

# Examples of semantic analysis conducted to study knowledge transfer

## An ontology for Research issues – mission-oriented

Antoine Schoen & Philippe Larédo

OECD meeting, March 12th, 2018



# Knowmak (H2020)



- To develop a web-based tool, which provides interactive visualisations and indicators on knowledge co-creation in the European research area
- Structured around three integrative elements:
  - Research topics, by developing ontologies on Societal Grand Challenges (SGC) and Key Enabling Technologies (KET)
  - Research Actors, both “conventional” and social actors
  - Geographical spaces

# Data sources



- Three classical sources
  - Publications database (ULEIDEN)
  - Patent database (UPEM)
  - Project database (AIT)
- These databases will be enriched selectively and will be the primary source for the KNOWMAK tools (WP3)
- Two newly developed data sources (WP4)
  - Database of social innovation projects
  - Database of influential users
- More experimental and coming at a later stage.

# Innovative dimensions (and challenges...)



- Linking policy topics to data
  - Ontologies as a flexible approach
  - Topics  $\leftrightarrow$  ontology classes  $\leftrightarrow$  keywords  $\leftrightarrow$  data
- Providing data on social innovation and user attention (WP4)
  - The broader societal reach of science
  - Linked to ‘classical’ outputs
- Integrating heterogeneous data sources Through a systematic and reproducible process
- To provide a richer view of research and its outreach

# A focus on indicators



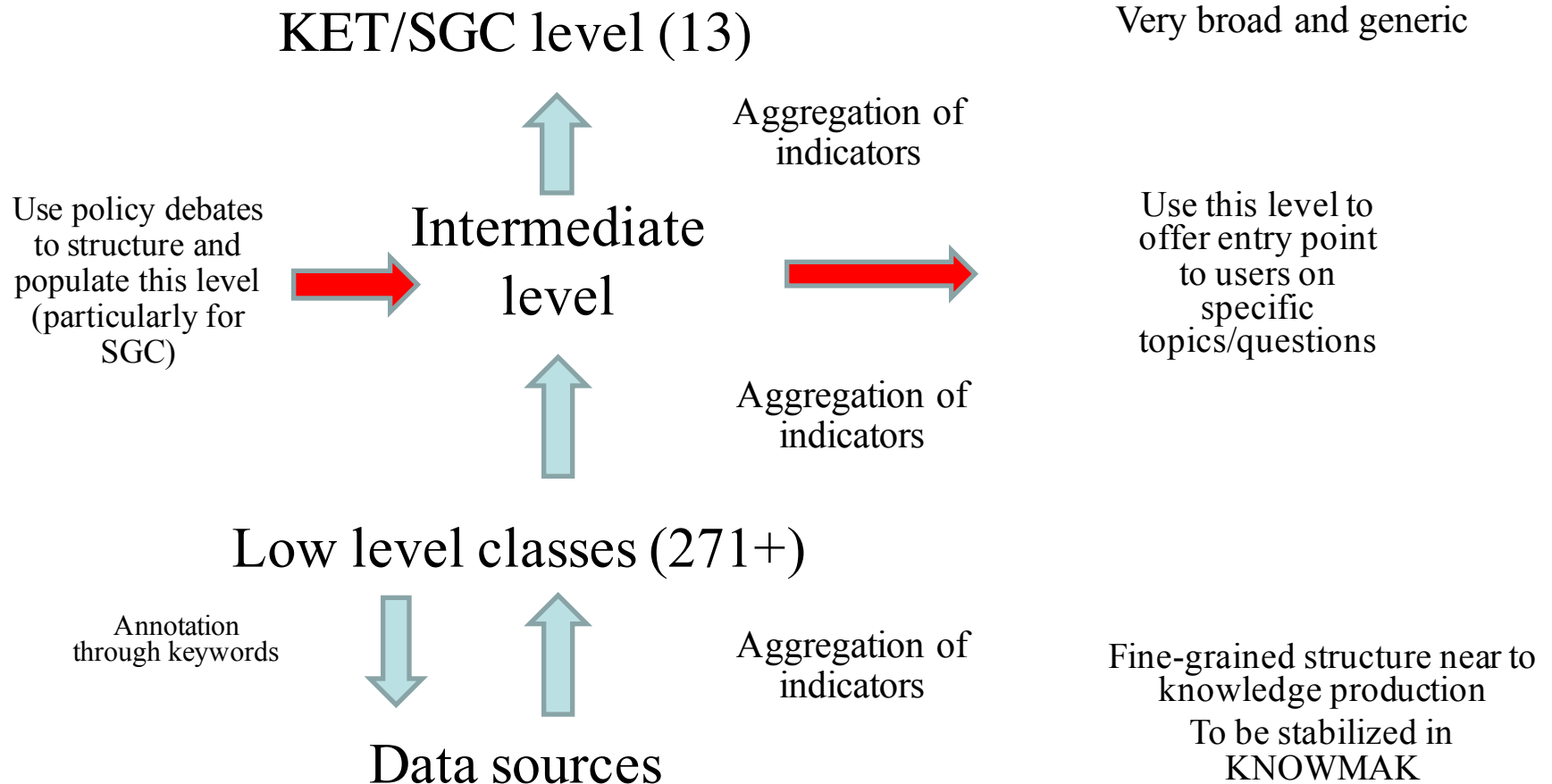
- The KNOWMAK tool will provide indicators, not data
- Relevant and condensed information
- No direct access to micro-data (also for legal reasons)
- To answer to relevant questions like:
  - Which are top-European research actors on a certain research topic?
  - In which topics is a given European region specialized?

# Ontology for Knowmak



- Within KNOWMAK, topics are handled through the development of an ontology, bridging the different language used by users and within data sources for similar content. The ontology are related to Key Emerging Technologies (KET) and Societal Grand Challenges (SGC) - with an exploratory focus on missions

# A staged approach to ontology



# Carbon neutral cities - classes

| class1                | class 2                                    | class 3  |
|-----------------------|--|--|
| Carbon Neutral Cities | smart cities and communities               |  |
|                       | Energy                                     | energy in buildings<br>biofuels for transport<br>CCMTs in transportation   |
|                       | food sustainability                        |  |
|                       | urban mobility                             | biofuels for transport<br>CCMTs in transportation<br>intelligent transport |
|                       | air quality management<br>carbon footprint |  |
|                       | bio-materials for construction             |  |

Note: orange indicates classes that exist already in SGC structure



# Carbon neutral cities - keywords

| Class                          | Keyword                                       |
|--------------------------------|---|
| air quality management         | greenhouse gas emissions                      |
| air quality management         | clean air                                     |
| air quality management         | cleaner air                                   |
| air quality management         | Paris Climate Agreement                       |
| air quality management         | net zero greenhouse-gas-emission balance      |
| air quality management         | net zero greenhouse gas emission balance      |
| bio-materials for construction | buildings with carbon-absorbing components    |
| bio-materials for construction | construction                                  |
| carbon footprint               | citizen carbon-ID                             |
| carbon footprint               | e-government streamlining of carbon footprint |
| carbon footprint               | streamlining of carbon footprint              |
| carbon footprint               | carbon footprint                              |
| carbon footprint               | carbon-neutral balance                        |
| carbon neutral cities          | carbon neutrality in cities                   |
| carbon neutral cities          | carbon neutrality                             |
| CCMTs in transportation        | sustainable freight                           |