RISIS

RESEARCH INFRASTRUCTURE FOR SCIENCE AND INNOVATION POLICY STUDIES

The RISIS-KNOWMAK tool providing integrated indicators on research and innovation activities across Europe

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Panel: Open Research Infrastructure in the field of Science and Innovation Policies Studies: a journey within RISIS and its datasets

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Background

RISIS

- RISIS as **pan-European research infrastructure** to study research and innovation dynamics and policies by providing **open access** for research to relevant, robust large-scale **datasets on R&I**

- The integration of R&I datasets across specifically relevant **integrative dimensions** offers new opportunities for monitoring at the ***micro-level*** of R&I activities, and

- enables RISIS to go beyond the provision of raw data, extending to the **public and fully open provision of relevant indicators in an user-friendly environment**

The RISIS datasets

RISIS

- **Firm innovation capabilities** (CIB, VICO and CHEETAH);
- **R&D output oriented datasets** (with publications CWTS publication database -, patents RISIS-Patent and R&D projects EUPRO)
- **Public research and higher education**: RISIS-ETER (incl. OrgReg)
- **Policy learning** (with SIPER, repository of policy evaluations)

These datasets are continuously updated, advanced and interlinked

Moreover, the RISIS includes **specialised smaller datatsets**, e.g. on research careers (MORE, PROFILE) or transnational programmes (JOREP), and

- **Four new datasets** in development on public research funding, non-academic PhD careers and non-technological innovation (social innovation and trademarks)

Access via the RISIS platform!

RISIS

- **Main principle: Raw data accessible against certain criteria, but relevant indicators fully public!**
  - Raw data are **open** for researchers that pose a relevant research project in the RISIS platform (https://rcf.risis2.eu/datasets#)
  - We are moving from **physical to distant access**, though keeping the possibility for physical visits (re-imbursed!) to RISIS datasets
- A number of resources (e.g. **RISIS-KNOWMAK**, organisation registers) are already fully public
- From 2021, the **RISIS platform** will allow
  - Direct access to datasets in a user friendly dashboard
  - Dynamic inter-linking of datasets directly in the platform (user projects)
  - Services and analytical tools to investigate RISIS datasets

A focus on ready-made indicators

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Demand, in particular from policy, not only to provide access to raw data, also to ready-made indicators

→ RISIS has opened a way to produce indicators across **three integrative dimensions** across datasets

- **Geocoding** of RISIS datasets at organisational level
- **Harmonisation of organisation names**
- **Dynamic topical classifications** via ontologies

Integration of RISIS datasets offers new opportunities for monitoring and investigating research performing and innovating organisations

The RISIS-KNOWMAK tool

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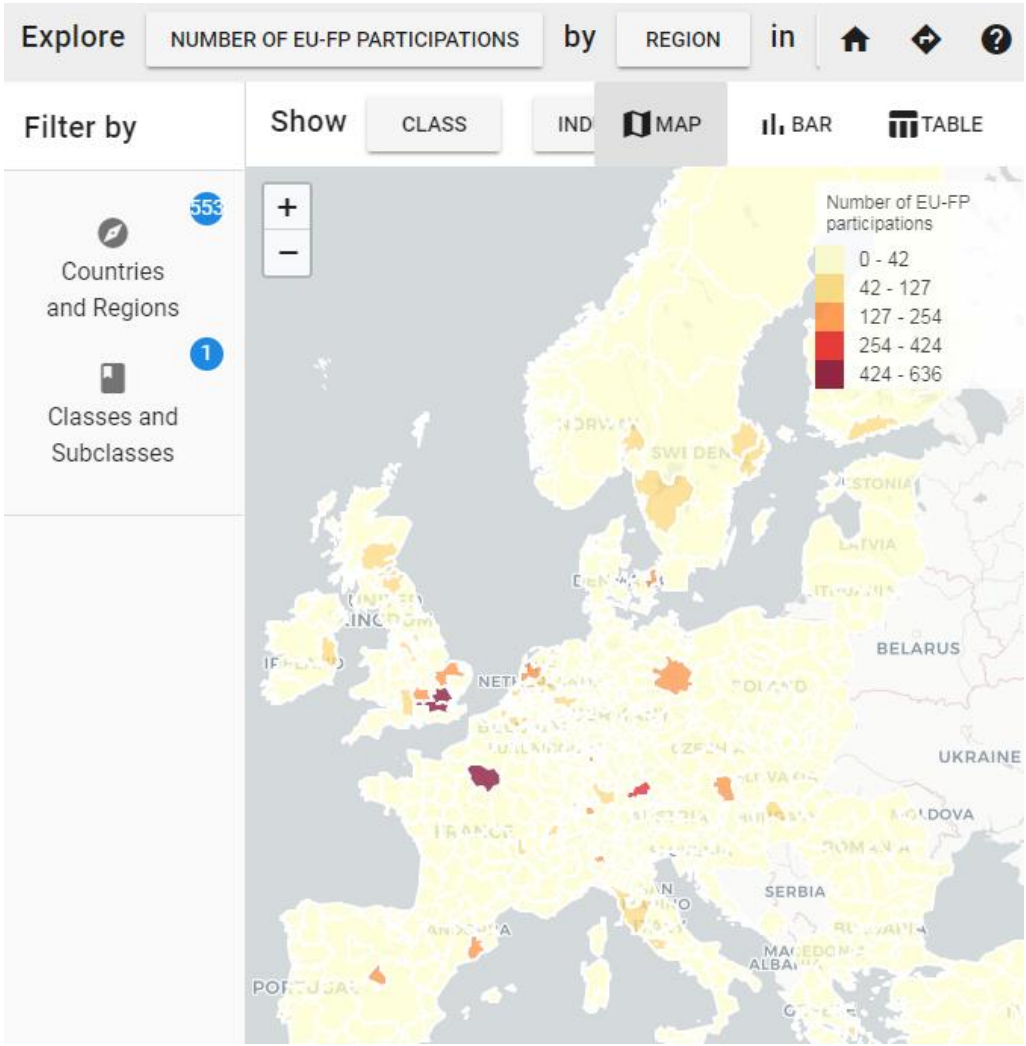
Focus: indicators on **knowledge production in the ERA**

- Links RISIS source data with Key Enabling Technologies (KETs) and Societal Grand Challenges (SGCs) via ontologies
- Indicators on knowledge production in KETs and SGCs (and 130 subtopics), across geographical spaces (adapted NUTS regions)
- Analytical and visualisation possibilities as well as download funtions for further investigation (e.g. specialisation analysis)



explore knowmak.eu

Architecture of the tool

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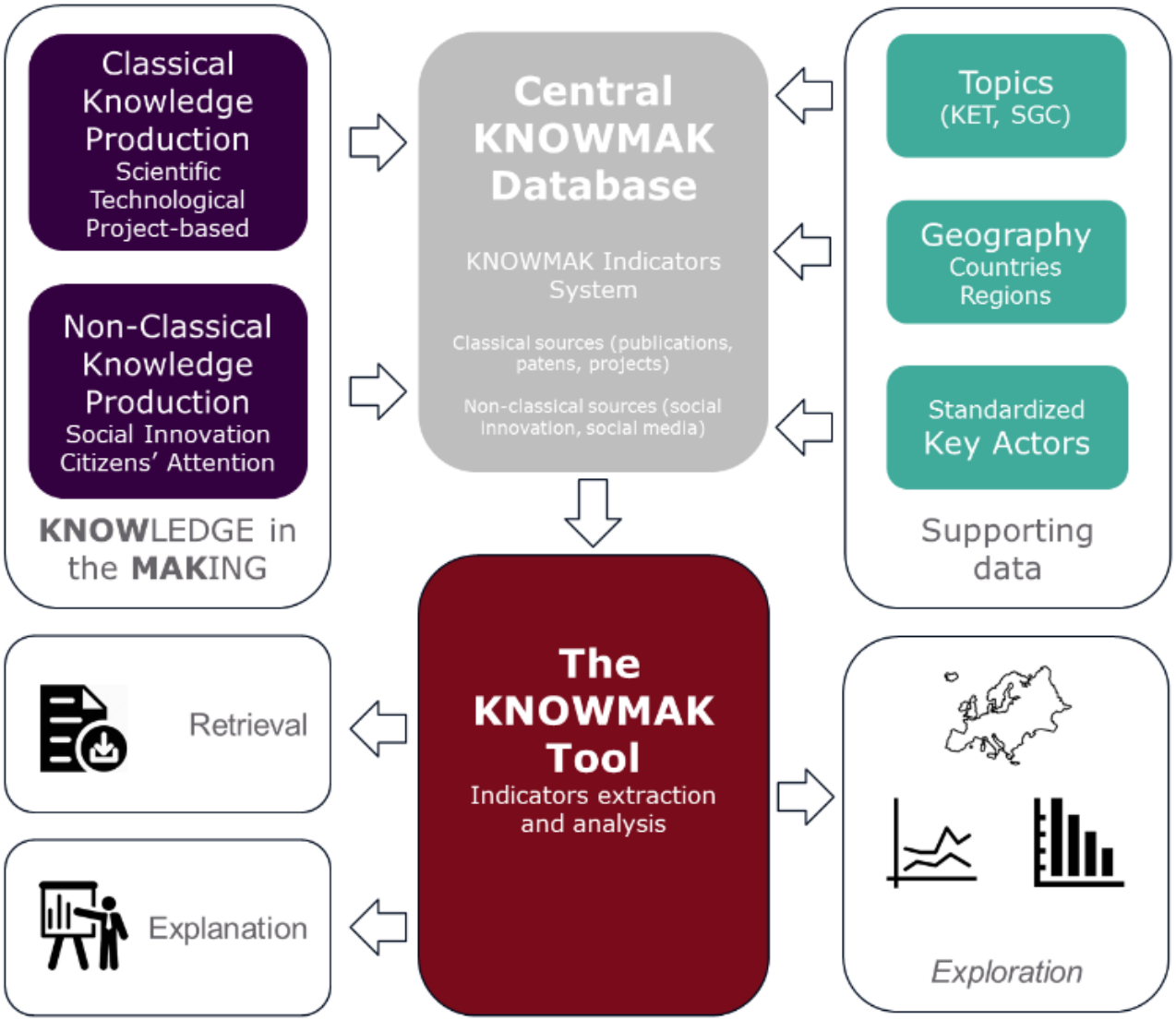

- Integration of **RISIS source data** along geography, topics and actors
- API-based procedures to calculate **indicators** and push them to an online tool
- Completely **open** to all users (researchers, policy analysts, research managers, etc.)
- Overall functions of the tool: **exploration**, **retrieval**, **explanation**

KNOWMAK coverage

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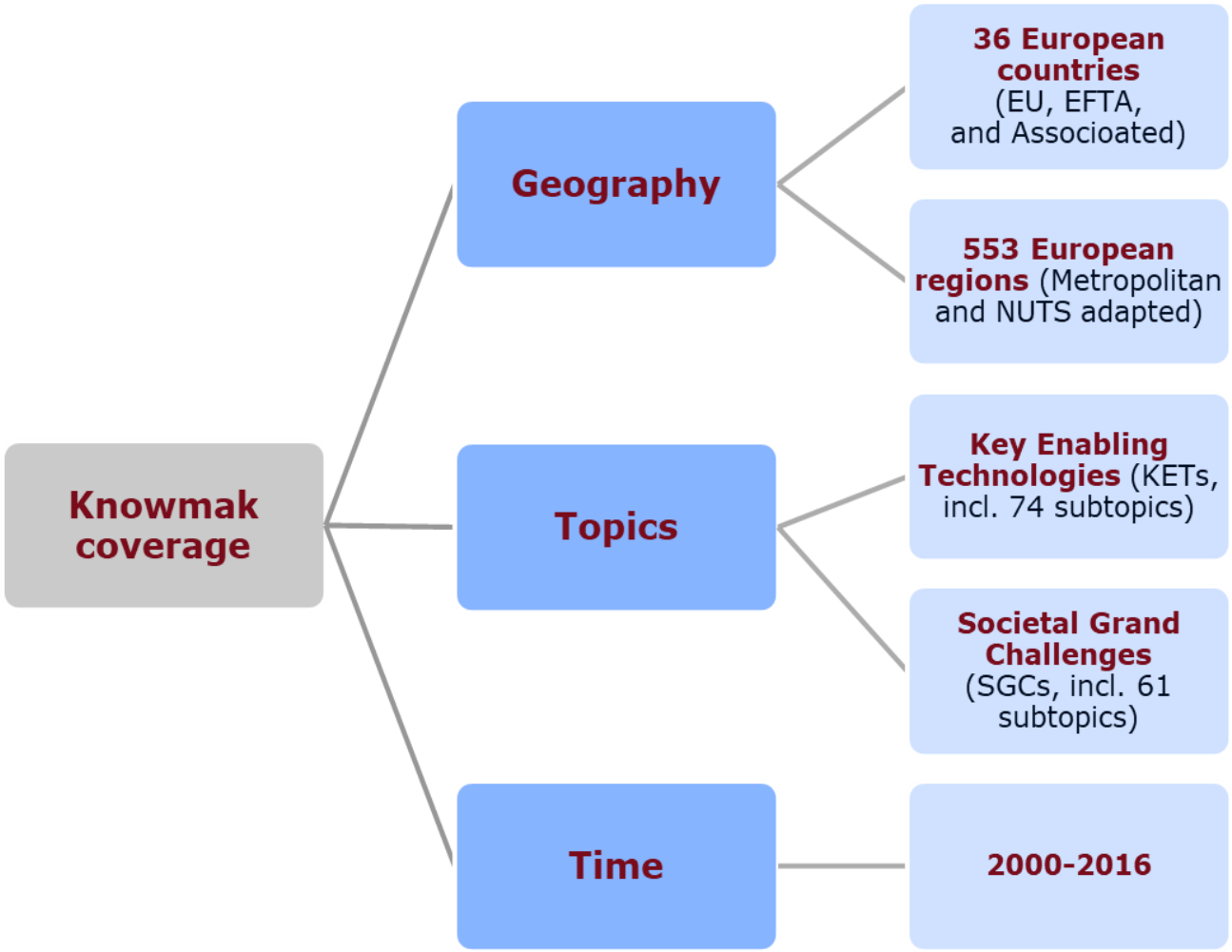

KNOWMAK indicators

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Category	Indicator	
	Number of publications Number of publications in the Top10% cited Number of intercontinental scientific collaborations` Number of Open Access publications Number of tweeted publications (user attention)	**Publications**
	Number of patent applications Number of transnational patent applications	**Patents**
	Number of EU-FP participations Number of EU-FP coordination	**EU-FP projects**
	Lists of social innovation projects per spatial entity and topic, with information on project title, website and actors (available via factsheets, see Section 4.3)	**Social Innovation**

Composite indicators

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Offering a synthetic view on science and technology intensity of European countries and regions

Knowledge production share

Average of the shares of projects, publications and patents; gives an overall impression of knowledge production activities, in particular when comparing a larger set of regions/countries or whole Europe

Knowledge production intensity

Total production share normalised by population

Science share intensity

Total scientific knowledge production share normalised by population

Technology share intensity

Total technological knowledge production share normalised by population

Network based indicators: ERA Network Centrality

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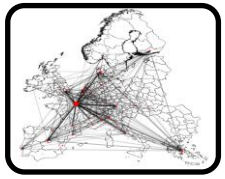
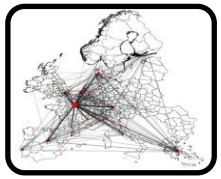
The KNOWMAK tool provides network-based indicators, derived from a network where nodes represent regions or countries, and edges different types of knowledge interaction between them:



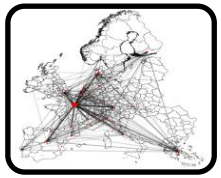
Publication degree centrality

Regional/Country degree centrality in publication networks (number of **cross-regional / cross-country** co-publications by topic)



Patent degree centrality

Regional/Country degree centrality in patent networks (number of **cross-regional / cross-country** co-inventions by topic)



Project degree centrality

Regional/Country degree centrality in project networks (number of **cross-regional / cross-country** FP participations by topic)

The KNOWMAK dashboard

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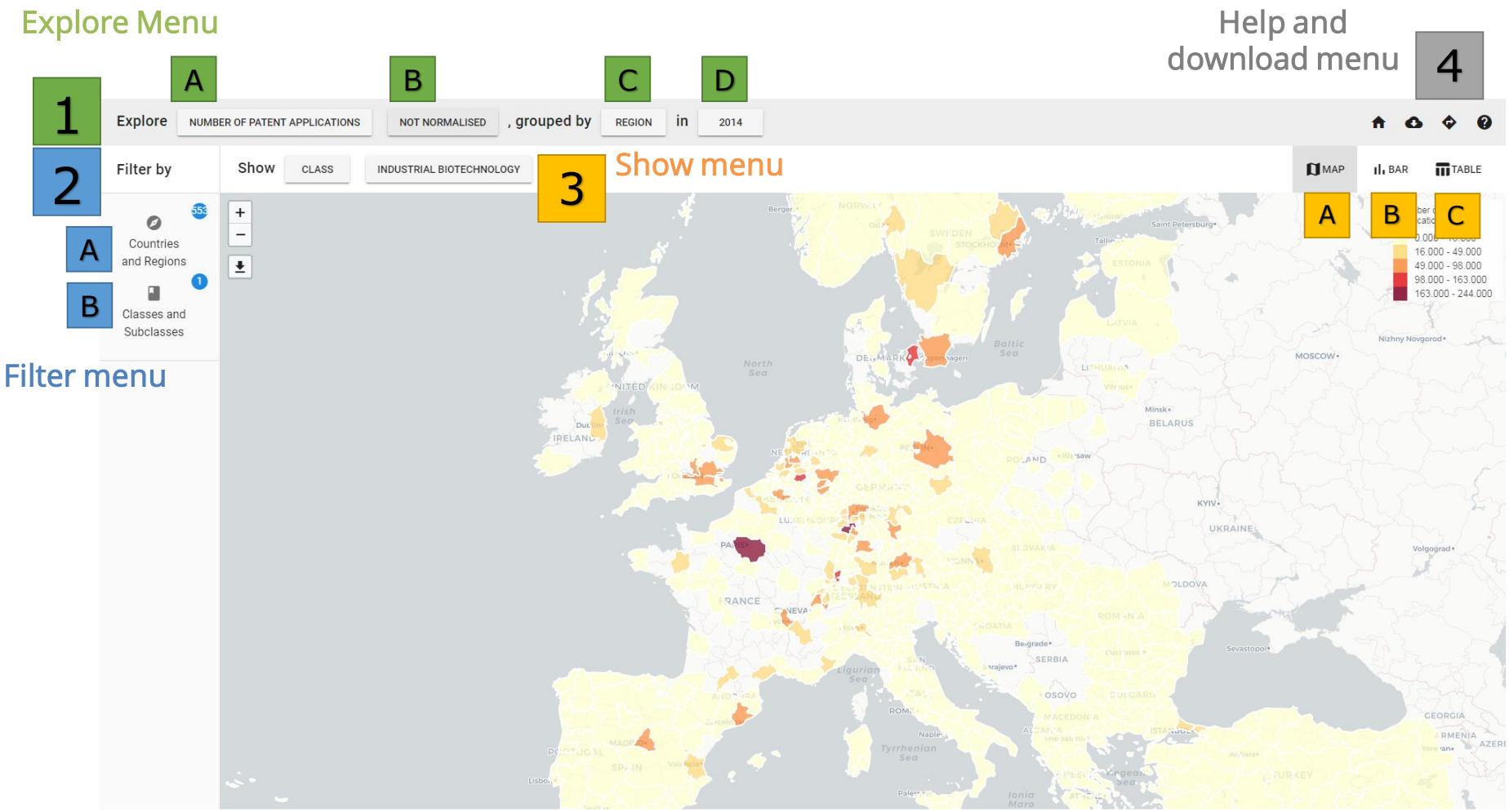

Check the KNOWMAK handbook for navigating, definitions, guides, etc.! (under the help menu)

Let´s enter!

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knowmak.eu

Some usage scenarios

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Scenario A: Spatial distribution of knowledge creation in Genomics research (different types, combined and networking)

Scenario B: Open Access and Social Media for disseminating new knowledge (total and by topics)

Scenario C: Identify Top knowledge producing Actors and Social Innovation Projects in Energy in Germany, Poland and France

Scenario A: Spatial distribution of knowledge creation in Genomics research

RISIS

1. Select

- base indicator: three types of knowledge creation, i.e. number of publications, number of patents, number of EU-FP participations (select only one first, can be switched during show)
- normalised or non-normalised, group by: spatial setting (country or region), time

2. Filter

- Tick „Classes and Subclasses“ menu and de-select all classes
- Then tick under the class button **Show** for selecting subclasses;
- Tick the arrow in the right next to the KET ‚Industrial biotechnology‘
- Select ‚Genomics‘, and close the filter menu by ticking ‚x‘

3. Show

- Switch between indicators, normalisations and spatial settings in the explore menu
- Add networking indicators to show network centrality of countries/regions
- Switch between different show views
- Download the indicators (from table view or download dialogue)

Scenario B: Open Access and Social Media for disseminating new knowledge (by topic)

RISIS

1. Select

- base indicator: Number of publications Open Access, number of publications tweeted (select only one first, can be switched during show)
- normalised or non-normalised, group by: class/subclass, time

2. Filter (optional)

- Tick „Countries and Regions“ menu if you want only specific spatial entities to be included

3. Show

- By grouping along classes/subclasses the tool switches to the bar char view
- Sort the indicator using the sort function
- Switch between classes and subclasses; use the zoom function to detect most prominent subclasses for the two indicators
- Show the data in table; sort and extract/download
- Filter out countries/regions and/or classes/subclasses with the filter function

Scenario C: Top knowledge producing Actors and Social Innovation Projects in Energy

RISIS

1. Select

- Select any base indicator (or leave the default, i.e. number of publications)
- normalised or non-normalised, group by: spatial setting (country or region), time

2. Filter

- Tick „Classes and Subclasses“ menu and de-select all classes (subclasses not necessary in this scenario)
- Select ‚Energy‘, and close the filter menu by ticking ‚x‘

3. Show

- To show top knowledge producing actors and Social Innovation projects (SIPs) in a specific country/region, click on it the map view (use the mouse overlay for displaying the name of the spatial entity); opens region/country factsheet;
- Show top-5 organisations by ticking the header and switch between patents, publications and projects; Show SIPs by ticking the header
- Click on an actor and/or SIP to get additional information

Current and future developments

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- In the short term:
  - Maintain the tool and update the current data/indicators
  - Add a few additional indicators, in particular totals (beyond KETs/SGCs)
  - Stabilize the tool technically (API based data transfer)
- In the mid term (2021):
  - Re-consider topical breakdown. Advance to new KETs/SDGs as starting point (also to be able to partly address missions)
  - Advance visualisation (e.g. for transformations) and analytical possibilities (more advanced indicators)

Directions

RISIS 

- RISIS2 website: risis2.eu
- RISIS core facility (access to the datasets): rcf.risis2.eu/datasets
- Direct access to OrgReg and RISIS-ETER: orgreg.joanneum.at
- Direct access to RISIS-KNOWMAK: knowmak.eu

Appendix

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How to start?

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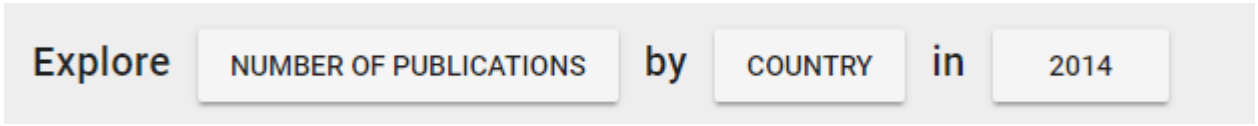

1. Selection of an **indicator,** and specify the exploration mode ("*explore by*") in terms of **geography** and/or **topics** and *in* **time**. The selection of the indicators to be displayed requires three choices by the user:

A Selecting the indicator to be explored

B Normalisation (not normalized or normalized by population);

C Explore selected indicator by

Geography **Country or Region**

OR

Topics **Class**: (6 KET and 7 SGC) or **Subclass**: (135 subareas of KETs and SGCs)

D In Year

a. In year **Years** 2010 – 2016

b. default year 2014 (no patents for 15/16)

How to filter?

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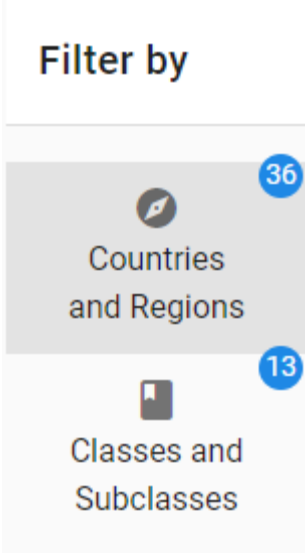
2 Filtering: the pre-selection from 1, i.e. the selected indicator can be filtered by



A Countries and regions

B Classes and subclasses

- By default, all countries and topics are selected.
  Ticking the all countries/all regions and the all topics/all subtopics box selects/de-selects all entities

- Specific countries/regions and classes/subclasses can be selected by ticking single boxes

How to explore? (I)

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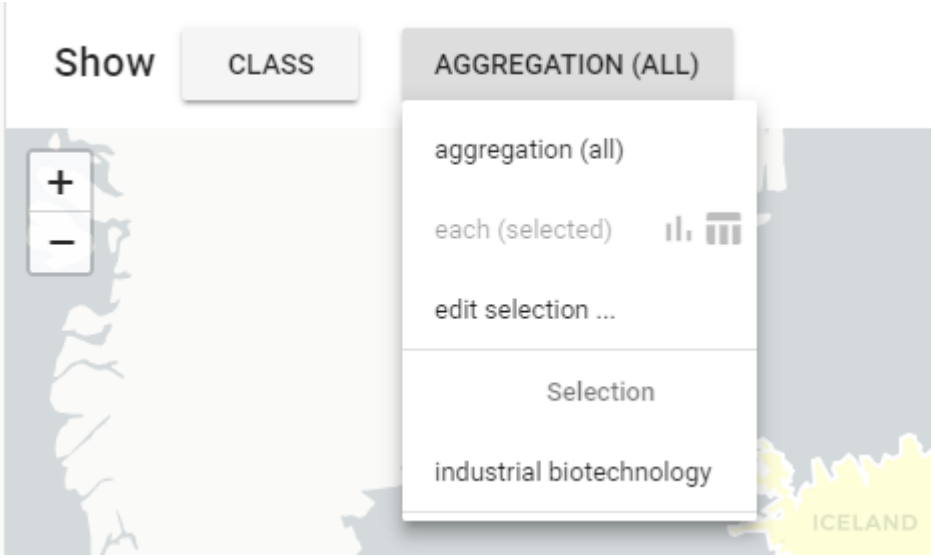
The analytical possibilities available are Map View, Bar Chart and Table View (incl. data download)

The Show option is needed to specify in the three analytical views the class or subclass to be displayed in case more than one classes/subclasses have been selected in the filter



Aggregation all: Total of the indicator (not of the selected topics)

Each (selected): all active classes/subclasses; switches therefore to bar chart (map view not possible)

Edit Selection: Switch between classes when only want to show one selected in the bar chart

How to explore? (II)

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The Map View contains the following elements/functions (see handbook for screenshots)

a. Legend (right top): contains the colours and the range for the five classes (natural breaks) produced for the indicator values
b. Zoom into map by using + and button or mouse wheel
c. To display value mouse over country/region
d. Display country/regional profile on right side of dashboard by

How to explore? (III)

RISIS

The Bar Chart displays the selected indicators by means of a classical bar chart, with each bar representing an indicator value for a country/region and/or class/subclass (see handbook for screenshots)

a. Sort the data in ascending/decending alphabetical order (A-Z/Z-A), or by increasing/decreasing numerical values (0-9/9-0)
b. Zoom into the bar chart by narrowing down (mouse over changes to an arrow) and/or moving the grey area of the small chart on the bottom of the page
c. To display value mouse over bar
d. Display country/regional profile on right side of dashboard by

How to display data and extract?

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The table view displays raw values of the selected indicator and contains the download function (for download in .csv format);

Unique to the table view is the possibility to display data for multiple years (data from year to year), which is in particular useful for data retrieval. Moreover you are able to

a. Select rows per page (default = 10) and click to go to next row
b. Sort function (for each column right hand to the columns header)
c. Display country/regional profile on right side of dashboard by
d. Download as selected in csv (data retrieval in .csv format)

Advanced download dialogue (multiple indicators and/or years) can be reached in the help menu by clicking the cloud symbol

OrgReg

RISIS

- the central tool for the harmonization of actors in the public research system
- Provides a consistent register of
  - public-sector research and higher education organizations,
  - including information on their demography, geographical location and linkages
- OrgReg Ids will be integrated in the main RISIS datasets to allow data integration
- Covers all European countries
- Is available on-line (via RISIS registration)

FirmReg

RISIS

- In equvivalent to OrgReg, FirmReg is the central facility of RISIS providing tools for the harmonization of actors in the private sector
- Covering all firms with a sizeable innovation output
- Currently provides a consistent register of
  - Firms coming from three firm-based datasets in RISIS (CIB, VICO and CHEETAH)
  - including information on parent-subsidiaries linkages
- A new release is planned for 2020

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THANK YOU !

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RISIS2 EU PROJECT

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