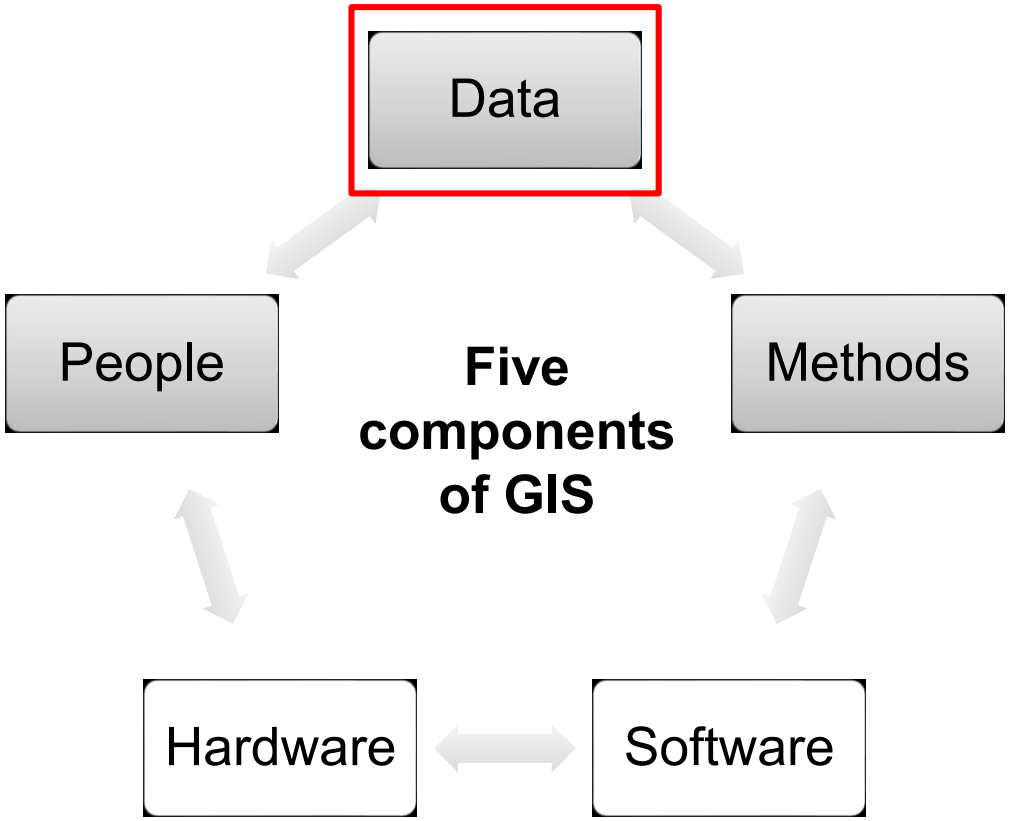
Students & employers ask for ArcGIS proficiency

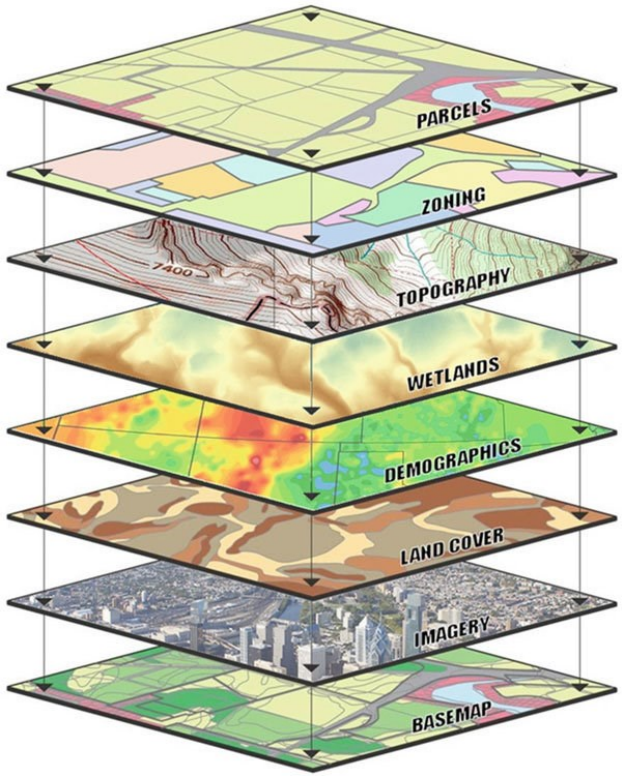
New employees & teachers use / teach ArcGIS

Advocate for more OSS

Weapon of choice: GeoInformation Systems (GIS)

- What is a GIS?

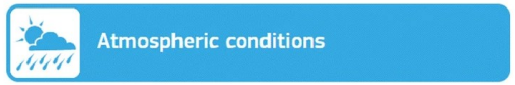


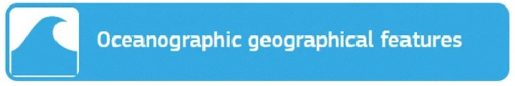


Different layers of data can be combined through a GIS to represent realistic and integrated digital maps of the Earth's surface or environmental goods and services

Barrier II: Proprietary / closed input data

- A lot has changed with INSPIRE

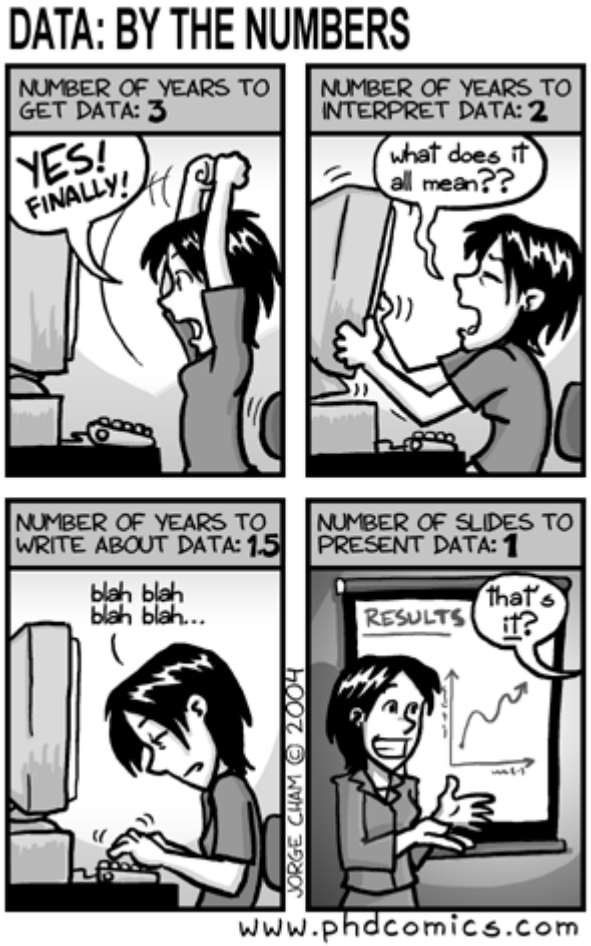




Barrier II: Proprietary / closed input data

- A lot has changed with INSPIRE
- BUT, best available data is still closed
  - Lack of knowledge about its existence
  - Access cumbersome, dependent on good will of owners, behind paywall, or prohibited
  - Sharing mapping results can be prohibited
  - Constrained repeatability and transferability

Advocate for more Open Data



Weapon of choice: GeoInformation Systems (GIS)

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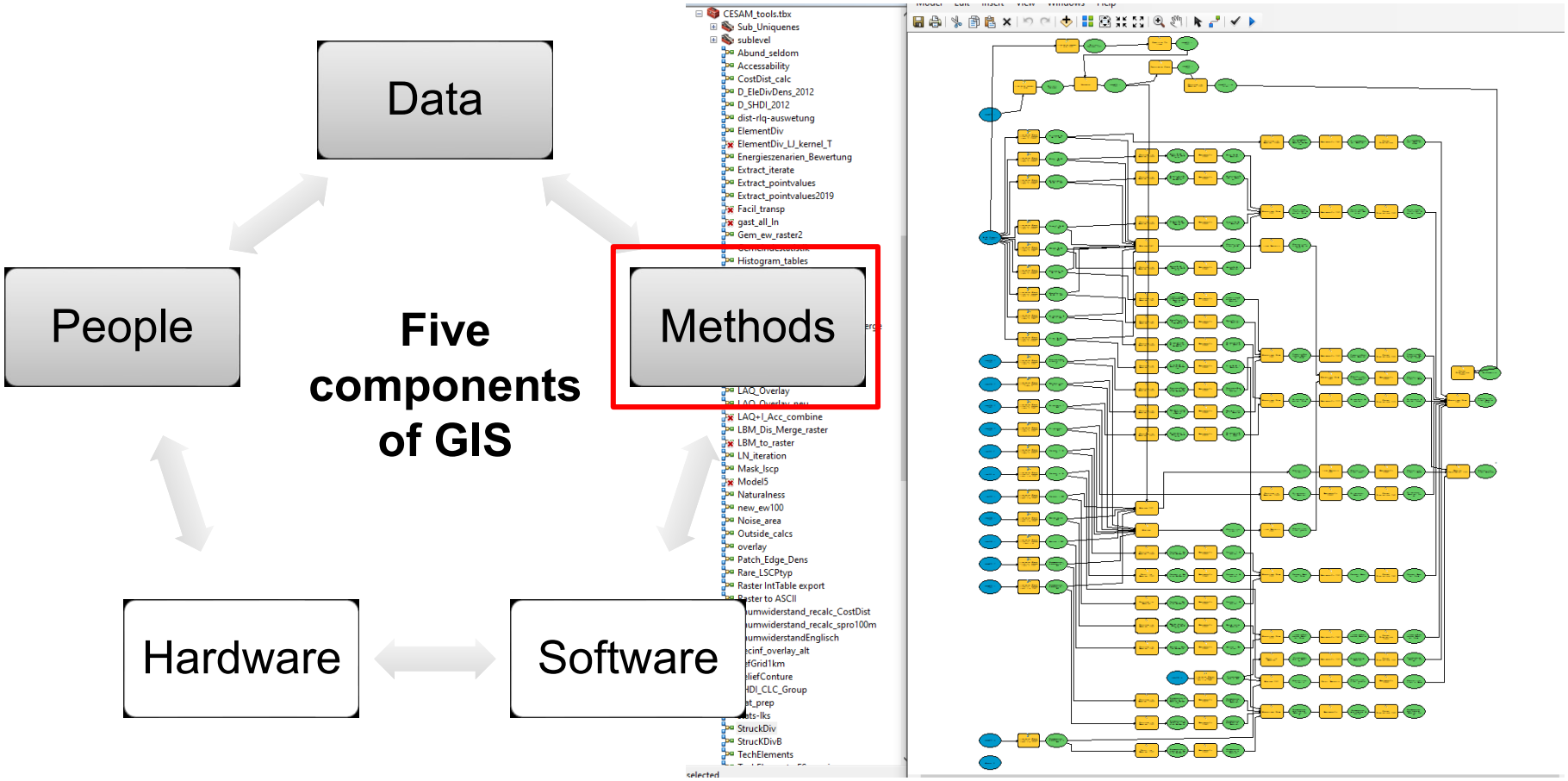
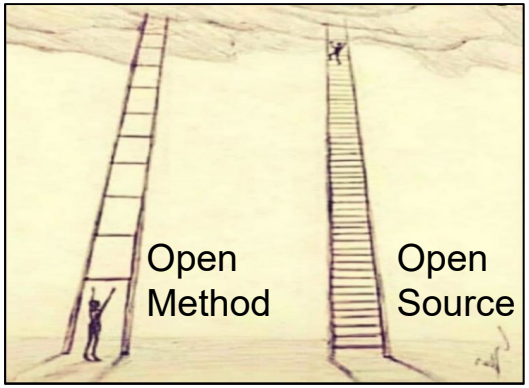


Barrier III: time and / or funding restrains



- Open methodology = Theoretical model → publish open access
- From open methodology to open source
  - Technical model
  - Working GIS model → detailed documentation
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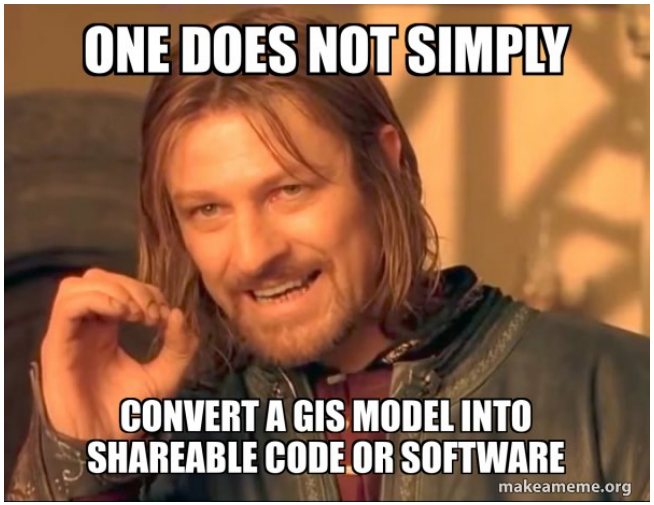
  - Shareable code or software



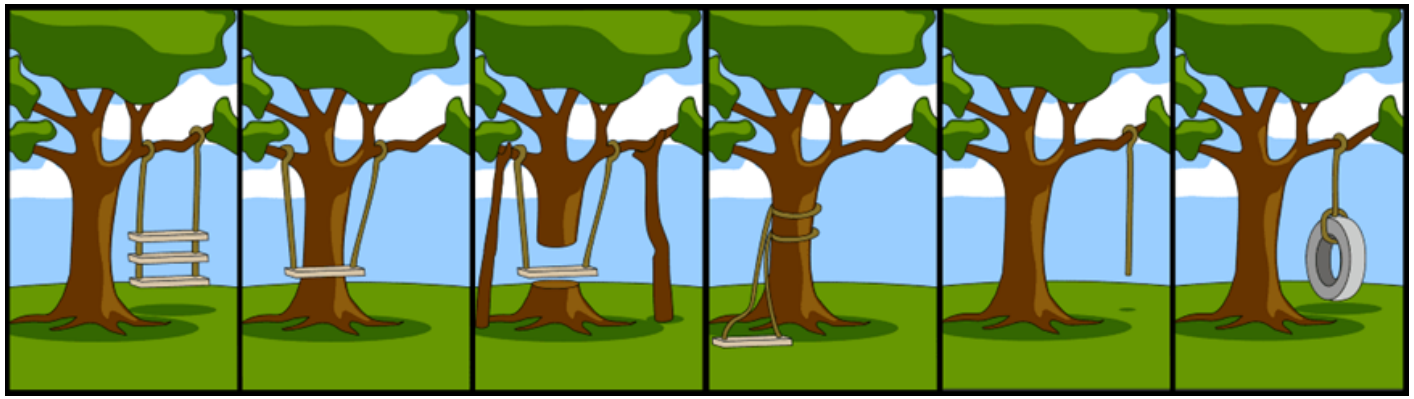
Barrier III: time and / or funding restrains

Researchers:

- Lack programming skills
- Lack time / funding
- In-house programming takes time and persistence

Programmers:

- Lack background knowledge
- Cooperation or service contract?
- Rights to code / software



How it was proposed | How it was understood | How it was developed | How it was programmed | How it was documented | What would actually be useful

Barrier III: time and / or funding restrains Examples for “successful” transfer

MANUELA
Managementsystem Naturschutz für eine nachhaltige Landwirtschaft

Vision:En 2040
Unsere Ideen, unsere Energiewende

Further developing nationwide indicators for cultural ecosystem services (KÖSL 2.0)

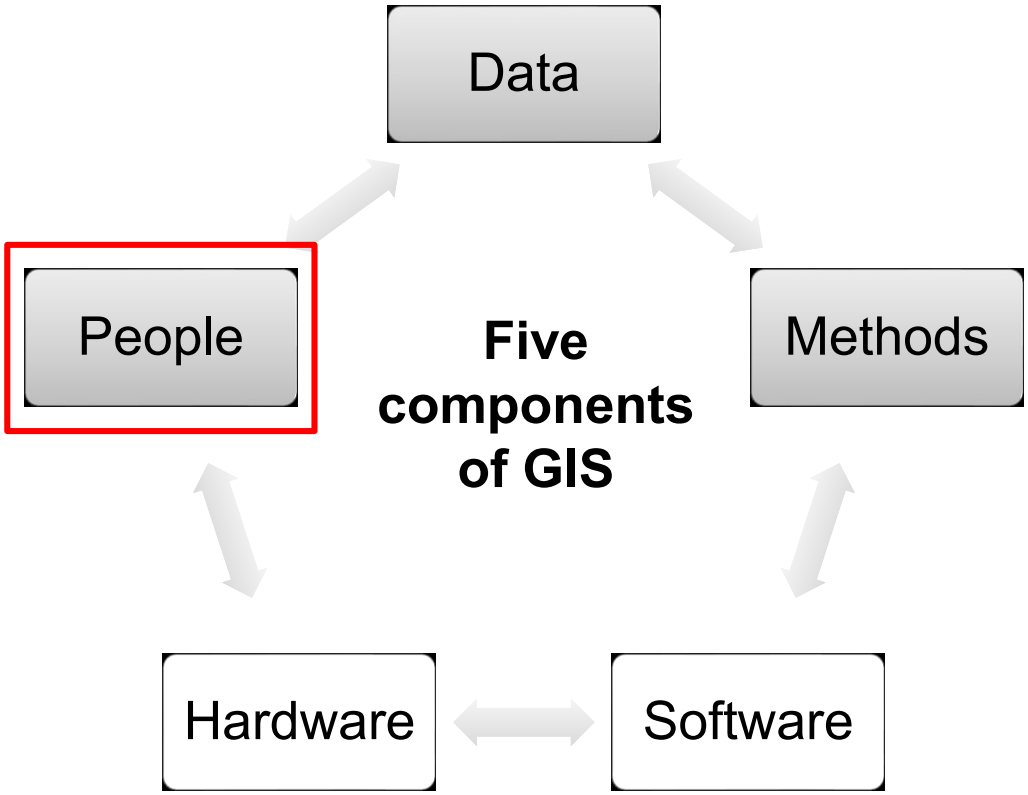
- Almost 10 years in the making
- Several R&D-Projects
- Several developers
- “Whenever there was time/funding”

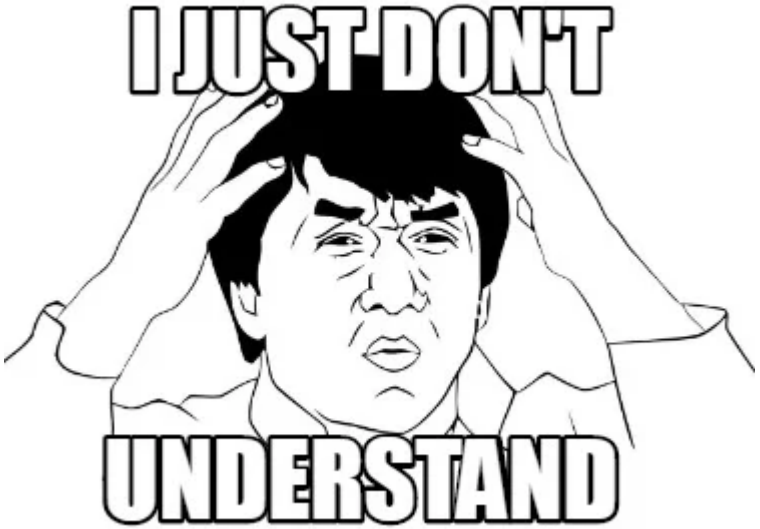
- Software now owned by third party? (former collaborator in R&D-project)

- A third-party currently tires to find money to “buy” an extended documentation / exported and commented code

Weapon of choice: GeoInformation Systems (GIS)

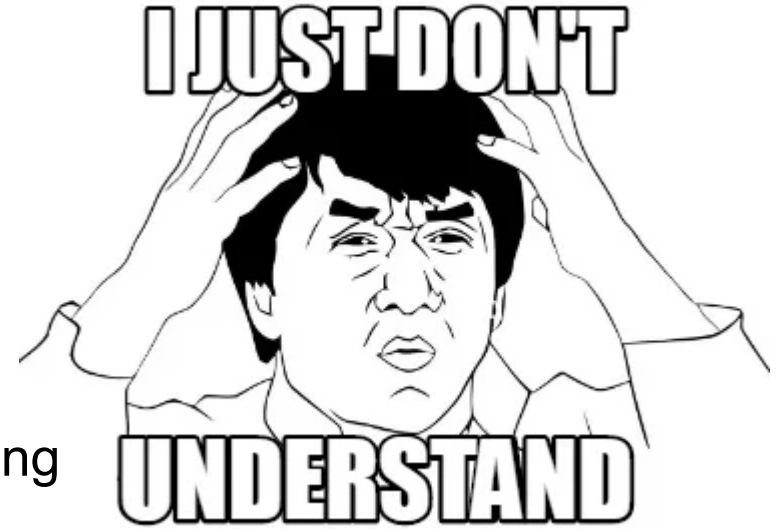
- What is a GIS?





Barrier III: time and / or funding restrains

- Easy access for a wider public (science communication)
  - Publish in English and German
  - (Re)write for different audiences (practitioners, decision makers, stakeholders, general public)
  - Different formats of knowledge sharing (e.g. WebGIS, StoryMap)
- Easy access for experts
  - Documentation, metadata
  - “Marketing”, distribution



Advocate for more funding to open science

What barriers do you encounter, and how can we overcome them?