

# Guideline for the ONLINE S3 toolbox tool/application RIS3 Innovation Maps

ONLINE S3 – 710659 – Guidelines for the pilot experimentation phase



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## HISTORY OF CHANGES

Version	Date	Contributing partner	Summary of changes
Version 0.1	2016-10-07	RIM	Structure of the document, elaboration of required information as a template for all tools
Version 1.0	2017-07-21	IIL	Initial Guideline Version
Version 1.1	2018-01-22	IIL	Update to include new features

## DISCLAIMER

The opinion stated in this report reflects the opinion of the ONLINE S3 consortium and not the opinion of the European Commission.

## ACKNOWLEDGEMENT

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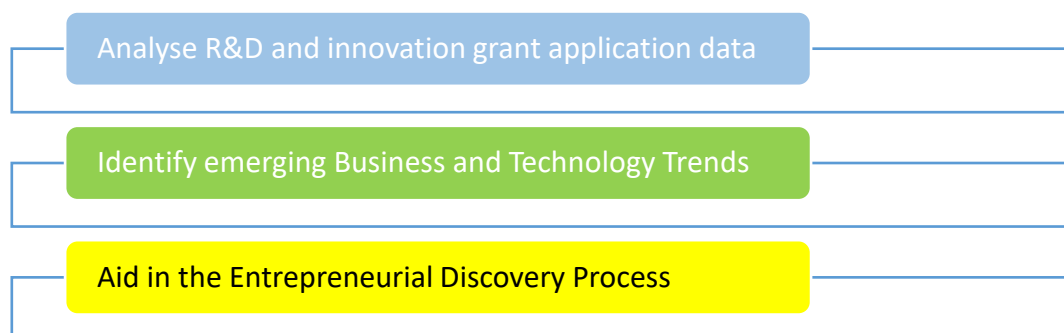
## BACKGROUND AND RATIONAL

Thus far, little effort has been made to analyse data from the private sector's R&D and innovation grant applications, both at national and regional levels. This data provides bottom-up information about new emerging businesses and technology trends as perceived by the private sector. Many R&D and innovation grants require matching funds from the private sector, and hence this information is more credible regarding business interests and trends than official declarations.

In the context of the smart specialisation process and entrepreneurial discovery, Innovation Maps (IMs) have been used to help tease out information about technological trends by the private sector. They are considered as a new way to collect and analyse data from R&D and innovation grant applications to identify emerging areas of business and technological strengths.

IMs were used as an essential part of the Entrepreneurial Discovery Process (EDP) in Poland, particularly within the pilot project on the EDP and business needs analysis conducted by the World Bank (2015) where they were used to identify key priorities for business innovation spending.

Figure 1 provides the rationale behind this ONLINE S3's application.



*Figure 1 Rational behind this ONLINE S3 application*



## DESCRIPTION OF THE APPLICATION

In general terms, Innovation Mapping is a method that enables acquiring a better understanding of the process of innovation, assisting in the development of new tools to measure innovation-related phenomena and to articulate innovation plans (Mahdjoubi, 1997).

The method is one that has not been widely used in EU regions and countries. In the context of the RIS3 development process, Innovation Maps have been used in Poland to help understand technological trends within the private sector using data on grant applications but this has not been implemented on a wider scale.

The World Bank (2015) methodology for developing an IM based on grant applications data is as follows:

1. **Data collection.** Data on grant applications is required to be collected and submitted to the application. If several Ministries, Agencies or Stakeholders are involved in the funding of innovation and R&D support programmes, then the tool amalgamates this into a single database.
2. **Data cleaning.** Data cleaning includes: Classification of support applications based on existing classifications (e.g. Nomenclature for the Analysis and Comparison of Scientific Programmes and Budgets - NABS (2007)), and the Extraction of data from the applications into: applicant type (Industry vs. Academia/Research); application status (Approved vs. Declined); geographic division (e.g. NUTS Regions); amongst other categories.
3. **Data analysis.** The ultimate objective is to create maps built along a business vs. technology matrix, combining the business area of a grant application, with a technological classification, to identify business and technology trends and new areas of competitive strengths based on revealed preferences of the private sector.
4. **Visualisation.** Heatmaps and geographical-based charts are produced to show the concentration of applications in regions, business areas and technology areas, as well as various other classifications.
5. **Policy intelligence.** When grant application data is collected over several years, the innovation maps' results can be compared to other exercises such as technological foresight results. They can also be benchmarked against smart specialisation priorities and analysed within specific groups to evaluate fitness of prioritised specialisation areas, etc.

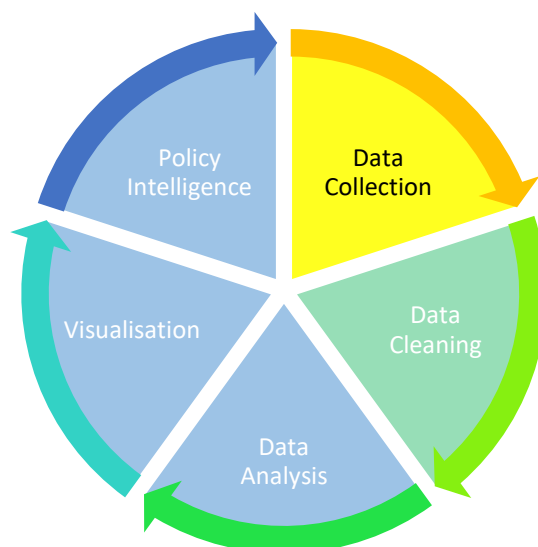


Figure 2 Overview of this ONLINE S3 application



## BENEFITS TO KEY ACTORS AND STAKEHOLDERS

IMs can help uncover critical bottom-up information embedded in firms' R&D and innovation applications for public support. Among the possible benefits, IMs:

- Act complementary to top-down approaches such as foresight programmes, macro and sectoral data and innovation surveys.
- Help verify, modify and create smart specialisation priority areas based on the private sector's real demand and thus help better prioritise public support for innovation and enhance its efficiency.
- Help monitor business and technology trends in real time.
- Provide credible and granular information on innovation activities across regions.
- Help identify regional strengths and concentrations of innovation activities. (World Bank, 2015)

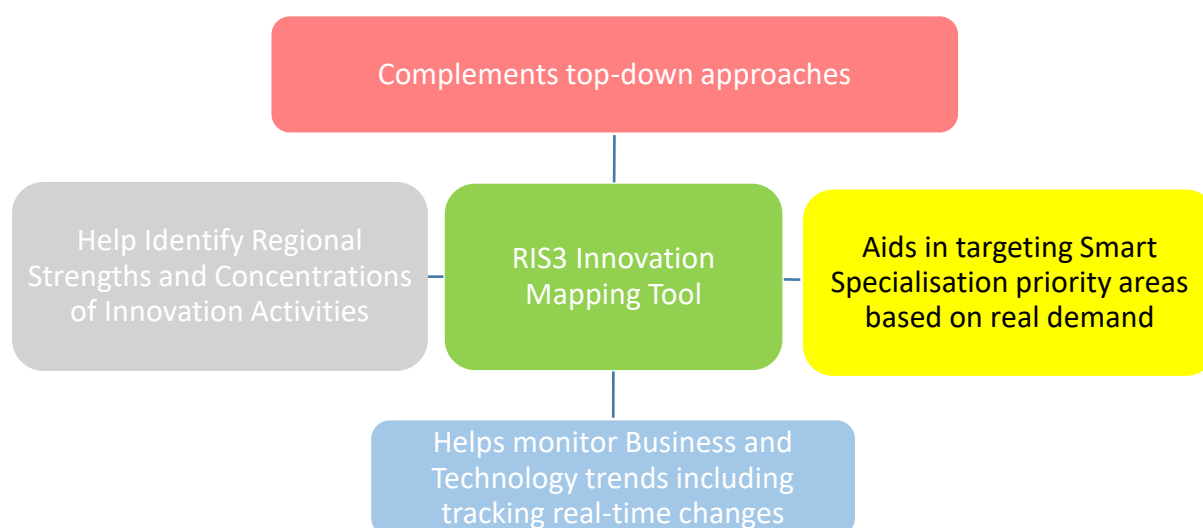


Figure 3 Benefits to stakeholders when using this ONLINE S3 application



## KEY ISSUES AND REQUIREMENTS

### Required Data

The collection of grant data from applications submitted to public innovation support institutions is a prerequisite for producing IMs. For countries that already collect this data, this requires the integration of standardised classifications of business and technology areas. This standardised approach to data collection helps to create IMs at regional, national and EU levels based on information from all relevant public support instruments, including specifically flagship grant programmes, and allows for effective comparison.

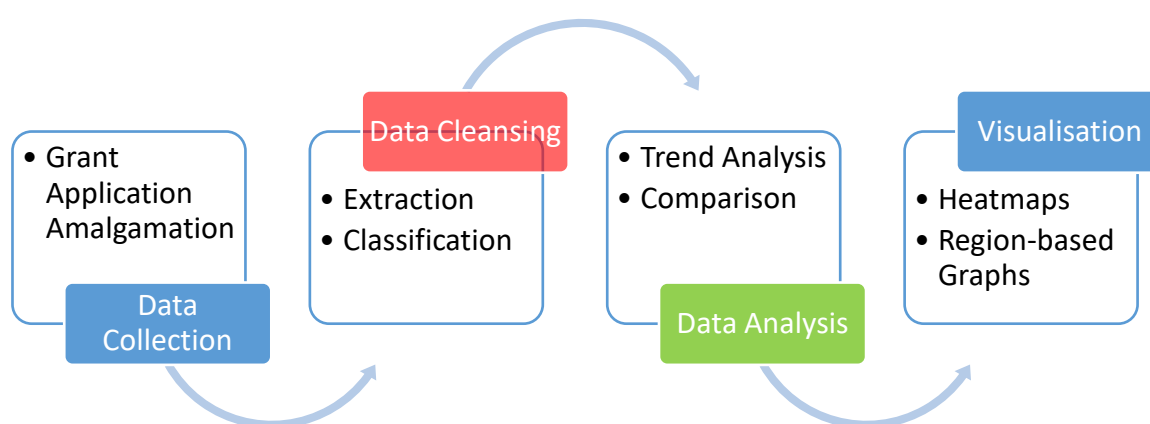


Figure 4 Key issues when using this ONLINE S3 application

## A STEP-BY-STEP GUIDE

### How to use this application step-by-step?

#### App. Navigation

Navigate through the stages of the Innovation Mapping methodology using the step wizard fixed at the top of the application page.

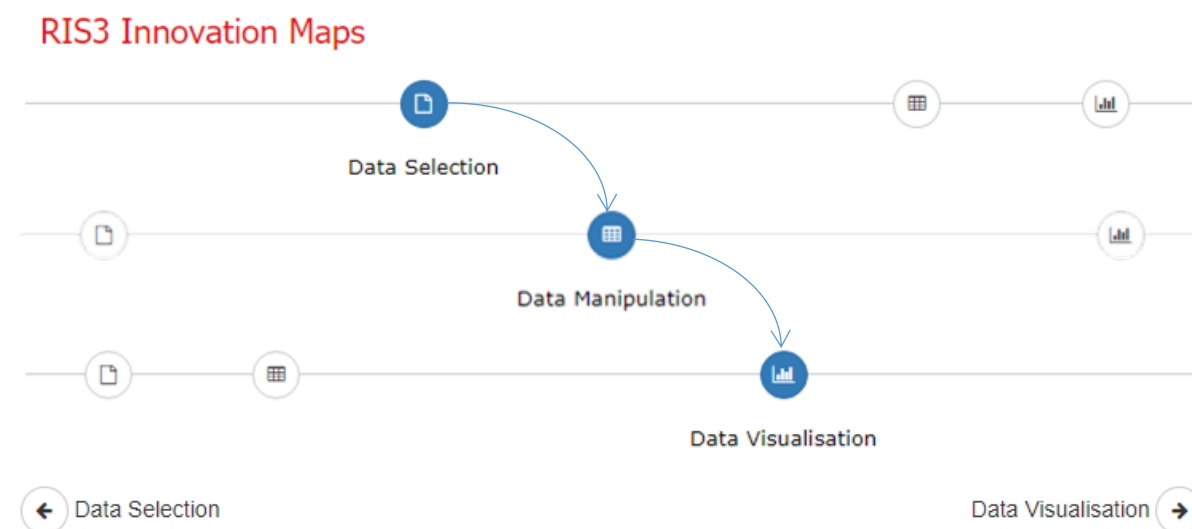


Figure 5 Navigating the ONLINE S3 application

### Step 1. a: Data Gathering

*Data collection and merging.*

A prerequisite to the use of this application is the availability of grant data concerning innovative programmes implemented across numerous regions. Data sources may include regional research councils or funding providers such as Gateway to Research in the UK and Tekes in Finland.

Compile relevant data from these providers in the application by one or more of the following means:

1. **File Selection:** Select a text-based file containing project-level grant application data to upload and analyse visually in the form of a heatmap or geo-scatter plot. File formats supported by the application include all standard text forms: [c|t]sv, xls[x], ods, json, etc.
2. **Data Import:** Query stored data from the sources listed previously.
3. Alternatively skip this step and manually enter or paste information into the tools editing interface.

Data Selection

Data Gathering

Upload and analyse data from private sector's R&D and innovation grant applications at both national and regional levels. Uncover bottom-up information about new emerging business and technology trends as perceived by the private sector and ultimately identify key priorities for business innovation spending.

Select File

Upload a file to be inserted into the current online spreadsheet to be processed and visualised among other data sources. [Download Template / Demo File](#)

Import Data

Select classified sample data from [GTR\(UK\)](#) and [Tekes\(FI\)](#).

Or skip:

Skip

Figure 6 Step 1 for using this ONLINE S3 application: Data Selection and Analysis

When uploading data, it is required to specify the relevant columns and to define the method of classification to be used concerning business and technology areas. Please note the use of standard classifications, OECD and NABS, is encouraged to allow for cross-regional and country comparisons in later stages.

### Step 1. b: Data Specification

*Selection of appropriate fields and the definition of a method of classification, by business area and technology area.*

At this stage, it is required to specify the relevant columns containing essential information including: Region, Funding, Business Area and Technology Classification. It is possible to create new columns for manual data entry should this data not be available.

The OECD and NABS standards are built-in to the application and are used as standard however the user may specify a custom classification method. In order to use a custom classification two additional csv files are required to be uploaded which contain:

Column	Contents	Example
"chapter"	Label	1.1.
"topic"	Title	Mathematics
"category" *	Hierarchy	Natural Sciences

\* optional





However, the use of standard classifications is encouraged to allow for cross-regional and cross-country comparisons.

Import Data
×

**Step 1:** Click 'Browse' and locate a file to be uploaded.

**Select File:**

Browse:
RIS3\_OpenDataTool\_Export.xlsx

[Help](#)

Import Options

File Properties

**Step 2:** Select settings according to contents of the file provided.

File Contains Headers ☒
Separator : ↓
Quote ' ↓

File Preview

Inspect the contents of the file in order to make necessary corrections.

**Step 3:** Edit data as necessary.

organisation_...	organisation_...	organisation_...	organisation_...	organisation_...	organisation_...
PRC	MADRID	ES	Research, Technology	www.rtdi.eu	RTDI
OTH	BRATISLAVA	SK	SLOVAK BUSINESS	www.nadsme.sk	SBA
HES	EDINBURGH	UK	THE UNIVERSITY OF	www.ed.ac.uk	UEDIN
HES	THESSALONIKI	EL	ARISTOTELIO PANE	www.auth.gr	AUTH
PUB	THESSALONIKI	EL	REGION OF CENTRA	www.pkm.gov.gr	RCM
HES	EDINBURGH	UK	EDINBURGH NAPIER	www.napier.ac.uk	TRI
PRC	NEUMARKT AN DER	AT	RESEARCH AND INN	rim.feldundhof.at	RIM
HES	ESPOO	FI	AALTO-KORKEAKOL	www.aalto.fi	AALTO
PRC	ST MARTIN AM YBB	AT	FELLNHOFER KATH	N/A	FELLNHOFER
REC	LOUVAIN LA NEUVE	BE	EUROPEAN FUTURE	www.efiscentre.eu	EFIS Centre
PRC	THESSALONIKI	EL	INTELSpace TEXNC	www.intelspace.eu	INTELSpace AE
PRC	READING	UK	INNOVA INTEGRA LI	innovaintegra.com	IIL
OTH	MARIBOR	SI	EKONOMSKI INSTIT	www.eim-mb.si	EIM

\* Only previewing first page of data

Column Selection

Specify the columns from which to read the following properties.

**Step 4:** Select the necessary columns.

**Region(s)** organisation\_\_country ↓

**Amount Funded** ecContribution ↓

**Business Area** Append New Column ↓

**Technology Classification** Append New Column ↓

Insert
Cancel

Figure 7 Step 1 (Continued.) for using this ONLINE S3 application: Data import and parsing

**Step 2: Data Cleansing and Classification.**

Imported data will appear in the spreadsheet where it can be modified and manipulated. If not originally provided it is possible to create new classification columns for the data where the user can classify funded projects by technology and business area. Classify each row representing a successful grant application or project using the provided drop down menus.

Data Manipulation

### Data Cleansing and Classification

Classify projects by business area and technology trend.

*Note: the use of standard classifications is encouraged to allow for cross-regional and cross-country comparisons although custom classifications are also supported.*

Records per Page 16 ▼

	Project Identifier	Region(s)	Funding	OECD	NABS
1	ONLINE-S3	<div>»Edinburgh, City of</div> <div>»Berkshire</div> <div>»Mostviertel-Eisenwurze</div> <div>Nivelles </div> <div>Arr. Nivelles</div>	3889000	5.9	11

Figure 8 Step 2 for using this ONLINE S3 application: Data cleansing and classification

**Step 3: Data Visualisation, Analysis and Policy Intelligence.**

Visualise the data in various formats to analyse trends concerning regional smart specialisation priorities.

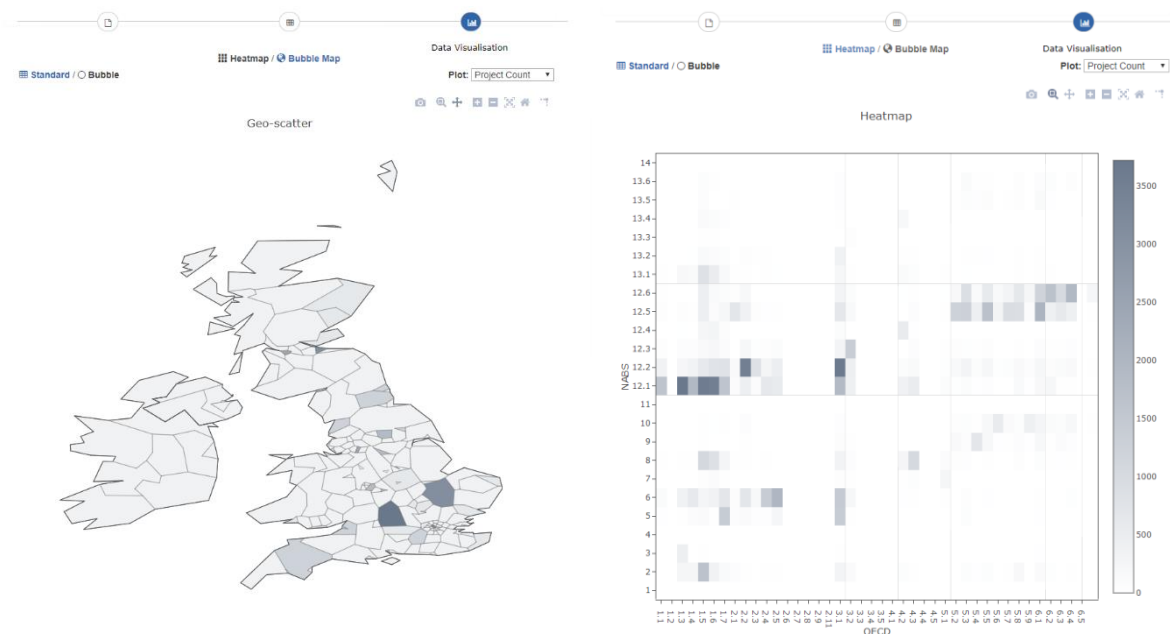


Figure 9 Step 3 for using this ONLINE S3 application: Innovation Map Visualisations – Bubble and Heat-maps

**Step 3. a. Construct and apply filters to refine the scope of the analysis.**

Step-by-step process to create and apply a new filter:

1. Firstly, select and right click the relevant column:
2. Select 'Filter Column' from the dropdown
3. Enter a filter word into the text box and click 'Apply'

Region(s)		
UKL12		2.11
UKF22		
UKI32		.3
UKI32		
UKI44		
UKF21		1
UKE32		
UKE21		6.1
UKH34		
UKI44		
UKM25	1416353.00	2.4
UKF21	536035.00	5.4,5.7
UKJ21	231590.00	5.4,5.7
UKE21	243599.00	5.1
UKD33	247490.00	1.5,2.1,1.6,5.7
UKI32	1037941.00	1.7,2.11

Contains: UKI

Apply Clear

Region(s)	Funding	OECD
UKI32	38282.00	5.9,2.11,1.3
UKI32	236950.00	1.1
UKI44	254072.00	5.1,5.2
UKI44	96352.00	5.9,5.4

Figure 10 Step 3 (Continued.) for using this ONLINE S3 application: Filter construction and application

**Step 4:** Plotting Options and Data Export

Adjust and save the underlying data and figures through the 'File' menu located on the side-bar.

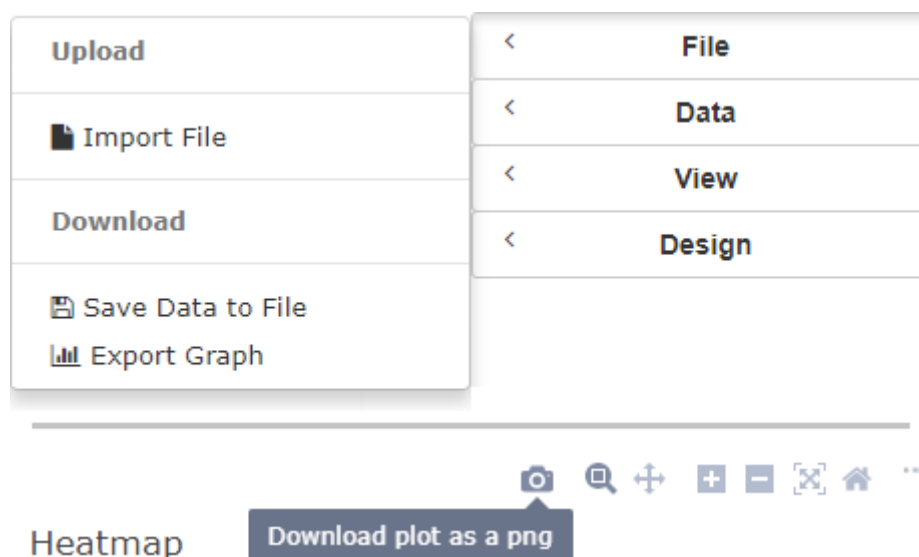


Figure 11: Adjusting settings and Export options

**Further Actions**

**Display Settings**  
[Help](#) ⓘ  
View and interpret different formats of data.

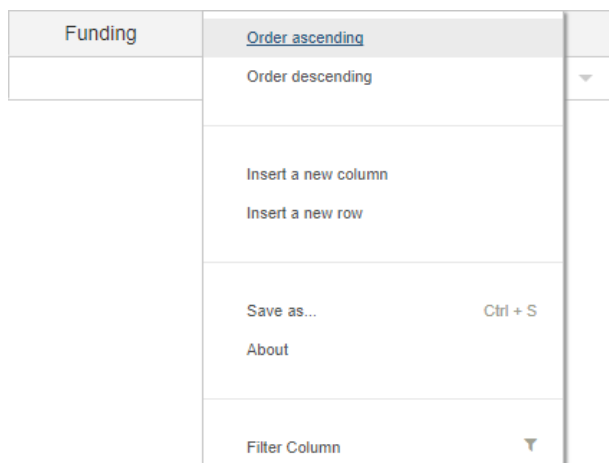
**NUTS Level:** 3 ▼  
Select appropriate NUTS-Level.

**Language** Native ▼  
View regions in chosen language.

**Show Codes** ✓  
Toggle between class identifiers and readable descriptions.

- Modify Settings:**

Adjust classification factors such as NUTS Level description for regions, language and code specifications using the 'Display Settings' Menu located on the sidebar.



- **Column:**

Select and Right click on a column in order to change the header title, sort the cells or construct a filter.

- **Insert:**

Add a new column or row by right clicking on a cell.

Click to enter Plot title



- **Title:**

Change the plot and axis title by clicking on the heading and typing as prompted.

## Save Graph

### Filename

\*.png

\*.png

\*.jpg, \*.jpeg

### Dimensions

 px ×  px

- **Format:**

Change the Image type for export - png, jpeg, webp or svg in the export menu located here: "File → Export Graph".

Save

Cancel



Plot:

Data:

Choose to plot project count or funding using the select box top-right of the graph.

## Design

### Bubble Scale:

1x

Close

- **Scale:**

Adjust the bubble size for improved comparison using the slider available here:

“Design → Bubble Map Options”.

## Step 5. Policy Intelligence

Analyse the data visualised by the app; for example: Identify regional strengths and concentrations of innovation activities using Heatmap plots with a regional filter or Bubble maps with classification filters. Click on the plot to find out more about a specific topic area or region.

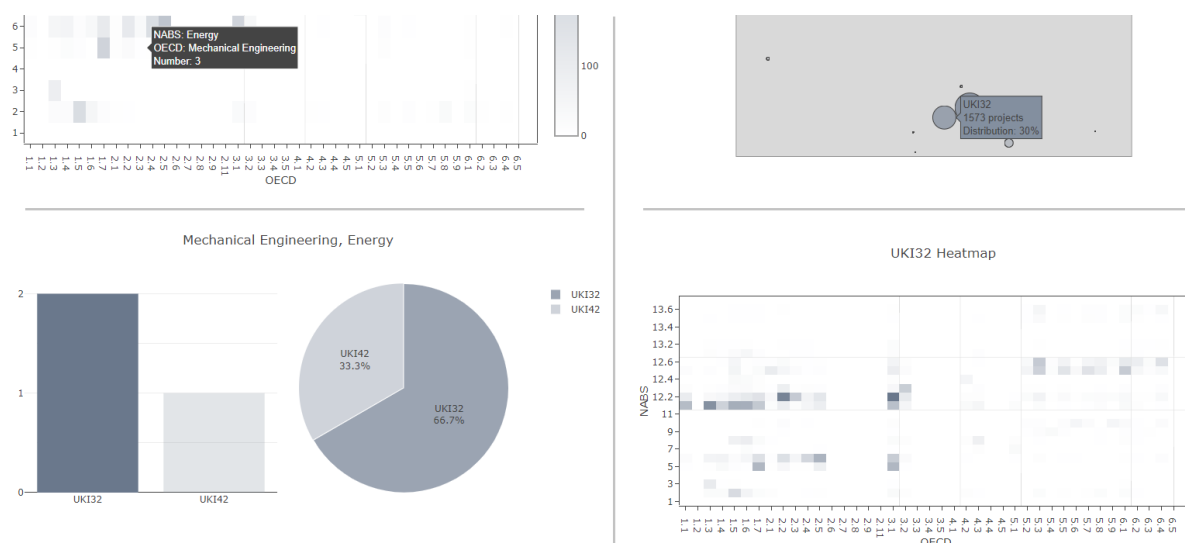


Figure 11 Step 5 for using this ONLINE S3 application: Analyse graphs in detail extracting useful information.



## FURTHER INFORMATION

### Relevant Data Sources

The main source of data for the implementation of this method is grant application data. Tools for tracking data on projects and initiatives that are publicly funded are not widely used in the EU.

Good practices in this regard include the open data storehouse of Tekes in Finland, which allows to search for projects and beneficiaries that have been funded through Tekes programmes. The Tekes database allows searches by organisation type; economic sector; project status; Tekes programme and research type. Technology areas are not defined in the database, although some of them are described in the project's abstract. The locality of the grant holders is also provided.

Probably the most developed grant dataset in the EU is the Gateway to Research database of the UK. The dataset provides information about publications, people, organisations and outcomes related to research projects. It includes information about the project such as abstract, duration, the amount awarded, the researchers involved and a list of publications produced. The data is collected from a range of systems used by the funding organisations to collect information from researchers, including the Joint Electronic Submissions system (Je-S) and ResearchFish. Gateway to Research (GtR) publishes information from a variety of source systems. The information is not transferred to GtR on a real-time basis and the information is processed against a set of business rules to determine suitability for publication. The dataset is currently static, or a simple snapshot of other databases and is not being updated regularly. However, the infrastructure is being built to refresh all the data in the website on a regular basis. This will enable consistency for future data access and further analysis. The database does not distinguish technology areas or economic areas. However, abstracts for projects are provided, as well as organisations descriptions. Private sector companies are also distinguished.

Ongoing studies on open data on the use of EU Structural Funds have shown that most data currently published by the EU national and regional authorities are not compatible yet with some of the fundamental requirements of the open data paradigm. Data is rarely complete, accessible, timely, machine-processable and non-proprietary. Open data on public support would allow for tracking of project themes and topics, and assessment of how they match with S3. This kind of data could be highly valuable in tracking progress towards objectives and vision, but also in informing the RIS3 update.



## REFERENCES

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