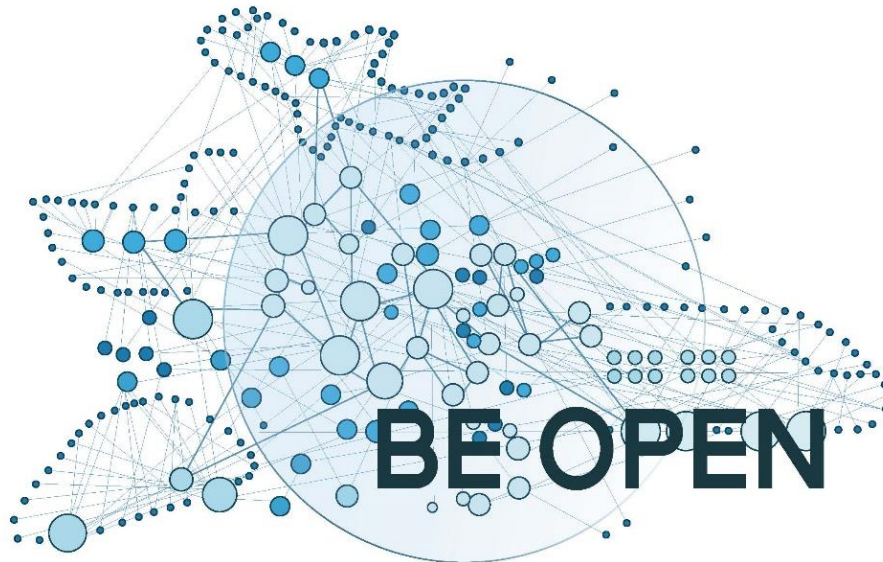




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## European forum and oBsErVatory for OPEN science in transport

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## D3.2 TOPOS development

Final

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## Abbreviations and Terminology

Abbreviations	Terminology
<b>CMS</b>	Content Management System
<b>EB</b>	Executive Board
<b>EC</b>	European Commission
<b>EOSC</b>	European Open Science Cloud
<b>FAIR</b>	Findable, Accessible, Interoperable, Reusable
<b>FP7</b>	7 <sup>th</sup> Framework Programme
<b>GDPR</b>	General Data Protection Regulation
<b>H2020</b>	Horizon 2020 Framework Programme
<b>KPIs</b>	Key Performance Indicators
<b>MS</b>	Member States
<b>RIs</b>	Research Infrastructures
<b>TOPOS</b>	Transport Observatory/fOrum for Promoting Open Science
<b>TOPOS4Orgs</b>	TOPOS Observatory for Organisations



## Executive summary

The objectives of the BE OPEN project are a) to create a common understanding on the practical impact of Open Science and b) to identify and put in place the mechanisms to make it a reality in transport research. As such, BE OPEN follows a two-fold action plan:

1. to engage key transport and open science-related communities in a participatory approach fostering a dialogue on Open Science (what exists, what should be done, how it should be done) among relevant stakeholders in Europe and around the world, and
2. develop a detailed roadmap for the implementation of sustainable open science modules which include key practices, infrastructures, policies and business models, all taking into account the specificities of the transport research domain, and the use and integration of existing-infrastructures and the emerging EOSC initiative.

The deliverable D3.2 will describe the design and implementation of the TOPOS forum and observatory. More analytically, it will describe the methodology selected for each particular tool together with the technologies that have been used for the implementation of these tools.

D3.2 is organized in 8 chapters. The first one is an introductory chapter presenting the aim and objectives of the current deliverable, the second describes the interconnection between Task 3.1 and Task 3.2. Chapter 3 deals with the TOPOS Gateway while Chapters 4 and 5 present the actual tools that have been developed (Observatory and Forum). Deliverable's conclusions are hosted in the last chapter of the current deliverable (Chapter 6).

# 1 Introduction

The development of the European Open Science Cloud (EOSC) was made following a number of pilot integrations of services and infrastructures that were connected under an interoperable framework, engaging a wide number of stakeholders, building trust and skills required for an open research data approach. A proper governance framework was followed to maximize operational and functional potentials of EOSC.

The core objectives of TOPOS Observatory and Forum are focused on limiting existing barriers in Open Science in Transport Research and aligning transport research with EOSC by following FAIR principles. By identifying applied development strategies, operation and services offered from existing Transport RIs and EOSC, TOPOS schemes and services aim to offer a stakeholder-driven governance with the active involvement of transport research organizations/institutions, transport infrastructures and e-infrastructures, transport research funding bodies and other relevant players (relent research communities, authorities and any other body dealing with transport-related data).

After examining the challenges for aligning transport research to EOSC approach, the TOPOS Governance scheme is presented (D3.1), based on a list of recommendations under each main topic (data management, architecture, funding and key organizational and functional aspects).

Being in line with EOSC approach but enhancing it at the same time to cover existing needs, gaps and challenges in an optimum way, are among the directions followed by TOPOS Observatory and Forum to open transport research. TOPOS specific orientation to transportation follows an interoperable scheme following at the same time a multilayer perspective based on transport thematic areas, competence areas and transport modes.

A webinar of TOPOS Observatory and Forum has been organised to support a fine introduction of the tools to the project's consortium and to provide a feedback of the developed tools to the developers.

A questionnaire has been introduced to the attendees of the webinar, asking for their support on the fine tuning of the developed tools. The structure of the questionnaire contained seven questions that were common for all tools. Then, there were two more specific questions for each tool, which were different between the tools. Annex II contains the full list of questions of the webinar's questionnaire.

## 2 Support driven from Task 3.1 (D3.1) to Task 3.2

The deliverable D3.1 contributed towards the development of new schemes for governance and membership scheme of the Transport Observatory/Forum for Promoting Open Science (TOPOS observatory and forum) in order to implement and transition FAIR principles.

For the industry stakeholders of transport research, long-term learning with an emphasis on sustainability constitutes a necessity and as such, they will confirm their continuous engagement with scientific stakeholders. The proposed membership and governance scheme has been built upon recognizing the challenges of data-driven transport research in pursuing excellent science and granting that the vision of Open Science in transport research is an iterative process based on constant learning and mutual alignment. Hence, the proposed schemes encompass some key elements, such as data culture and management, services and architecture and funding mechanisms. Task 3.2 implemented and assessed the Governance and Membership Schemes concluded in Task 3.1.

TOPOS development has been in line with all above guidelines and strategies presented in TOPOS declaration deliverable (D3.1) and following the TOPOS services architecture and Service Integration and Management System (SIAM). All recommendations presented in D3.1 linked with the TOPOS development phase have been followed while developing the Open Access Transport Observatory and Forum.

TOPOS development is linked with a clear framework for system specifications implementation, standards and processes, interfaces towards interoperability and proper data and infrastructure sharing across transport providers and involved parties. All these aspects, actions and frameworks have been followed in the deployment phase, considering a number of KPIs and protocols, being in line with data related recommendations and under proper front and back end design, to support the required membership schemes and policy of use.

### 2.1 Key elements of TOPOS Governance scheme and relevant recommendations

Key elements of TOPOS governance scheme follow the core element of EOSC governance and a list of additional elements that cover existing gaps and take advantage of existing opportunities to further develop a coherent and complete and at the same time flexible and able to adopt in future challenges, governance framework. Therefore, key elements for TOPOS Governance scheme and relevant recommendations are presented below.

#### TOPOS Governance is established under 4 steps:

- A. TOPOS Governance model development, inspired by existing models, being at the same time in line with TOPOS ecosystem and involving all transport-related actors and influencers, towards its sustainable vision.

- B. EC having the support of TOPOS pilots, prepares initial documents to be further elaborated by the Governance framework in its initial phase, such as the draft Rules for Participation and draft shared resources.
- C. TOPOS Governance framework is formally established as an agreement of the Member States, adopting the initial strategy and work plan. TOPOS Board is set up and following the Executive Board and the Working Groups are also being established. TOPOS governance further elaborates on ECs initial plans and work.
- D. TOPOS financing goals and orientation are being planned, based on funding mechanisms between MS and EC, leading to scale economies that ensure sustainability of shared data, services and operations.

### TOPOS Governance Scheme key elements include:

**TOPOS Governance model:** a strong and flexible model to support sustainable transportation research infrastructure in Europe, following the rules of representativity, proportionality, inclusiveness, transparency, accountability and trust.

**TOPOS Governance framework:** organized under three layers: institutional, operational and advisory.

**TOPOS Executive Board (EB) and Coordination framework:** with monitoring and advisory role the Executive Board will coordinate stakeholders and ensure proper implementation of programming, business model and financing related issues. The Coordination framework will set the measures of readiness in delivering the EOSC main functionalities, supporting EB actions.

**TOPOS funding and sustainability:** Co-funding mechanisms with mixed revenue streams will be established supporting long-term capacity and sustainability for transport research data.

**TOPOS continuous development covering global research achievements:** TOPOS will reach global partners and top researchers to cover transport research advancements globally by top experts, increasing its value of open transport research data, widening its network and nodes, based on the Stakeholder forum support.

Considering the above elements, a list of TOPOS governance-related recommendations has been proposed below.

### Data Related Recommendations:

1. Establishment of a FAIR Data Action Plan
2. Adaptation of the European Interoperability Framework
3. Development of a data standards catalogue
4. Conformation with all legal frameworks that apply for data usability and reusability, by screening existing legislations and take advantage of opportunities for data harmonization on applicable legal frameworks (e.g., GDPR, copyright-related laws, etc.), which will be addressed in WP4 deliverables
5. Design of TOPOS Data Action Plan for all TOPOS data, data-related algorithms and tools, protocols, etc., including data guidelines and recommendations
6. Consultation with relevant stakeholders and development of a Data oriented Expert Group
7. Development of a certification scheme for FAIR transport data infrastructures

8. Develop and communicate incentives and rewards for data and resources sharing

### **TOPOS Board (of Member States, Associated countries & EC) Related Recommendations:**

1. Development of the TOPOS roadmap and strategies, setting specific criteria per action
2. Monitoring TOPOS achievements, considering a list of KPIs (defined in future Deliverable 5.2)
3. Coordination and Cooperation with relevant initiatives and actors
4. Establishment of a top expert committee for searching suitable candidates for TOPOS Executive Board
5. Effective supervision of the implementation of TOPOS
6. Support long term sustainability actions and decisions

### **TOPOS Stakeholders Forum Related Recommendations:**

1. Be open to all stakeholders involved in transport research data management
2. Support and advice the TOPOS Executive Board through active involvement and regular meetings

### **TOPOS Executive Board (European stakeholder organizations from Europe and beyond), Stakeholder Forum and Working Groups related recommendations:**

1. Screening and mapping needs per thematic area, transport mode, transport-related challenges
2. Connect with relevant initiatives and collaborate with them
3. Identification of risks and design of mitigation actions
4. Assistance on TOPOS coordination and advice on strategies and implementation
5. Meeting goals, being proactive and effective

### **TOPOS Communications & Engagement Related Recommendations:**

1. Development of a sound and consistent communication strategy targeting a wide audience in Europe and beyond
2. Taking advantage of existing communications channels to reach scale
3. Development of the TOPOS brand
4. Engage stakeholders to continuously support and disseminate TOPOS Communication strategies, being in line with them and properly advising on updates/adjustments needed.

## 2.2 TOPOS Membership Scheme

Research has been undertaken in BE OPEN, on the Users area of Open Science in European Transport Research. The research concluded to two main user groups, the Organisations and the Individuals groups.

The Organisations group represents the Industry, the Research Community and the Society as can be seen in Figure 1.

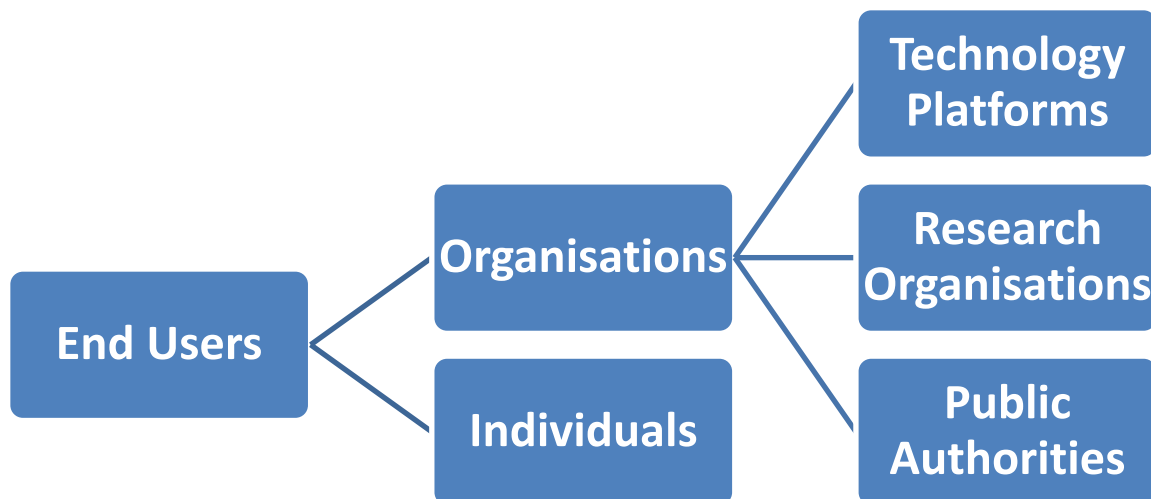


Figure 1 End Users Categories

### 2.2.1 Categories of Members

#### Categories of Members in TOPOS Observatory – Organisations

The TOPOS Observatory for Organisations is realized with an Open Research Gateway for Transport Research based on the content available in the OpenAIRE Research Graph. It serves the three categories of Organisations identified:

- Technology platforms like institutional, thematic repositories, data archives and disciplinary web sites
- Research Organisations, public and private, like research centers, universities, small and medium enterprises that participate in research activities, and research projects.
- Public authorities like national and international research funding organisations.

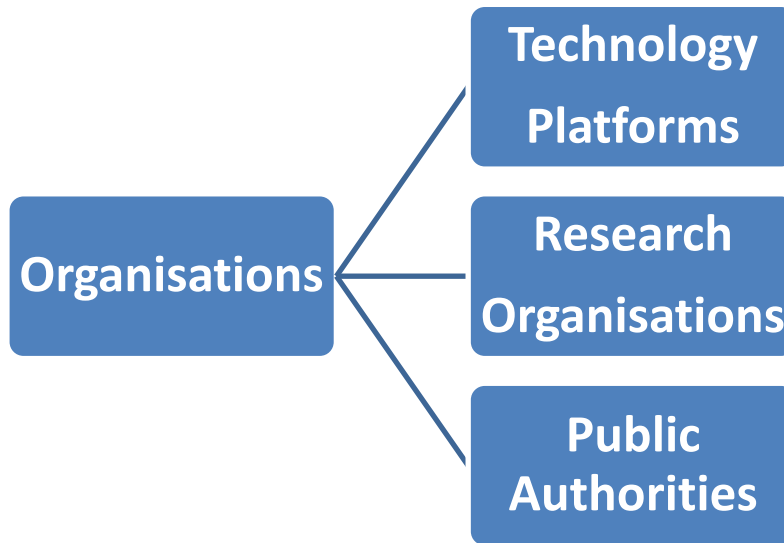


Figure 2 Organisations' End Users

### Categories of Members in TOPOS Observatory – Individuals

Scipedia, as the platform of the Individual TOPOS Observatory, is an open professional network where professors, students, scientists, researchers and professionals in science and technology can share and access knowledge, expertise and the outcome of their work.

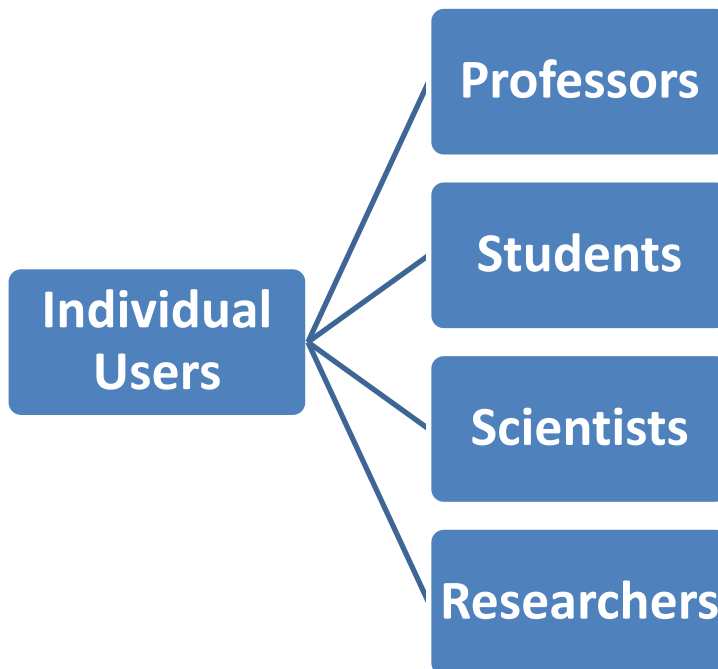


Figure 3 Individual's End Users



### **Categories of Members in TOPOS Forum - Organisations and Individuals**

The content of TOPOS Forum will follow the membership scheme of the TOPOS Observatory. This means that the content of the forum will be divided in two main areas – topics. These are the Organisations’ topic and the Individuals’ topic under which the corresponding end users will post appropriate content.



### 3 TOPOS Observatory and Forum Webinar

As it has already been mentioned, a webinar has been organised to support the TOPOS Observatory and Forum. The webinar took place in two different dates, the first one on the 21<sup>st</sup> of January 2021 and the second, one week later, on the 28<sup>th</sup> of January.

This webinar was an internal one (strict instructions for not inviting attendees outside the consortium) and its aim was to better introduce the TOPOS tools to the partners of the consortium. Feedback has also been collected to provide ideas and suggestions to the developers of the tools.

The webinar lasted one and a half hours. The time was equally divided into the three main areas of TOPOS, the Observatory for Organisations, the Observatory for Individuals and the Forum. The agenda of the first webinar can be found on the Annexes area (Annex I). The agenda of the second webinar was exactly the same. The only difference was on the date of the webinar (28<sup>th</sup> of January 2021).

The consortium internally informed their employees for this specific webinar. There were thirty-one participants on the first webinar and seventeen on the second one.

The participants were able to ask questions at the end of each session. There was specific amount of time dedicated to this question answering. These questions were the first collected feedback for the developed TOPOS tools from real users. The feedback has been analysed and presented appropriately on each tool's chapter.

## 4 TOPOS Gateway

The domain “[topos-observatory.eu](https://www.topos-observatory.eu)” was registered to set up the TOPOS Forum/Observatory and it has been used to incorporate the different subdomains of the project which are presented in Chapters 4 and 5 of this deliverable.

Domain/ Subdomain	Usage
<a href="https://www.topos-observatory.eu/">https://www.topos-observatory.eu/</a>	TOPOS Gateway containing information about TOPOS Observatory (for Organisations and for Individuals) and TOPOS Forum
<a href="http://openaire.topos-observatory.eu/">http://openaire.topos-observatory.eu/</a>	Redirection to openAIRE platform
<a href="http://scipedia.topos-observatory.eu/">http://scipedia.topos-observatory.eu/</a>	Redirection to Scipedia platform
<a href="http://forum.topos-observatory.eu/">http://forum.topos-observatory.eu/</a>	TOPOS Forum

Table 1 List of Domain/ Subdomains of TOPOS Gateway.

In WP3, the project consortium has agreed within the 2<sup>nd</sup> Project Meeting that the TOPOS Gateway will be developed and enhanced to become the TOPOS Observatory for Organizations, TOPOS Observatory for Individuals and TOPOS Forum.

TOPOS Gateway has been developed as an installation of Joomla. Joomla CMS (content management system) is an open-source software, designed to present information to the end use. The use of this CMS provides advanced flexibility on modifications and easier maintenance.

During the tasks undertaken in WP2, focus on the user’s area of Open Science in European Transport Research, two main user groups have been defined: individual researchers and organizations (Figure 1).

The TOPOS Observatory for Organization platform has been defined with the objective to serve three categories of organizations: technology platforms like institutional, thematic repositories, data archives and disciplinary web sites; research organizations, public and private, like research centers, universities, small and medium enterprises that participate in research activities; public authorities like national and international research funding organizations.

At the same time, the TOPOS Observatory for Individuals has been defined in order to provide an exchange framework for professors, students, scientists, researchers and professionals in science and technology.

Figure 4 shows the main page of the TOPOS Gateway where the TOPOS Observatory for Organisations (OpenAIRE) and the TOPOS Observatory for Individuals (Scipedia) have been directly linked. Furthermore, TOPOS Forum may be directly accessed from the main page of TOPOS Gateway too.

The main menu (top menu on the web site) of the TOPOS Gateway provides further information about BE OPEN project, OpenAIRE platform, Scipedia platform and the TOPOS Forum.



Figure 4 TOPOS Gateway main web page.

## 5 TOPOS Observatory

### 5.1 TOPOS Observatory for Organisations (openAIRE platform)

The TOPOS Observatory for Organizations (TOPOS4Orgs) has been defined with the objective to serve three categories of organizations in the field of Transport Research: content providers, i.e., technology platforms like institutional, thematic repositories, data archives and disciplinary web sites; research organizations, public and private, like research centers, universities, project consortia, research infrastructures, small and medium enterprises that participate in research activities; public authorities like national and international research funding organizations.

The objective is realized by means of the OpenAIRE CONNECT platform (<https://connect.openaire.eu>), which integrates a suite of OpenAIRE services to engage with stakeholders and support them at implementing Open Science practices and monitor the uptake of Open Science principles in the research community. At the heart of the CONNECT platform there is the OpenAIRE Research Graph (<https://graph.openaire.eu>), an open resource that includes metadata and links between scientific products (e.g., literature, datasets, software, and "other research products"), organizations, funders, funding streams, projects, communities, and data sources (aka content providers). OpenAIRE collects metadata records from more than 70K scholarly communication sources from all over the world, including Open Access institutional repositories, data archives, journals. All the metadata records (i.e., descriptions of research products) are put together in a "data lake", together with records from Crossref, Unpaywall, ORCID, Grid.ac, and information about projects provided by national and international funders. Dedicated inference algorithms applied to metadata and to the full-texts of Open Access publications enrich the content of the data lake with links between research results and projects, author affiliations, subject classification, links to entries from domain-specific databases. Duplicated organisations and results are identified and merged together to obtain an open, trusted, public resource enabling explorations of the scholarly communication landscape like never before.

On top of the graph, OpenAIRE offers a plethora of services and products to cover different needs of different stakeholders of Open Science and research. For example, the graph is analysed for the calculation of statistics that support the monitoring of the uptake of Open Science principles and the compliance to Open Access mandates and guidelines of funders. Third parties can also perform their analysis on the whole graph or parts of it accessing the metadata records via the OpenAIRE HTTP API (<https://develop.openaire.eu>) or the dumps published on Zenodo (<https://doi.org/10.5281/zenodo.3974604>).

Thanks to the OpenAIRE CONNECT platform, the TOPOS4Orgs (<https://beopen.openaire.eu - http://openaire.topos-observatory.eu/>) was set up to offer dedicated services to the stakeholders in the field of Transport research. The home page of the TOPOS4Orgs (**Error! Reference source not found.**) is a single-entry point to all research products relevant in the domain of Transport Research available in the OpenAIRE Research Graph. Those have been identified by applying the criteria described in Section 5.1.2. Users of the gateway also find Open Science publishing tools to (i) deposit research products of any type and get persistent identifiers via Zenodo (manually or programmatically

via API); (ii) add details of the research context of a research product by creating links to projects and to other related research products (e.g., a link between a dataset and the software that analysed it); (iii) manually add research products to the gateway. Via such tools, researchers populate and access an open, participatory scholarly communication graph of interlinked objects through which they can share any kind of products in their community, maximise re-use and reproducibility of science, and outreach the scholarly communication at large.

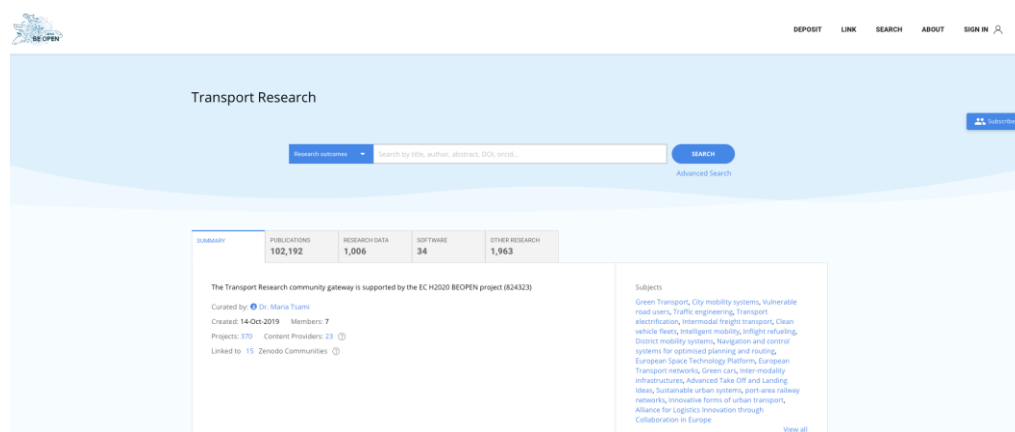


Figure 5 The home page of the TOPOS Observatory for Organisations

## 5.1.1 Services of the TOPOS Observatory for Organisations

### 5.1.1.1 TOPOS4Orgs services for content providers

The services of the TOPOS4Orgs for the category of content providers, i.e., technology platforms like institutional, thematic repositories, data archives and disciplinary web sites covers different aspects of the research life-cycle and Open Science.

By registering in the OpenAIRE PROVIDE Dashboard<sup>1</sup>, repositories and archives can contribute with their metadata records to the OpenAIRE Research Graph and, therefore, to the TOPOS4Orgs. To join the OpenAIRE network, repositories and archives must export metadata records about scholarly objects of any type (published scientific literature, pre-prints, research data and software, scientific workflows, patents, and other types of research products) according to the OpenAIRE interoperability guidelines<sup>2</sup>. To support the adoption of the guidelines, OpenAIRE provides technical support (help desk and tutorials) and a Validator service for the automatic verification of the compliance of the exported records with the guidelines. If applicable, the content provider can give the consent to OpenAIRE to also collect the full-texts of Open Access publications: OpenAIRE will run its full-text mining algorithms to further enrich metadata records with links to projects, publications, datasets, software, organisations, research infrastructures and terms from standard classification schemes (see Section 5.1.3.2). The aggregated metadata records will be included in the OpenAIRE Research Graph and merged with duplicates that OpenAIRE might have collected from other providers to form a richer record that is the union of the information available from each provider. The content provider will be

<sup>1</sup> OpenAIRE PROVIDE Dashboard: <https://provide.openaire.eu>

<sup>2</sup> OpenAIRE interoperability guidelines: <https://guidelines.openaire.eu>

able to get the enrichments OpenAIRE introduced to its records by using the OpenAIRE Broker service available in the PROVIDE Dashboard<sup>3</sup>.

In addition, providers will find a specific landing page both on the OpenAIRE EXPLORE portal and the gateway with functionality to monitor their content in terms of access (via the OpenAIRE UsageCounts service<sup>4</sup>) and statistical indicators:

- *UsageCounts*: usage statistics about the research products aggregated from the providers. The example in Figure 6 only shows counters for the “OpenAIRE views”, that is the number of accesses to the research products of the provider in the OpenAIRE portals (EXPLORE or any of the gateways). In Figure 7, instead, multiple counters can be seen thanks to the fact that the repository registered for the OpenAIRE UsageCounts service via the PROVIDE dashboard. In addition to the “OpenAIRE views” it can be seen: “Downloads”, that is the number of full-text downloads in the repository, and “Total views”, that is the number of views of the product landing pages in OpenAIRE and the repository itself.
- Statistics (see Figure 6): graphs and charts about the results aggregated from the content provider (Research results per year, per type, per funder, per projects)

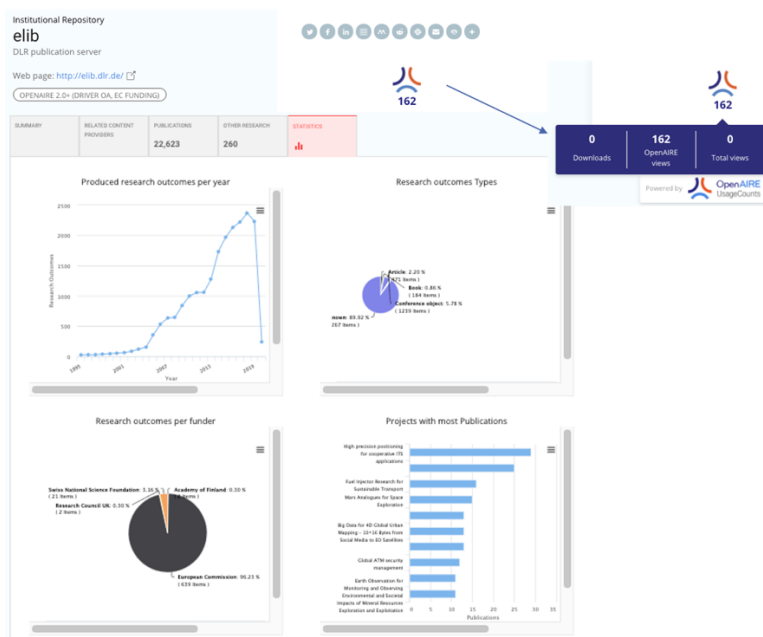


Figure 6 Landing page for a content provider (DLR publication server<sup>5</sup>) that did not register to the OpenAIRE UsageCounts

<sup>3</sup> OpenAIRE PROVIDE Dashboard: <https://provide.openaire.eu>

<sup>4</sup> Guide for the OpenAIRE UsageCounts service: <https://www.openaire.eu/guides-usage-counts>

<sup>5</sup>

[https://beopen.openaire.eu/search/dataprovider?datasourceId=opendoar\\_\\_\\_\\_::84f0f20482cde7e5eacaf7364a643d](https://beopen.openaire.eu/search/dataprovider?datasourceId=opendoar____::84f0f20482cde7e5eacaf7364a643d)

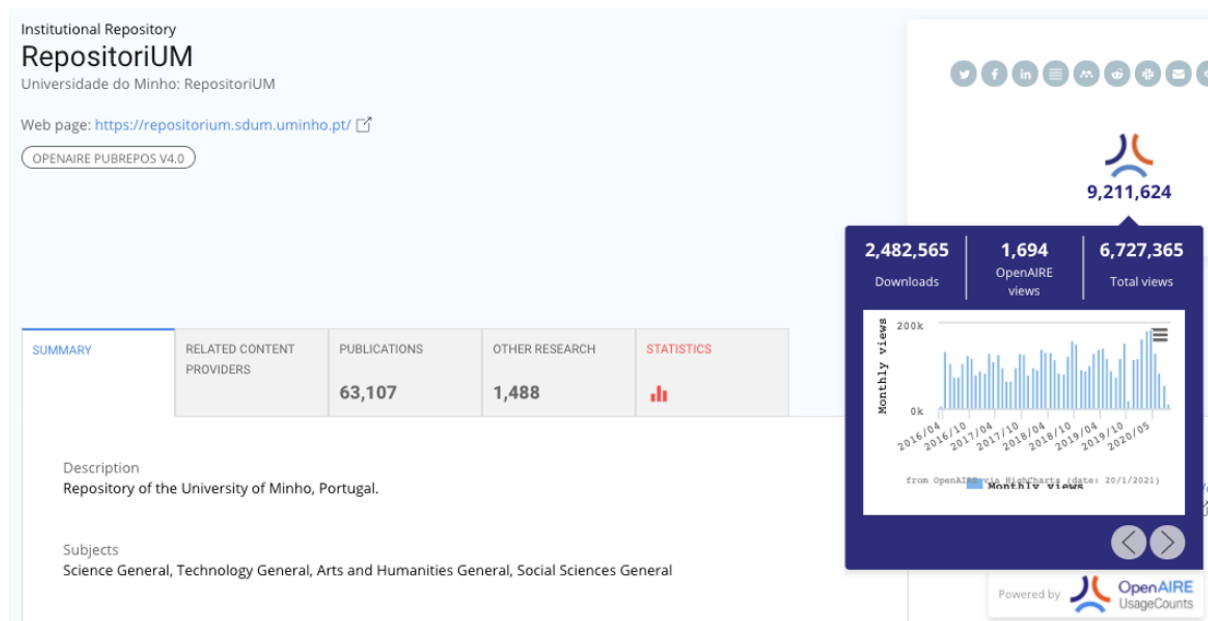


Figure 7 Landing page for a content provider (University of Minho<sup>6</sup>) that registered to the OpenAIRE UsageCounts

Finally, content providers joining the OpenAIRE network will bring an important benefit to organizations and researchers participating in projects of the European Commission. The System for Grant Management of EC H2020 Participant Portal (Sygma) uses the OpenAIRE API to suggest to project managers the publications and datasets to be included in the official form for continuous reporting. In short, if a publication/dataset is in OpenAIRE with the link to the funding project (which can be collected directly from providers, added by OpenAIRE users using the Link functionality<sup>7</sup> or by the OpenAIRE mining algorithms), Sygma will propose that publication/dataset for inclusion in the continuous reporting for that project, simplifying the reporting procedure.<sup>8</sup>

Disciplinary web sites, instead, can exploit the OpenAIRE dumps or the API to include metadata records about research products in the transport sector in their portals. OpenAIRE publishes the dumps every six months on Zenodo<sup>9</sup>, while the HTTP API<sup>10</sup> can be used to search and get records that are currently available in the gateway.

### 5.1.1.2 TOPOS4Orgs services for research organisations

The services of the TOPOS4Orgs for the category of research organisations (e.g., research centers, universities, project consortia, research infrastructures, small and medium enterprises that participate in research activities) aims at supporting the implementation of Open Science publishing practices and the monitoring of the uptake of Open Science practices of their researchers.

<sup>6</sup>

[https://beopen.openaire.eu/search/dataprovider?datasourceId=opendoar\\_\\_\\_\\_\\_:8e98d81f8217304975ccb23337bb5761](https://beopen.openaire.eu/search/dataprovider?datasourceId=opendoar_____:8e98d81f8217304975ccb23337bb5761)

<sup>7</sup> Guide about the OpenAIRE Link functionality: <https://www.openaire.eu/claim-publication>

<sup>8</sup> More details can be found in the use case available at <https://www.openaire.eu/reporting-research-outputs-to-the-ec-using-the-openaire-api>

<sup>9</sup> OpenAIRE: dumps for research communities and initiatives: <https://doi.org/10.5281/zenodo.3974604>

<sup>10</sup> HTTP API documentation: <https://develop.openaire.eu>

Zenodo (<https://zenodo.org>) is a “catch-all repository” that researchers without a thematic or an institutional repository can use to deposit research products of any type in a trusted environment. The BE OPEN consortium created in October 2019 the BE OPEN community<sup>11</sup> to “create a common pool of knowledge to allow Open Science to become a reality in transport research” and host “Contributions in every field of transport research” (see Figure 8). As of January 2021, the community hosts 18 research products. Any organization without an official Open Access repository can easily create a dedicated Zenodo community and ask its affiliated researcher to deposit there their research outputs. In fact, Zenodo communities have been used in many different ways by different organisations: project consortia have Zenodo communities for their projects, publishers have one for each of their journals, universities have them to easily and efficiently comply with national Open Access mandates.

Thematic Zenodo communities that are relevant for the Transport research are reachable directly from the TOPOS<sup>12</sup>. As depicted in Figure 9, the TOPOS4Orgs suggests thematic Zenodo communities that can be used for deposition according to the Open Science principles. The list is manually curated by the curators of the gateway. Services of thematic research e-infrastructure can use the Zenodo API to publish the outputs of the researchers directly in the BE OPEN Zenodo community and/or any of the other communities.

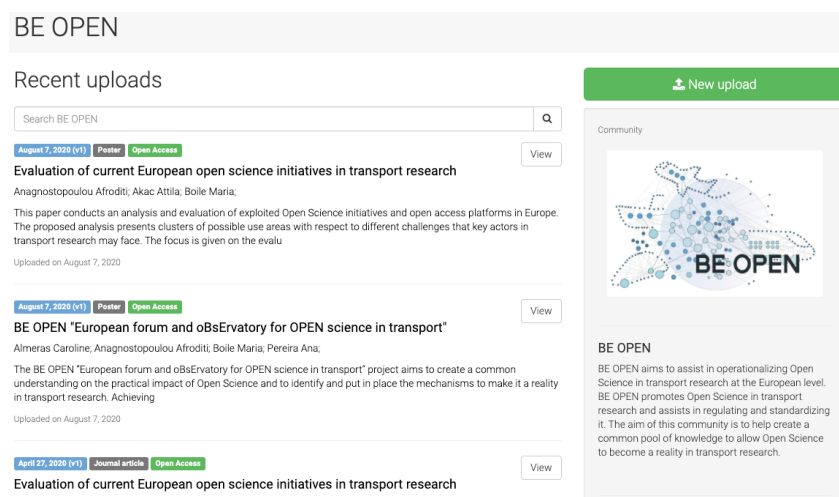


Figure 8 BE OPEN community on Zenodo

<sup>11</sup> BEOPEN Zenodo community: <https://zenodo.org/communities/be-open-transport>

<sup>12</sup> <https://beopen.openaire.eu/participate/deposit/zenodo>



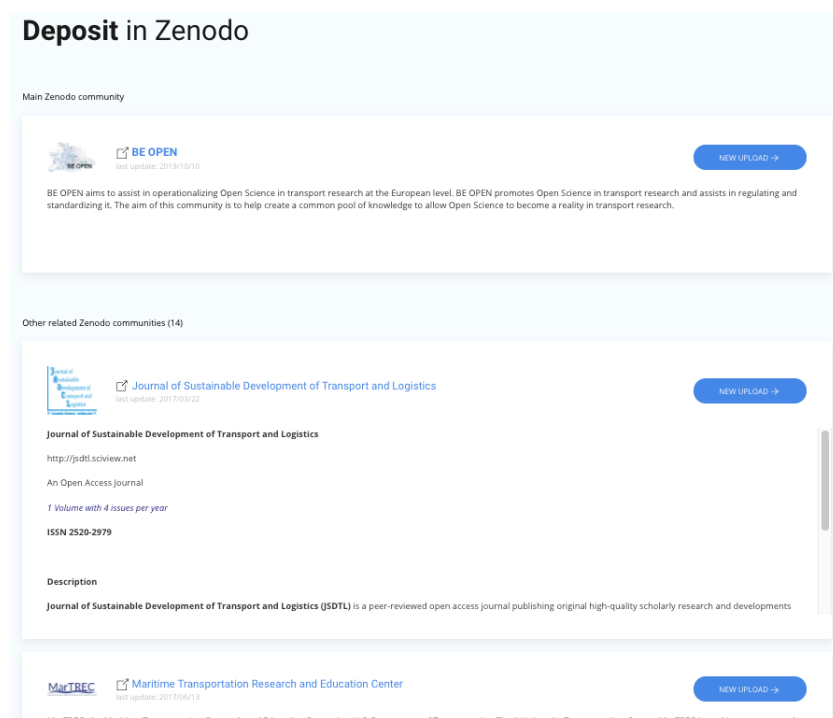


Figure 9 Thematic Zenodo communities in the TOPOS

In addition, organisations will find a specific landing page both on the OpenAIRE EXPLORE portal and the TOPOS4Orgs with functionality that support: (i) the monitoring of the outputs and the projects the organisation is involved, thanks to specific indicators on Open Access and (ii) the reporting and dissemination of research results. Figure 10 shows the landing page for the Deutsches Zentrum für Luft- und Raumfahrt<sup>13</sup>. The different tabs allow to focus on a specific type of research entities:

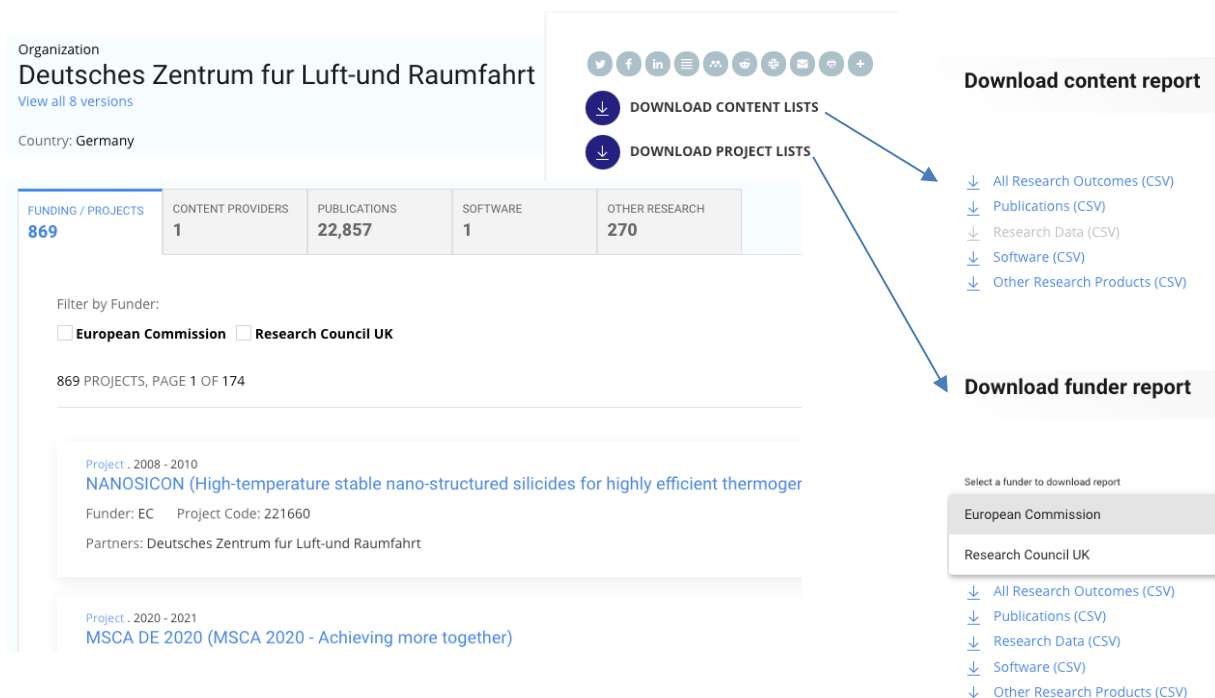
- The “FUNDING/PROJECTS” tab allows to search and browse the projects where the organisation participates in.
- The “CONTENT PROVIDERS” tab links to the providers operated by the organisation
- The “PUBLICATIONS”, “SOFTWARE”, “OTHER RESEARCH” tabs allow to search and browse the research objects of different types produced by researchers affiliated with the organisation. The lack of the “DATASET” tab in Figure 10 is because OpenAIRE could not account any dataset to researchers affiliated to the organisation.

On the top right of the landing page, functionality to support reporting are available:

- DOWNLOAD CONTENT REPORT: generate a csv file with information about the research outcomes associated to the organisations
- DOWNLOAD PROJECT LISTS: generate a csv file with the list of projects the organisation participates to or with the list of those project research outcomes

<sup>13</sup> [https://beopen.openaire.eu/search/organization?organizationId=dedup\\_wf\\_001::4f95ab0cb05910658e19f86433947b25](https://beopen.openaire.eu/search/organization?organizationId=dedup_wf_001::4f95ab0cb05910658e19f86433947b25)

In addition, OpenAIRE is working to provide on-demand institutional monitoring dashboard where additional monitoring functionality will be made available.



The screenshot displays the OpenAIRE landing page for the organization 'Deutsches Zentrum für Luft- und Raumfahrt'. The page includes a header with the organization name and country (Germany), a navigation bar with social media icons, and a main content area with a table of statistics:

FUNDING / PROJECTS	CONTENT PROVIDERS	PUBLICATIONS	SOFTWARE	OTHER RESEARCH
869	1	22,857	1	270

Below the statistics, there are filter options for the funder (European Commission and Research Council UK) and a list of projects. Two project entries are visible:

- Project . 2008 - 2010: NANOSICON (High-temperature stable nano-structured silicides for highly efficient thermogog)
- Project . 2020 - 2021: MSCA DE 2020 (MSCA 2020 - Achieving more together)

On the right side, there are two panels for downloading reports:

- Download content report:** Includes links for All Research Outcomes (CSV), Publications (CSV), Research Data (CSV), Software (CSV), and Other Research Products (CSV).
- Download funder report:** Includes a dropdown to select a funder (European Commission or Research Council UK) and the same set of report download links.

Figure 10 Landing page for an organisation

A landing page for a project consortium is presented in Figure 11. It provides functionality that support the monitoring of the outputs and the reporting to the funder, which are useful to the project manager and all members of the project. An example is given in Figure 11 and Figure 12, which refer to the EC H2020 project AUTOPILOT<sup>14</sup>. The different tabs allow to focus on a specific type of research outputs (scientific literature, dataset, software, other types of research products) that received funding from the project at hand. The tab “STATISTICS” (see Figure 12) shows instead graphs and charts about the project results (Research results per year, per content provider, per access mode). On the top right of the landing page functionality to support the dissemination and reporting of research results are offered:

- Direct links to some of the most popular social media
- SHARE RESULTS: to embed project results in web site
- DOWNLOAD REPORT: generate an HTML or CSV document listing metadata about the project result
- UsageCounts: usage statistics about the project research results. By clicking on the logo, a pop up appears to show the number of access to the landing pages of the products on OpenAIRE and the views and downloads on the original content providers (if the providers registered to the service). This may give an idea of the impact of the project in the scholarly communication landscape.

<sup>14</sup> [https://beopen.openaire.eu/search/project?projectId=corda\\_\\_h2020::51fefb07a29923a0ebe39eca369cc6b2](https://beopen.openaire.eu/search/project?projectId=corda__h2020::51fefb07a29923a0ebe39eca369cc6b2)

**Project:** 2017 - 2020 - Closed  
**AUTOPILOT**  
AUTOMated driving Progressed by Inter

**OPEN ACCESS MANDATE FOR PUBLICATIONS AND RESEARCH DATA** | EUROPEAN COMMISSION

Funder: **European Commission** | Project code: 731993 | Call for proposal: H2020-IOT-2016  
Funded under: H2020 | IA | Overall Budget: 26,555,500 EUR | Funder Contribution: 19,925,000 EUR  
Status: **Closed**

Start Date: 01 Jan 2017 | End Date: 29 Feb 2020  
Detailed project information (CORDIS) →

**Download report**

Select content type to download  
All research outcomes

- Download EC report (HTML)
- Download EC report (CSV)

**STATISTICS**

SUMMARY	PUBLICATIONS	RESEARCH DATA	SOFTWARE	OTHER RESEARCH
	24	64	0	0

**Share results**

```
<script type="text/javascript">
</script>
<script type="text/javascript">
document.write("<div id="os_widget"></div>");
document.write("<script type="text/javascript"> src="https://www.open...
</script>");
</script>
```

**LINK THIS PROJECT TO...**

- DEPOSIT YOUR RESEARCH
- SHARE RESULTS
- DOWNLOAD REPORT

Project metrics are derived from aggregating individual research results metrics.

Downloads	OpenAIRE views	Total views
921	3	3,607

4,531

Partners: [VERSAILLES GRAND PARC ST. TECHNOLOGIE BV](#), [NEC LABORATORIES EUROPE GMBH](#), [CEA](#), [CETECOM GMBH](#), [TIM](#), [AYUNTAMIENTO DE VIGO](#), [TELE ATLAS](#), [ERTICO ITS EUR](#), [IBM \(Ireland\)](#), [VeDeCoM Institute](#), [VTI](#), [CONTINENTAL AUTOMOTIVE FRANCE SAS](#), [EGM](#), [CTAG](#), [PSA](#), [Deutsches Zentrum für Luft- und Raumfahrt](#), [HWDU](#), [STIFTELSEN SINTEF](#), ...

View all 49 organizations

Figure 11 Landing page for a project

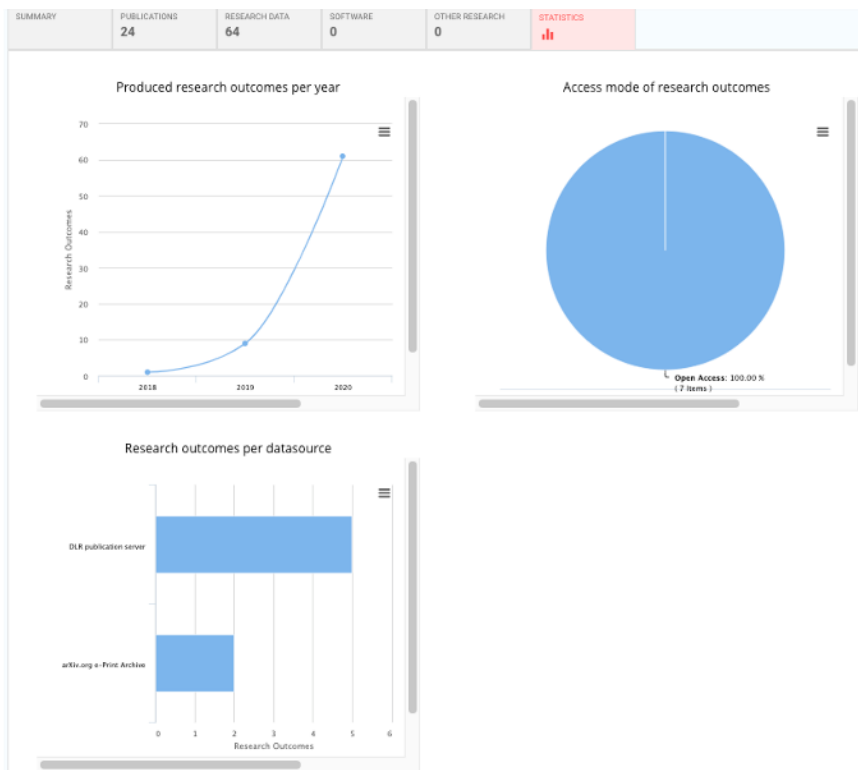
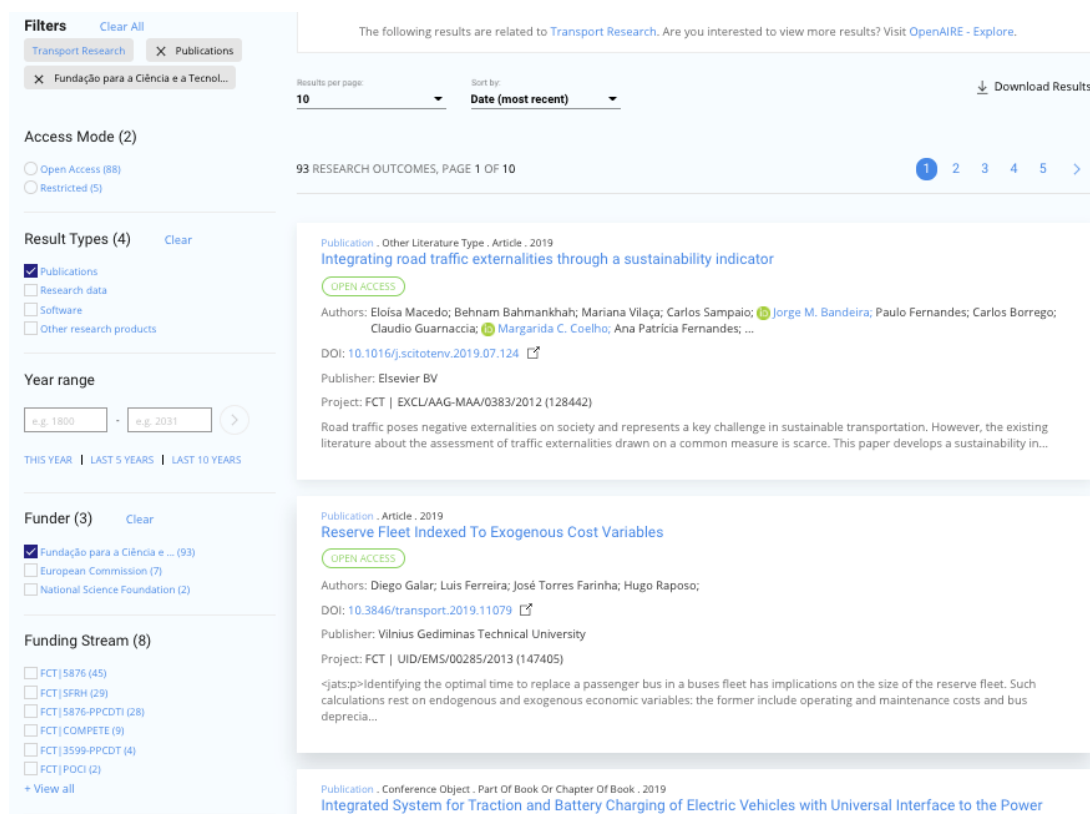


Figure 12 Statistics for the EC H2020 AUTOPILOT project

### 5.1.1.3 TOPOS4Orgs services for public authorities

Public authorities like national and international research funding organizations can find in the TOPOS4Orgs services for monitoring the impact of their funding in the community of Transport research. For example, Figure 13 shows how the national funder of Portugal (FCT) can check which of their projects have publications related to the domain of Transport research by using the faceted search. The faceted search is also useful to easily identify co-funded publications. As can be seen in Figure 13, among the publications funded by FCT projects, some are also funded by the European Commission and the US National Science Foundation.

In addition, funders can request a MONITOR dashboard<sup>15</sup> and configure it to show indicators addressing different Open Science aspects of the research outputs of the projects they have funded, from Open Access to publications and data, to the adoption of persistent identifiers. The screenshot in Figure 14 shows the monitor that have been set up for the European Commission (FP7 and H2020 programmes)<sup>16</sup>.



The screenshot displays a search results page with the following elements:

- Filters:**
  - Transport Research (selected)
  - Publications (selected)
  - Fundação para a Ciência e a Tecnol... (selected)
- Access Mode (2):**
  - Open Access (88)
  - Restricted (5)
- Result Types (4):**
  - Publications (checked)
  - Research data
  - Software
  - Other research products
- Year range:**
  - Input fields: e.g. 1800 - e.g. 2031
  - Buttons: THIS YEAR, LAST 5 YEARS, LAST 10 YEARS
- Funder (3):**
  - Fundação para a Ciência e ... (93) (checked)
  - European Commission (7)
  - National Science Foundation (2)
- Funding Stream (8):**
  - FCT|5876 (45)
  - FCT|SFRH (29)
  - FCT|5876-PPCDT1 (28)
  - FCT|COMPETE (9)
  - FCT|3599-PPCDT (4)
  - FCT|POCI (2)
  - + View all
- Search Results:**
  - 93 RESEARCH OUTCOMES, PAGE 1 OF 10
  - Publication - Other Literature Type - Article - 2019: **Integrating road traffic externalities through a sustainability indicator** (OPEN ACCESS). Authors: Eloisa Macedo, Behnam Bahmankhah, Mariana Vilaça, Carlos Sampaio, Jorge M. Bandeira, Paulo Fernandes, Carlos Borrego, Claudio Guarnaccia, Margarida C. Coelho, Ana Patrícia Fernandes, ... DOI: 10.1016/j.scitotenv.2019.07.124. Project: FCT | EXCL/AAG-MAA/0383/2012 (128442).
  - Publication - Article - 2019: **Reserve Fleet Indexed To Exogenous Cost Variables** (OPEN ACCESS). Authors: Diego Galar, Luis Ferreira, José Torres Farinha, Hugo Raposo. DOI: 10.3846/transport.2019.11079. Project: FCT | UID/EMS/00285/2013 (147405).
  - Publication - Conference Object - Part Of Book Or Chapter Of Book - 2019: **Integrated System for Traction and Battery Charging of Electric Vehicles with Universal Interface to the Power**

Figure 13 Publications funded by FCT in the TOPOS for organisations

<sup>15</sup> OpenAIRE MONITOR: <https://monitor.openaire.eu>

<sup>16</sup> OpenAIRE MONITOR Dashboard for the European Commission: <https://monitor.openaire.eu/dashboard/ec>

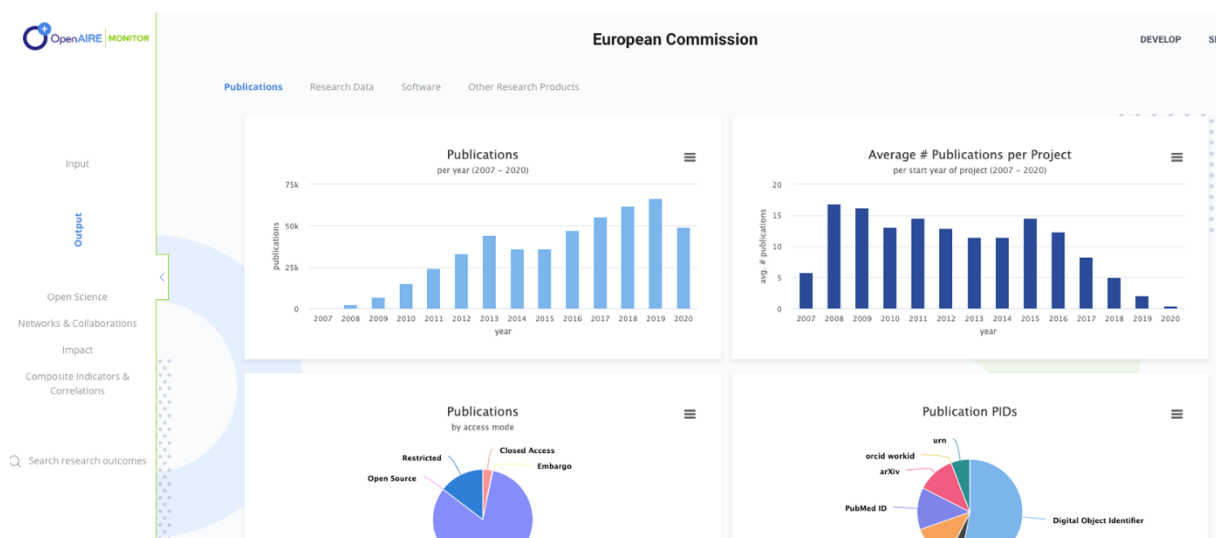


Figure 14 Monitor dashboard for the European Commission (FP7 and H2020 programme)

### 5.1.2 Configuration criteria for the population of the TOPOS

The content available in the TOPOS4Orgs is defined by a set of criteria that “managers”, experts in the domain and aware of the needs of the community, can configure via an online administration dashboard (see Figure 15).

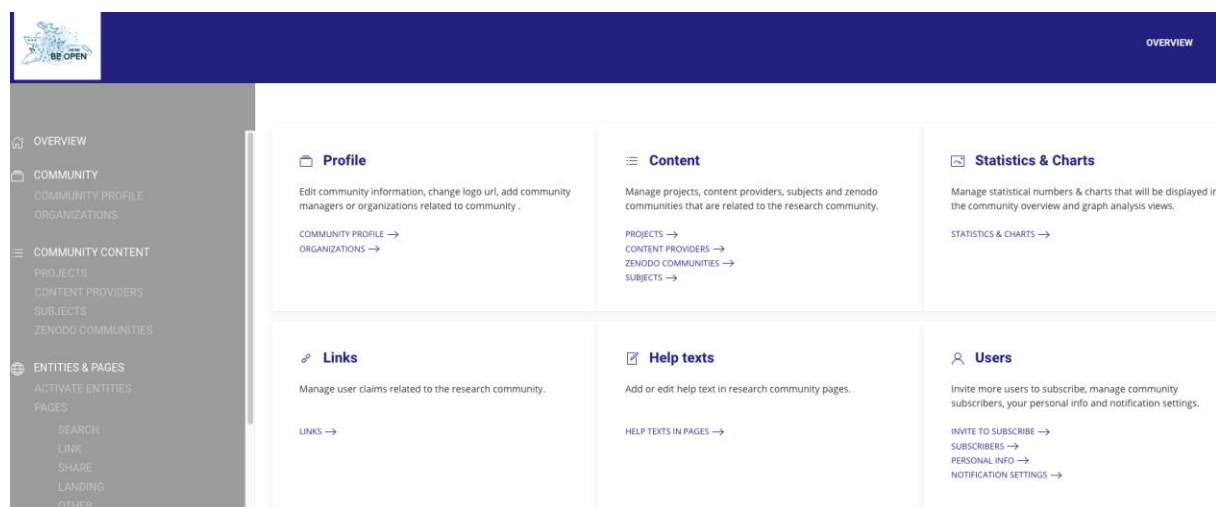


Figure 15 Administration dashboard for configuring the TOPOS Observatory for Organisations

Managers can configure the algorithms used by the OpenAIRE infrastructure to assign scientific products in the OpenAIRE Research Graph to the community based on information available in the metadata or in Open Access publications full-texts (full-text mining). OpenAIRE algorithms analyse the research graph to identify all products that are relevant for the community (e.g. products with relevant subjects, deposited in thematic or community specific repositories and archives, linked to domain-specific projects). In addition, managers can also act as “community moderators” by: (i) accepting and rejecting links and products manually added by researchers and (ii) selecting the statistics and charts that are relevant and publicly visible.

In order to proceed with the initial set-up of the TOPOS4Orgs, members of the BE OPEN consortium provided the following inputs that were processed to be included in the gateway configuration and used in the full-text mining algorithms:

- List of relevant projects
- List of relevant content providers
- List of relevant organizations
- Glossary for transport statistics — 5th edition — co-published by Eurostat, UN and ITF.

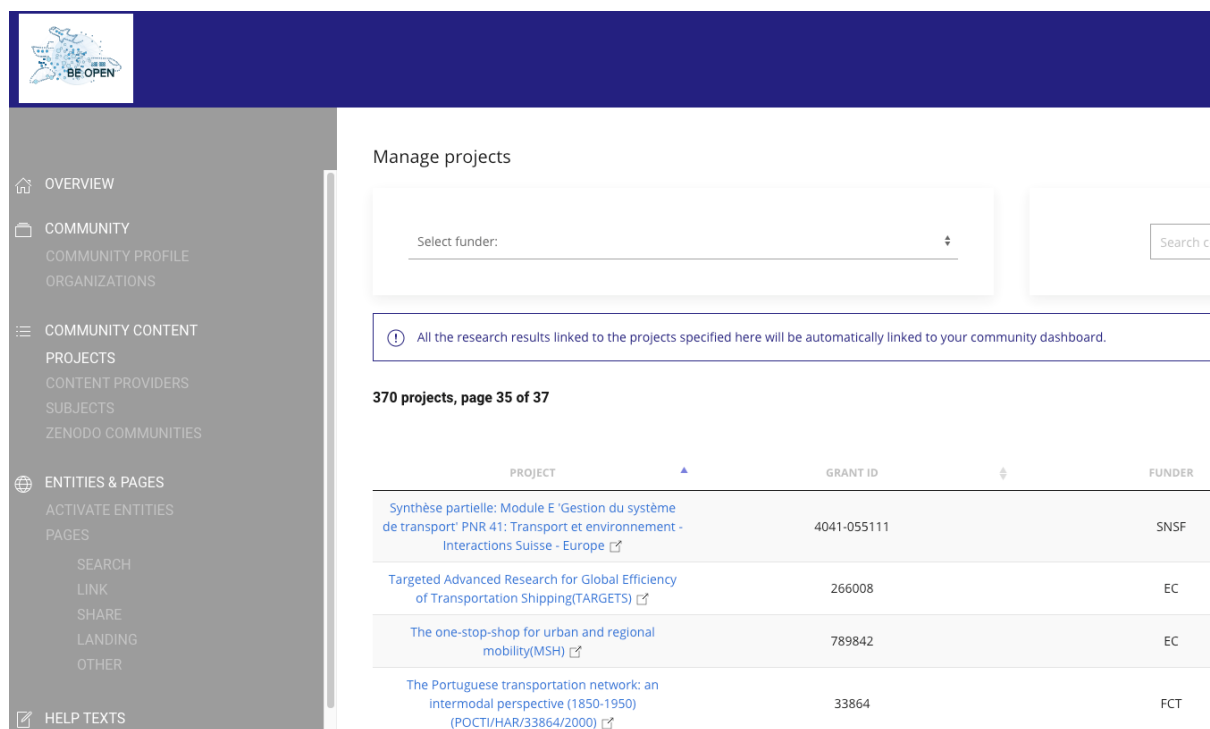
The initial configuration was then refined and improved, as discussed in the following subsections.

### 5.1.2.1 Projects

The list of relevant projects as of November 2019 includes 50 projects funded by the European Commission (34 under the framework programmes FP7 and H2020, 16 under FP5 and FP6). The detailed list of projects is also available in the spreadsheet document that you can download from <https://data.d4science.net/AfQQ>.

The 34 FP7 and H2020 projects have been added to configuration, together with additional projects of other national and international funders available in OpenAIRE, as shown in Figure 16. As a result, if a research product is identified as funded by one of those projects, it will also be tagged as relevant for the community and, therefore, will be included in the TOPOS4Orgs.

In January 2021, 1005 research products have been identified thanks to this configuration criteria.



PROJECT	GRANT ID	FUNDER
Synthese partielle: Module E 'Gestion du système de transport' PNR 41: Transport et environnement - Interactions Suisse - Europe	4041-055111	SNSF
Targeted Advanced Research for Global Efficiency of Transportation Shipping(TARGETS)	266008	EC
The one-stop-shop for urban and regional mobility(MSH)	789842	EC
The Portuguese transportation network: an intermodal perspective (1850-1950) (POCTI/HAR/33864/2000)	33864	FCT

Figure 16 Relevant projects in the configuration of the Open Research gateway on Transport Research

### Opportunities for improvement

OpenAIRE integrates metadata about three million projects funded by 23 different funders from Europe and beyond. Examples are NIH and NSF from United States, ARC from Australia, CONICYT from

Chile, National European funders like FCT (Portugal), SFI (Ireland), NWO (The Netherlands). The full list of funders and projects can be viewed on the OpenAIRE Explore portal at the URL <https://explore.openaire.eu/search/find/projects>.

Thanks to the administrative dashboard, managers can search for relevant projects across all 23 funders by using specific keywords in the dedicated text box. The response is the list of projects whose titles, acronyms (and soon abstracts) contain the user search terms.

The integration of new funders and new projects is a continuous process in OpenAIRE. It would be important for the gateway curators to check every now and then about the availability of new projects to be included in the gateway configuration.

#### **5.1.2.2 Content providers**

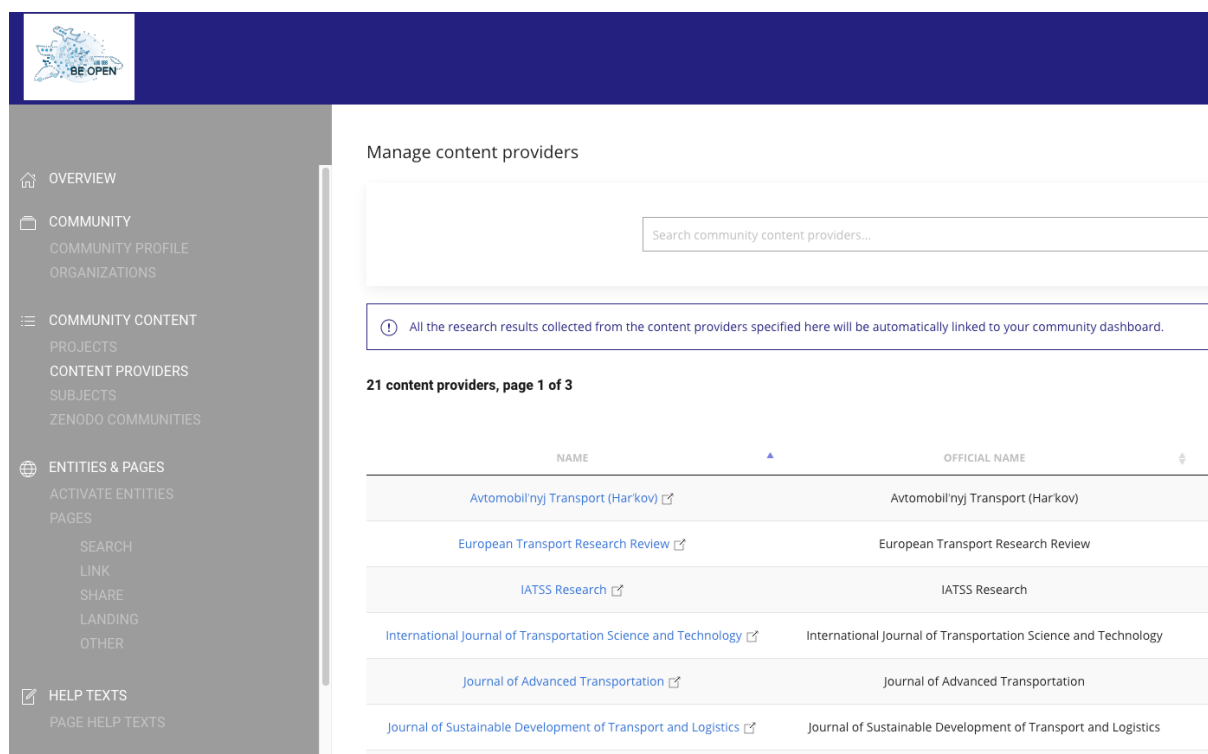
The list of relevant content providers as of November 2019 includes 24 repositories (see the annotated list in <https://data.d4science.net/AfQQ>).

Most of the repositories are registered on re3data (19). Three of them are already aggregated by OpenAIRE via Datacite (4TU.Centre for Research Data, Center for International Earth Science Information Network, and Kinder Institute Urban Data Platform) and one is directly aggregated (Copernicus). The four repositories cover a wide range of domains and cannot be considered specific enough to Transport Research and include in the TOPOS4Orgs all the products they host. OpenAIRE will be able to identify from those three repositories (and all repositories it aggregates) the research products relevant for the domain of Transport Research exploiting the information from the subjects.

The 15 repositories that are not available via Datacite do not seem to offer proper API that OpenAIRE can use to collect the metadata about the research products they host.

The initial configuration of the TOPOS4Orgs (October 2019) therefore did not include any content providers. However, managers properly exploited the admin dashboard to select content providers already integrated in OpenAIRE. In January 2021, 21 content providers have been selected for inclusion, as depicted in Figure 17. 13,600 research products have been identified thanks to this configuration criteria.





Manage content providers

Search community content providers...

All the research results collected from the content providers specified here will be automatically linked to your community dashboard.

21 content providers, page 1 of 3

NAME	OFFICIAL NAME
Avtomobil'nyj Transport (Har'kov)	Avtomobil'nyj Transport (Har'kov)
European Transport Research Review	European Transport Research Review
IATSS Research	IATSS Research
International Journal of Transportation Science and Technology	International Journal of Transportation Science and Technology
Journal of Advanced Transportation	Journal of Advanced Transportation
Journal of Sustainable Development of Transport and Logistics	Journal of Sustainable Development of Transport and Logistics

Figure 17 Relevant content providers in the configuration of the Open Research gateway on Transport Research

### Opportunities for improvement

Opportunities for improvement relate to the repositories highlighted in yellow in the initial list provided in <https://data.d4science.net/AfQQ>:

- *NASA Socioeconomic Data and Applications Center*: the repository is registered on re3data and does not offer API to programmatically collect metadata from the repository. However, it is possible to download from the web site a csv file of the interesting publications/datasets. The downloaded file can be used to get the DOIs of the records to include in the TOPOS4Orgs via the bulk link functionality.
- *RADAR Luke*: the repository is registered on re3data but it is not yet harvested by OpenAIRE. A preliminary analysis shows that the repository offers a GEO REST API that is not compliant to the OpenAIRE guidelines. Information returned by the API seems to not contain the bibliographic information OpenAIRE needs.
- *ETH Travel Data Archive*: the archive is on re3data but is officially no longer maintained. No API could be found to access metadata about the archived survey. This is a case that shows the importance of FAIR practices and data management plans in the context of projects: data produced by the projects should not be stored only in a project web site or on an archive whose life-time depends on the project duration. One possibility to support the accessibility and ensure the preservation of the surveys is to upload the surveys into another maintained Open Access thematic repository or Zenodo.
- *IFSTTAR research data*: the repository is on re3data and its metadata also available from Datacite. The repository is discipline-specific and all its products can be added to the TOPOS4Orgs provided their metadata records, collected from Datacite, contain the proper provenance information. Note that the Archive Institutionelle Ifsttar is instead directly harvested by OpenAIRE and properly added to the configuration.



- *Cranfield Online Research Data*: the repository is on re3data and OpenAIRE collects its metadata records via figShare. However, metadata in the repository refer to research products of different disciplines, hence the products must be identified based on the subjects declared in their metadata records. To include those that cannot be automatically identified, it is suggested to create a csv file of their DOIs and use the link functionality.

Finally, the European Data Portal (<https://www.europeandataportal.eu/>) is also an interesting source that provides access to open data. Based on the current content acquisition policies of OpenAIRE, metadata from the European Data Portal cannot be harvested because they are mainly governmental data. However, the European Data Portal includes records from the EU Open Data Portal (<https://data.europa.eu/>) and, from there, it is possible to identify resources of the European Commission Joint Research Centre. Those are to be considered research data and therefore can be included in OpenAIRE. Although the EU Open Data Portal is not compliant to the OpenAIRE guidelines, the OpenAIRE team will include the relevant metadata records, considering the strategic importance of the source for the BE OPEN community.

### 5.1.2.3 Organisations

Among the information available in the OpenAIRE Research Graph there are links between organizations and research results (i.e., authors' affiliations), available in some cases in the aggregated metadata of research results and, for Open Access publications, obtained by applying text mining techniques on their full-texts.

Those links can be used to identify research products to include in the TOPOS4Orgs, provided the organizations' research focus is the domain of Transport Research.

The list of relevant organizations as of November 2019 includes 40 organizations from the public or private sectors, all of them working in the field of Transport Research except for one (Austrian Institute of Technology, excluded from the gateway configuration).

The list available in <https://data.d4science.net/AfQQ> has been annotated with the identifiers of the organizations assigned by the trusted registry grid.ac and the internal identifiers assigned by OpenAIRE. The availability of an OpenAIRE identifier ensures that it is theoretically possible to have affiliation links to that organization in the OpenAIRE Research Graph. Over a total of 39 organizations, 21 have an OpenAIRE identifier and can be added to the configuration. 5 of the 21 organizations cannot be found on grid.ac, but they are available in OpenAIRE via EC project databases (i.e., those organizations are participants of EC FP7 and/or H2020 projects).

Thanks to the initial configuration for organization, in December 2019, 470 research products were identified as relevant for the community.

### Opportunities for improvement

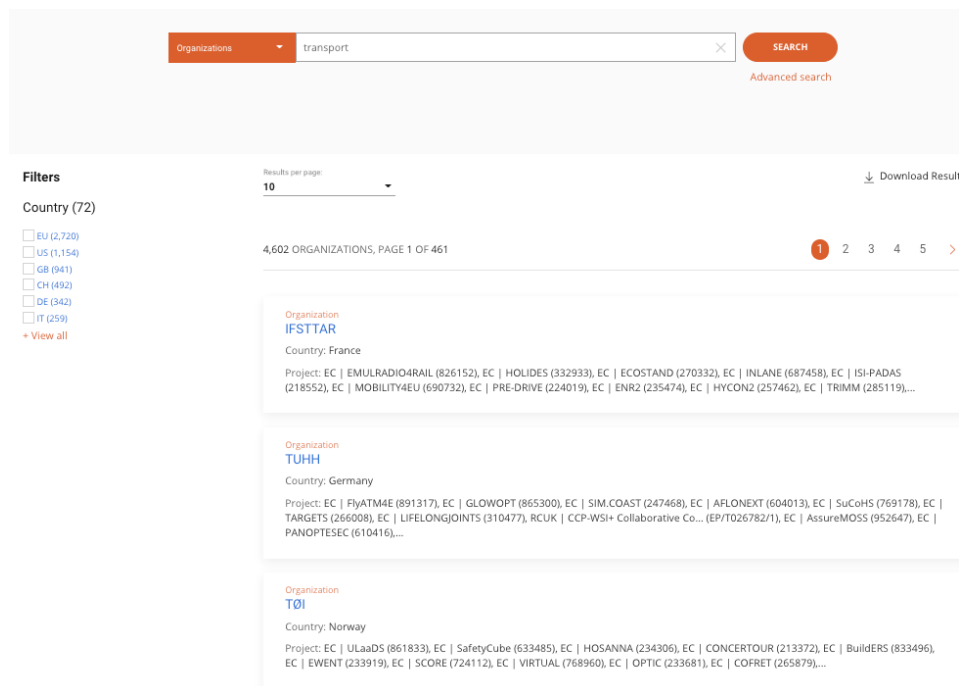
18 organizations in the provided list could not be found in OpenAIRE. Of those, three are available on grid.ac, hence they could enter into the OpenAIRE Research Graph after the next content updates:

- Transportation Research Board (TRB), with grid.496755.c. It is worth to note that, even if the organisation is not yet available in OpenAIRE, its journal "[Journal of the Transportation Research Board](#)" is and it has been added to the configuration among the content providers.

The absence of the organisation, therefore, is not considered to have a bad impact on the coverage.

- International Road Transport Union (IRU) with grid.425303.3
- VOLVO RESEARCH AND EDUCATIONAL FOUNDATIONS with grid.481430.a

In addition, more organizations possibly related to Transport Research can be found in the OpenAIRE Research Graph (see Figure 18) and be used to enrich the gateway configuration.



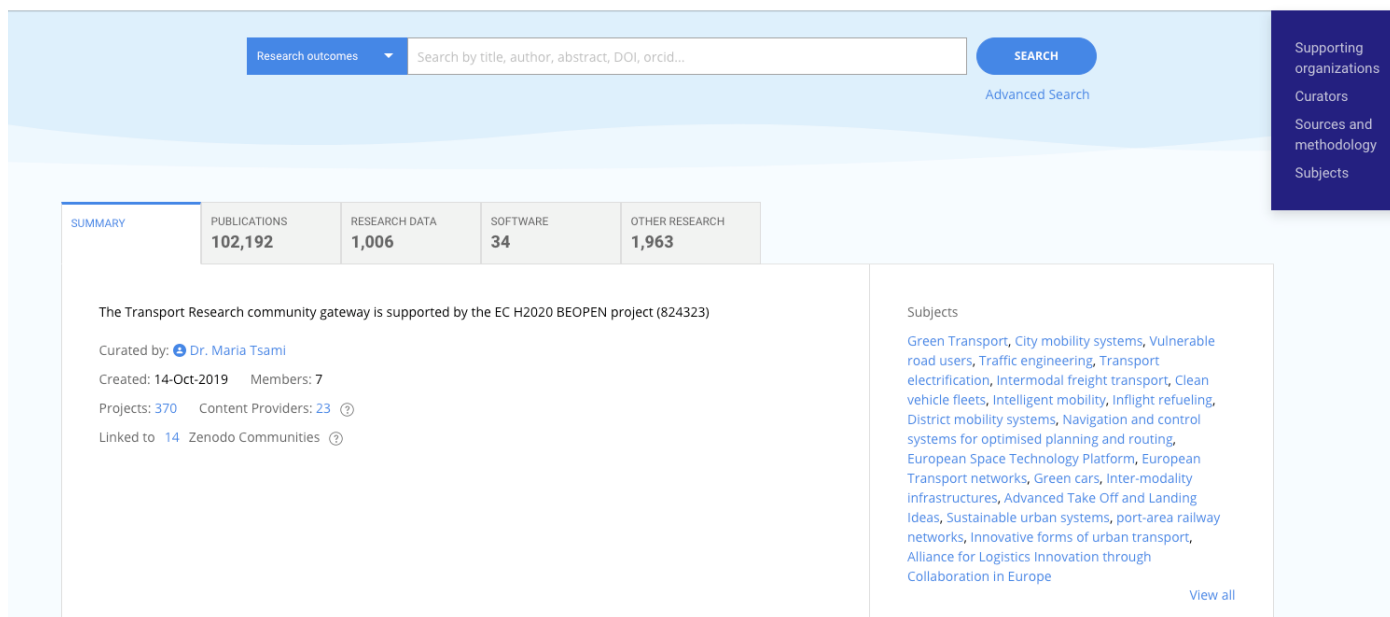
The screenshot shows the OpenAIRE search interface. At the top, there is a search bar with the text 'transport' and a 'SEARCH' button. Below the search bar, there are filters for 'Country (72)' with checkboxes for EU (2,720), US (1,154), GB (941), CH (492), DE (342), and IT (259). The search results are displayed in a list format, showing the first three organizations: IFSTTAR (France), TUHH (Germany), and TØI (Norway). Each organization entry includes its name, country, and a list of project IDs.

**Figure 18 Opportunity for improving the coverage of research products in the gateway: identify organisations working on the discipline of transport research among those already available in OpenAIRE**

### 5.1.2.4 Keywords

The TOPOS4Orgs can be configured to include research products whose keyword list contains at least one specified in the configuration.

For the initial set-up of the gateway, the top terms of the Glossary for transport statistics 5th edition, co-published by Eurostat, UN and ITF, have been added to the configuration. Further refinements during the course of the project led the keyword list to grow from the 10 top terms to more than 80 keywords. The full, up-to-date list of keywords is always visible on the home page of the TOPOS4Orgs, as shown in Figure 19. To view the full list, users can simply click on the “View all” link on the bottom right or select “Subjects” from the “About” menu item at the top right of the gateway.



The screenshot shows the BE-OPEN search interface. At the top, there is a search bar with a dropdown menu set to 'Research outcomes' and a search button. Below the search bar is a navigation menu with options: Supporting organizations, Curators, Sources and methodology, and Subjects. The main content area displays a summary table with the following data:

SUMMARY	PUBLICATIONS	RESEARCH DATA	SOFTWARE	OTHER RESEARCH
	102,192	1,006	34	1,963

Below the table, there is a description of the Transport Research community gateway, its curator (Dr. Maria Tsami), creation date (14-Oct-2019), and statistics (7 members, 370 projects, 23 content providers, 14 linked Zenodo communities). A 'Subjects' section lists various transport-related terms like 'Green Transport', 'City mobility systems', and 'Traffic engineering'.

Figure 19 Configured keywords as of January 2021

If one keyword of a research product in the OpenAIRE Research Graph is equal (ignore case) to one of the terms in the configuration, the product is included in the TOPOS4Orgs.

In December 2019, with the initial configuration, 1763 research products have been identified as relevant for transport research because they contained at least one of the 10 top terms of the Glossary in their list of keywords. In January 2021, with the extended configuration, 103,966 research products have been identified.

This approach is very basic and addresses obvious cases for disciplinary research communities. The effectiveness of the algorithm mainly depends on the established practices of researchers when depositing their products (i.e., if they use keywords and terms from standard vocabulary). When such practices are not well established, a more intelligent approach must be adopted. For Transport Research, the selected strategy aims at classifying research papers according to the taxonomy described in the glossary by applying advanced full-text mining techniques (see Section 5.1.3 for details).

### Opportunities for improvement

Now that the TOPOS4Orgs is populated with research products, it is possible to run an analysis to identify recurring keywords or similar keywords that can be added to the configuration and improve the coverage. Even if the algorithm described above is fairly trivial, it is useful to cover the cases where the more advanced full-text mining algorithm described in Section 5.1.3 cannot be applied. Examples are full-texts that cannot be retrieved from the provided URL or research products that have no full-text to mine, like research data and software.

### 5.1.2.5 Zenodo communities

Zenodo is a multi-disciplinary repository for sharing, preserving and showcasing research products of any type (e.g., publications, posters, presentations, research data, software). When a user deposits a product on Zenodo, a DOI (if not already available) is assigned to it and the metadata are pushed in real-time into the OpenAIRE Research Graph.

In order to group depositions based on user-defined criteria, Zenodo introduces the concept of “Zenodo communities”. They can be seen as “curated containers” of research products. Often, Zenodo communities are used by project managers to group deliverables and outputs of their research products; by institutions that have not an official open access institutional repository; by research groups working on a specific research topic.

Managers of the TOPOS4Orgs can search for Zenodo communities whose products are relevant for the domain and add them to the configuration: all research products deposited in the selected Zenodo communities will then be discoverable via the TOPOS4Orgs.

As of January 2021, 15 Zenodo communities have been added to the gateway configuration, as shown in Figure 20, leading to the inclusion of 789 additional research products to the TOPOS4Orgs.

### Opportunities for improvement

Due to the high creativity of Zenodo users when creating Zenodo communities, it is suggested to double check once in a while if new interesting communities have been created on Zenodo.

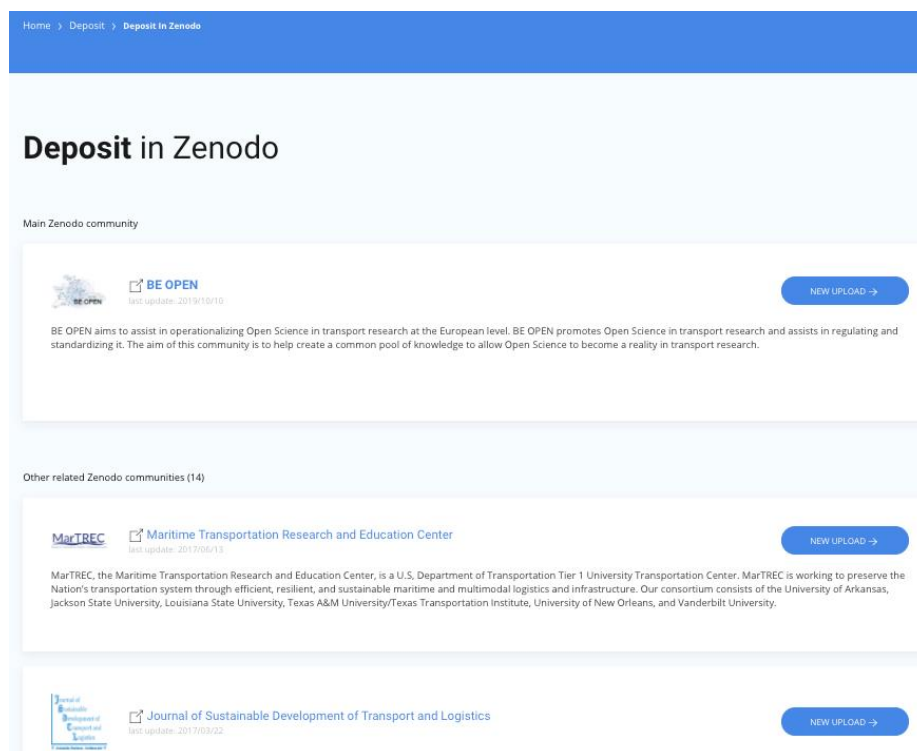


Figure 20 Selected Zenodo communities as of January 2021

### 5.1.2.6 Context propagation

One of the main principles of Open Science is that all kinds of research products are made available and linked together with semantic relationships. For example, a scientific publication may have a link to the analysed dataset, the software used for processing, and the output data. In many cases, the metadata record describing the publication is richer than the metadata that describes the software and the dataset. Also, metadata of the publication can be enriched with information by applying text mining algorithm on its full-text, as described in Section 5.1.3.

As a consequence, the algorithms described in the previous sections may not identify as relevant for the community the research products whose metadata is not rich enough. However, these products may be linked to others that have been identified thanks to a richer metadata set.

In order to address this case, OpenAIRE “propagates the context” from one research product to the products it links, provided the semantics of the relationship is “strong enough”. In particular, information about the community can be propagated to products which are linked via relationships with semantic “is supplement to” and “is supplemented by”<sup>17</sup>.

In the first run on December 2019, the algorithm applied to the BE OPEN use case identified additional 17 research products for the Transport Research gateway. In January 2021, the number increase to 29.

It is expected that the number will grow over time because of two main factors: (i) the identification of more research products by the other approaches, which would lead to a higher number of products that can be used as starting point for the propagation; (ii) the increasing availability of semantics relationships between the research products: if the uptake of Open Science publishing principles in the community grows, more semantic relationships among the products will be available in the OpenAIRE Research Graph and exploitable by the context propagation.

## 5.1.3 Full-text mining algorithms

### 5.1.3.1 Mining for funders and projects

As described in Section 5.1.2.1 **Error! Reference source not found.**, a number of relevant FP7 and H2020 EC projects were added to the configuration. Whenever a research product is identified as funded by one of those projects, it will also be tagged as relevant for the community and thus included in the TOPOS4Orgs. This section will first describe the way OpenAIRE project mining works. Then, it will describe the work done for configuring a dedicated mining algorithm for the community to be applied on the full-texts of Open Access publications, for the projects funded by older EC projects (FP5 and FP6) which are not already integrated into OpenAIRE.

Project mining in OpenAIRE text mines the full-texts of publications in order to extract matches to funding project codes/ID's. The mining algorithm works by utilising the following project metadata provided by each funder: (i) the grant identifier of each project, and (ii) the project acronym, if available. The OpenAIRE mining modules are implemented as a Python executable and use *madIS*

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<sup>17</sup> with the semantics as defined by Datacite, see [https://schema.datacite.org/meta/kernel-4.3/doc/DataCite-MetadataKernel\\_v4.3.pdf](https://schema.datacite.org/meta/kernel-4.3/doc/DataCite-MetadataKernel_v4.3.pdf)

(<https://github.com/madgik/madis>), a Database Management System (DBMS) which extends SQL with User Defined Functions (UDFs) written in or called by Python.

The mining algorithm follows the steps below:

1. Pre-processing/normalization of the full-texts using several functions, which depend on the characteristics of each funder (i.e., the format of the grant identifiers):
  - a. Stopword and/or punctuation removal,
  - b. tokenization,
  - c. stemming,
  - d. converting to lowercase, etc.
2. String matching: The grant identifiers are matched against the normalized text using database techniques.
3. Validate and clean results using the context near the match:
  - a. The algorithm looks for other metadata like project acronyms, or other generic positive or negative words or phrases, such as: “is funded by”, “ERC Grant”, “H2020”, “seventh framework”, “FP7”, “grant”, “european commission”, “project”, “work”, “supported”, “contract”, “research”, “program”, and many more. These are used for calculating a confidence value for each publication-->project link, and a threshold is set to optimise high accuracy while minimising false positives, such as matches with page or report numbers, post/zip codes, parts of telephone numbers, DOI’s or URL’s, accession numbers, etc.
  - b. Rules are also applied for disambiguating results: there are Academy of Finland (AKA) projects with identical project IDs to FP7 projects, or Russian RSF projects that share the same grant IDs with Russian RFBR projects, and so on. For example, grant number 213506 could be used to acknowledge funding from FP7 project GLYFINERY, or AKA project “CoE in Complex Disease Genetics” (see <https://beta.openaire.eu/search/find/projects?keyword=213506>), as shown by the following example acknowledgement statements:
    - i. Data collection was supported by the *Academy of Finland* Center of Excellence in Complex Disease Genetics (Grant no. **213506**)
    - ii. This work was funded by the *European Community’s* 7th Framework Programme under Grant Agreement Number **213506**

For each funder, the corresponding funding mining module is first developed and tested locally (at ATHENA RC) using a large collection of Open Access publications from arXiv, PubMed and HAL. The results produced are manually curated and the algorithm may need to be tuned by, for example, refining the pre-processing / normalization functions (e.g., disable punctuation removal when the project identifiers contain punctuation marks), or optimizing the disambiguation rules using Naive Bayes and manual work. A couple of iterations are usually required to minimise false positives. Then, the mining module is integrated with the Information Inference Service (IIS) of the OpenAIRE system (<https://github.com/openaire/iis>). On the next IIS provision run, mining results become visible in BETA (<https://beta.explore.openaire.eu>). These results are produced by mining all the full-texts available in Beta, so they need to be validated once more, either by the mining team, the relevant NOAD, or the funder. If necessary, the algorithm is tuned further, before given the all clear for running in Production.

Project mining works very well and was the first Text & Data Mining (TDM) service of OpenAIRE. Performance results vary from funder to funder but precision is higher than 98% for all funders and 99.5% for EC projects. Recall is higher than 95% (99% for EC projects), when projects are properly acknowledged using project/grant IDs. These rates are based on tests that have been performed with manual validation of the results.

OpenAIRE also provides a web service of the project mining: <http://mining.openaire.eu/openaireplus/analyze>. Here, one can either use the online interface to paste text from a publication, or provide UTF-8 encoded text using the HTTP POST method. The service will return a JSON encoded result containing the following fields:

- funding info: Result category
- fund: e.g., EC, Wellcome Trust, FCT, etc.
- acronym: The project acronym (only for FP7 projects)
- grantid: The project grant identifier
- confidence: Confidence weight

Result example:

```
{"funding_info": [{"fund": "EC", "acronym": "OPTIQUE", "grantid": "318338", "confidence": 0.92}]}
```

For BE OPEN, a new mining module has been developed to identify the 16 FP5 and FP6 relevant EC projects that are not integrated in OpenAIRE and it is currently under testing.

### **5.1.3.2 Document classification**

Apart from the project mining modules described in the previous section, OpenAIRE also provides a document classification service. The implemented text classification methodologies employ analysis of free text stemming from the abstracts of the publications (but the same mechanism can also work for the full-text). The purpose of applying a document classification module is to assign a scientific text one or more predefined content classes.

This requires the existence of a taxonomy, i.e., a set of content class labels, organized either in a hierarchical or in a flat way. However, the trained models are not hierarchical: even in the case of a hierarchical initial representation of classes, it has been decided to simplify the automatically generated class hierarchy. In a tree-like hierarchy, it has been decided to return the labels of a particular level of the tree, without taking into consideration its hierarchical structure. This is done for the sake of algorithmic simplicity and computational complexity. In OpenAIRE, the currently used taxonomies are:

- arXiv
- MeSH (Medical Subject Headings)
- ACM
- DDC (Dewey Decimal Classification, or Dewey Decimal System)



From the above taxonomies, only DDC, which is a hierarchical library classification system<sup>18</sup>, partially covers transportation, under the class “300 Social Sciences”, and the division “380 Commerce, communications & transportation”, with relevant sections such as:

380 Commerce, communications, transportation

385 Railroad transportation

386 Inland waterway & ferry transportation

387 Water, air, space transportation

388 Transportation

However, in OpenAIRE, have been adopted only the 54 most frequent classes, which includes only the higher division “380 Commerce, communications & transportation”, which is not adequate for the purposes of BE OPEN. Instead, it has been decided to work on extending the OpenAIRE classifier by adding a taxonomy for transport research. For this purpose, it has been agreed to use the latest (2019) edition of the “Glossary for Transport Statistics”<sup>19</sup>, which has been jointly published by the United Nations Economic Commission for Europe (UNECE), Eurostat, and the International Transport Forum.

The Glossary provides definitions of statistical terms for all modes of transport, from infrastructure, vehicles and traffic measurement, through to transport safety, energy consumption and intermodal movements. Compared to the 4th edition of the Glossary, which is described in Chapter 7 of deliverable D2.1<sup>20</sup>, the new 5th (2019) edition comprises 744 definitions, in which the rail, road, inland waterway, maritime, air and intermodal freight transport chapters have been substantially revised. In addition, a completely new Accidents section has been added to the Maritime transport chapter. A new chapter ‘Energy consumption’ has been created, combining and harmonizing the previous energy sections in the individual modal chapters. The intermodal definitions in each transport mode were removed from all chapters and inserted into the updated Intermodal Freight Transport chapter. The title of section III was changed to ‘Enterprises, investment and maintenance’ from ‘Enterprises, economic performance and employment’. The definitions for Enterprise, Employment and Turnover were deleted from all chapters as these are general terms and are not transport specific. New chapters on ‘Environmental impact of transport’ and ‘Passenger mobility’ were developed and added as new chapters to the Glossary.

OpenAIRE’s existing classifiers were built using supervised learning machine learning techniques [4,5]. Text information representation is rather straightforward, since it only involves the extraction of term frequencies, which are then used to estimate the respective probabilities used in the classifier. The implementation is very similar to a Naive Bayes text classifier. Since the adopted scheme only involves text segmentation, dictionary terms retrieval, a simple computation of frequency-related weights, and

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<sup>18</sup> DCC: <https://www.oclc.org/en/dewey.html>

<sup>19</sup> UNECE/ITF/EUROSTAT (2009). Glossary for Transport Statistics, 5th Edition. Publications Office of the European Union, 2019. Luxembourg

<sup>20</sup> D2.1: Open access publications and the performance of the European transport research, 2019. BE OPEN. <https://beopen-project.eu/storage/files/beopen-d12-open-science-framework-terminology-and-instruments.pdf>



a computation of average soft probabilities, the implementation of the testing phase of the classifier can be achieved in the context of a data processing workflow. To this end, once more the *madIS*<sup>21</sup> system is used.

In order to provide smoother probability estimates, a *post-processing* step has been applied. In particular, a simple linear regression function has been trained to map the extracted Bayesian probability estimates for each document (and for each classification taxonomy). Towards this end, a small subset of manual annotations and respective documents has been used. The resulting linear model is applied after the classification decision to the extracted class probabilities, leading to “normalized” probabilities.

Finally, a *pre-classifier* has been trained to distinguish between the four classification models. A Naive Bayes classifier has also been trained on the four-class classification task. For each test document, the pre-classifier is applied, learning to four probability estimates, one for each taxonomy. Then, the individual classifiers are applied, only if the respective taxonomy probabilities are higher than 0.7 (Figure 4).

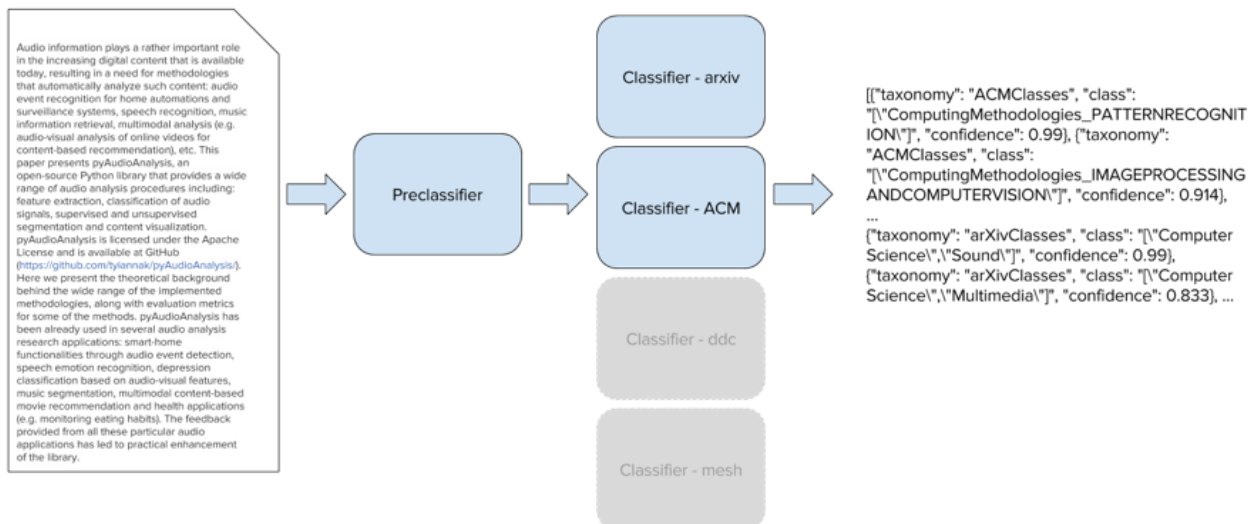


Figure 21. Example of pre-classification and classification applied on an unknown document

A major part of the work for building the OpenAIRE classifiers involved gathering, pre-processing and organising the involved datasets that were used to train the respective supervised models: 400K training documents for training the arXiv classifier (135 classes), 700K docs for MeSH (60 classes), 250K docs for ACM (62 classes), and 200K for DDC (54 classes). Unfortunately, in the BE OPEN project - and this is a major obstacle – there is not a labelled corpus of publications in transport research that can be used for training the classifier. Ideally, a large dataset of publications relevant to transport research was required, together with annotations/labels for all subcategories of the “Glossary for Transport Statistics”. This does not currently exist and therefore a more semi-automatic/manual solution was proposed. The modified and simplified document classification consists of the following three parts:

### 1. Creation of weighted terms from the glossary

<sup>21</sup> *madIS*: <https://github.com/madgik/madis>

The “Glossary for Transport Statistics” has been used to create weighted terms. Since the glossary was available in a human readable docx file (with explanations, images, etc.), an algorithm has been created to extract the categories and the terms and some manual work to clean some of the terms has to be done. Each term in the glossary has to be split to individual words or bigrams. For example, for the term "Conventional high-speed railway vehicle", it has been created the terms 'conventional high-speed', 'high-speed railway', 'railway vehicle', 'conventional', 'high-speed', 'railway', and 'vehicle'. The initial weight of each term is analogous to the count of its appearances in the general category, while the weight of bigrams is twice the weight of single words.

## 2. Pre-processing of plain texts and vocabulary

The plaintexts and the vocabulary are first pre-processed and normalized in order to enhance the searching of the terms in the text. The pre-processing tools that are utilized are the following:

- Tokenization - punctuation removal
- Convert everything to lowercase
- Stopword removal
- Stemming

## 3. Classification

The classification phase runs on abstracts of publications. An existing local collection of 460K abstracts has been utilised for the tests, from arXiv and PubMed Open Access publications that was created previously for testing some of our text mining algorithms. It has been iterated over each word/bigram of the abstract and it has been JOINed with the weighted terms using DBMS techniques. The confidence of each corresponding category has been increased by its weight when a term was found. Each matched term counts only once even if it appears multiple times in the abstract since according to our experiments this leads to better results.

The result of following the above three step process was the creation of just over 820 weighted single-word terms and 174 weighted bigrams, covering all the Glossary’s categories:

- A. Railway Transport
- B. Road Transport
- C. Inland Waterway Transport
- D. Pipeline Transport
- E. Maritime Transport
- F. Air Transport
- G. Intermodal Freight Transport
- H. Energy Consumption
- I. Environmental Impact of Transport
- J. Passenger Mobility

For each publication that goes through the transport research classifier, the output is one of the above 10 categories, the weight, and a set of terms matched (with their respective weights) that can explain the behaviour of the classifier and are helpful for identifying useful or not so useful terms. This allows for improving the classifier (manually since, as explained earlier, there is not a labelled corpus to be used as training set). On this way, it has been quickly discovered that the term “transport” is actually

a bad term to use. The use of it concluded to hundreds of false positives: papers relating to physics, astronomy, quantum mechanics, etc. Here are some example titles which are not related to transport research and which are eliminated when removing the term:

*"Phase-induced transport in atomic gases: from superfluid to Mott insulator"*

*"Majorana fermions in an out-of-equilibrium topological superconducting wire: an exact microscopic transport analysis of a p-wave open chain coupled to normal leads"*

*"Large scale circulations and energy transport in contact binaries"*

*"Numerical simulation of turbulent sediment transport, from bed load to saltation"*

*"Heat transport in giant (exo)planets: a new perspective"*

*"Theory of Fast Electron Transport for Fast Ignition"*

Instead, "transport" is useful when used in bigrams, such as: air transport, coach transport, freight transport, goods transport, intermodal transport, passenger transport, pipeline transport, public transport, railway transport, road transport, transport enterprise, transport IWY, transport link, transport road, waterway transport, and so on. (Note that in the actual classifier which has been used, the stemmed versions of the above bigrams that allow for matching the plural of words or other suffixes.) Hence, the single term "transport" was removed from the vocabulary of terms. A couple of similar adjustments were made and then tested in order to improve the classifier. Similarly, there have been selected fifty stemmed terms to be used with the pre-classifier from the top most frequent terms.

The classifiers in OpenAIRE use the weights to set a threshold under which results are discarded as false positives. In order to find an appropriate confidence threshold for the transport research classifier, there have been manually curated over 62K lines of results (produced by the classifier when running on the test dataset of 460K abstracts). Each line of results is comprised of the OpenAIRE documentID of the publication to which the abstract belongs to, the list of matched words with their individual weights, the assigned category (A-J), and the weight value.

Some publications can return more than one result, for example the publication "Anatomy of a Crash"<sup>22</sup> results in five lines, one for each of the following categories: B (Road Transport), F (Air Transport), A (Railway Transport), E (Maritime Transport), C (Inland Waterway Transport); in descending confidence/weight order.

This makes sense as the article deals with all transportation modes and their perturbations. As written in the paper's abstract: "Transportation modes, whether air, road or rail, are coupled and interdependent." Although the paper provides a case report of the Asiana Crash in San Francisco International Airport on July 6th 2013, it investigates "its repercussions on the multimodal transportation network" and "it studies the resulting propagation of disturbances on the transportation infrastructure in the United States. The perturbation takes different forms and varies in scale and time frame: cancellations and delays snowball in the airspace, highway traffic near the

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<sup>22</sup> Aude Marzuoli et. al., "Anatomy of a Crash", 2014, arXiv: <https://arxiv.org/abs/1410.4256>

airport is impacted by congestion in previously never congested locations, and transit passenger demand exhibit unusual traffic peaks in between airports in the Bay Area.”

It also makes sense that the classifier has selected only the categories that include a subsection on “VI. ACCIDENTS”, and not categories D (Pipeline transport), G (Intermodal Freight Transport), or others, as those do not have subsections for accidents. Depending on the final confidence threshold chosen, the results for E (Maritime Transport) and C (Inland Waterway Transport) would probably be excluded (these modes of transport are not explicitly mentioned in the abstract). The 62K lines of results returned, involve 50K unique publications, meaning that there is a number of cases where a single article can be assigned to more than one category, as was the case with the aforementioned example.

Due to lack of time, manual curation of all 62K lines of results produced by the classifier was not feasible. So, instead, there have been randomly sampled 1% of the results which that curated. The term curation mean that these publications have been checked for relevance with BE OPEN and transport research. The team’s expertise did not allow the check of the class (category) assignment. This should ideally be done by a domain expert. After the 1% curation of the results, there was a significant amount of labelled (True/False) sets of results. The ordering of the lines in descending order of confidence values ended up to an outcome of the distribution of valid results with respect to the confidence weight. It has been noticed that lines with very high confidence ( $>21$ ; these are unnormalised weights calculated as explained in step 3, classification, earlier) were correct. On the other hand, all results were false when a cluster of wrong lines existed between the confidence interval 18-20, followed by a cluster of correct results between 16-17, and thereafter mostly apart from the occasional single correct line (with confidences: 12.5, 7, and 6).

Since this curated set of results was only a 1% sample of the full set of results, it could not be used for selecting the most appropriate confidence threshold. However, it concluded that a quite high threshold of  $\geq 21.5$  was required for best results (allowing only 433 lines from the full set of 62K lines), or perhaps  $>15$  (1442 lines). Due to lack of time, it has been decided to set the confidence threshold to 21.5 (any result with a confidence of less than this would be discarded) and curate the remaining lines that pass the threshold from the full set of results (the maximum weight in our results was 95). The results were poor: 240 correct lines and 193 wrong lines, i.e., an accuracy of about 55%. However, raising the threshold to 40 gives 151 correct and 65 wrong lines (216 total) and a better accuracy of 70%, and raising it even further to 45 gives 90 correct and 7 wrong lines (97 total) reaching a 93% accuracy, and finally with a threshold of 50, all 71 lines returned are correct (100% accuracy). However, the raising of the accuracy to so high values ended up to results from only a few categories: mostly B (Road Transport) and F (Air Transport). In addition, many correct results with lower confidence were missing, indicating that the classifier has much space for improvement and is not yet tuned properly.

Ideally, the team would like to curate all 62K lines of results in order to get a better picture of the performance of the classifier. Since this may take considerable time, another way of progressing would be to take the curated lines from the full set and the 1% set (which includes lines down to the lowest returned confidence of 0.5) and find the most frequent words that appear only in lines which are wrong; eliminating these words from our vocabulary will improve the results. Although there was not more time available for further running the analysis, just from the experience of curating the above results, some terms from the vocabulary stand out as not useful, for example: average, category, configuration, control, cross, energi, left, line, link, main, network, number, perform, state, system,

total, type, weight, year, ... These appear frequently in publications from the domain of (astro)physics, quantum mechanics, graph theory, network analysis, math optimisation problems (travelling salesman, etc.). Even a term like “gas”, which sometimes refers to petrol/fuel, will still produce numerous false results from articles related to astrophysics.

Another thing that is worth pointing out about the results presented above is that they were produced by running the classifier on publications from arXiv and PubMed. arXiv (<https://arxiv.org>) has publications in the fields of physics, mathematics, computer science, quantitative biology, quantitative finance, statistics, electrical engineering and systems science, and economics, whereas PubMed (<https://www.ncbi.nlm.nih.gov/pubmed/>) contains publications from biomedical literature (MEDLINE) and life science journals. In other words, they are not the best repositories to use for developing or testing a classifier for transport research. This could also explain that relative low numbers of correct results produced.

Until some of the above issues can be addressed, this classifier is not yet ready to be included as part of the OpenAIRE document classification service. As highlighted previously, the proper way to create the classifier would be to first collect a large corpus of publications related to transport, and have them manually labelled by one or more experts in transport research at least at the first level (A-J) of categories, if not at the second level (e.g., I-VI). Then in combination with negative examples (publications unrelated to transport) machine learning methods have been applied and trained appropriately. Since this might not be feasible during the duration of the BE OPEN project, a good alternative might be to work with the publications that are currently being collected by the BE OPEN gateway (e.g., from publications linked via the FP7 & H2020 projects tagged as relevant to transport research, or the relevant organisations, institutions, repositories or Zenodo communities provided). This would produce a more targeted dataset for testing and tuning the classifier. Such corpus of publications has been used for running topic modelling analysis. However, probabilistic topic modelling also requires an expert in the loop to validate, categorise, and give meaningful labels to topics.

It is worth considering creating or obtaining a labelled collection of publications in order to train the classifier in the proper way. Since OpenAIRE’s document classifiers are based on the Naive Bayes statistical approach, it can work even when data are not abundant (a couple of thousand labelled abstracts per category could suffice). Support Vector Machines (SVM) could also be used with such a dataset, with perhaps slightly better accuracy. Deep Learning approaches are not recommended as they would require substantially more pre-labelled training data (the more data the better, e.g., millions of tagged examples). In addition, when training data are low, simpler approaches far outperform deep neural networks. Document classification has a very large number of words to use to classify each document, unlike sentence classification where the number of words is low and the order of words greatly influences the meaning of the sentence. In our case, however, the order of words contains less predictive power over class (category), reducing the effectiveness of Convolutional Neural Networks (CNN), Hierarchical Attention Networks (HAN), or LSTMs, which in addition require massive training data.

#### 5.1.4 Webinar Feedback

A survey was circulated among the participants and the section of questions about the TOPOS4Orgs received 11 replies (10 complete). 4 from people working in a research center, 4 from universities, 1

from a person who work for an institutional technology platform, 1 from an NGO small and medium enterprise, 1 from a researcher who did not specified the type of organisation.

Q2 What keywords did you use on your search?  
Free text answer

Q3 How does TOPOS Observatory for Organisations rate in terms of depth of coverage?  
Possible answers: Very Poor, Poor, Average, Good, Very Good, N/A

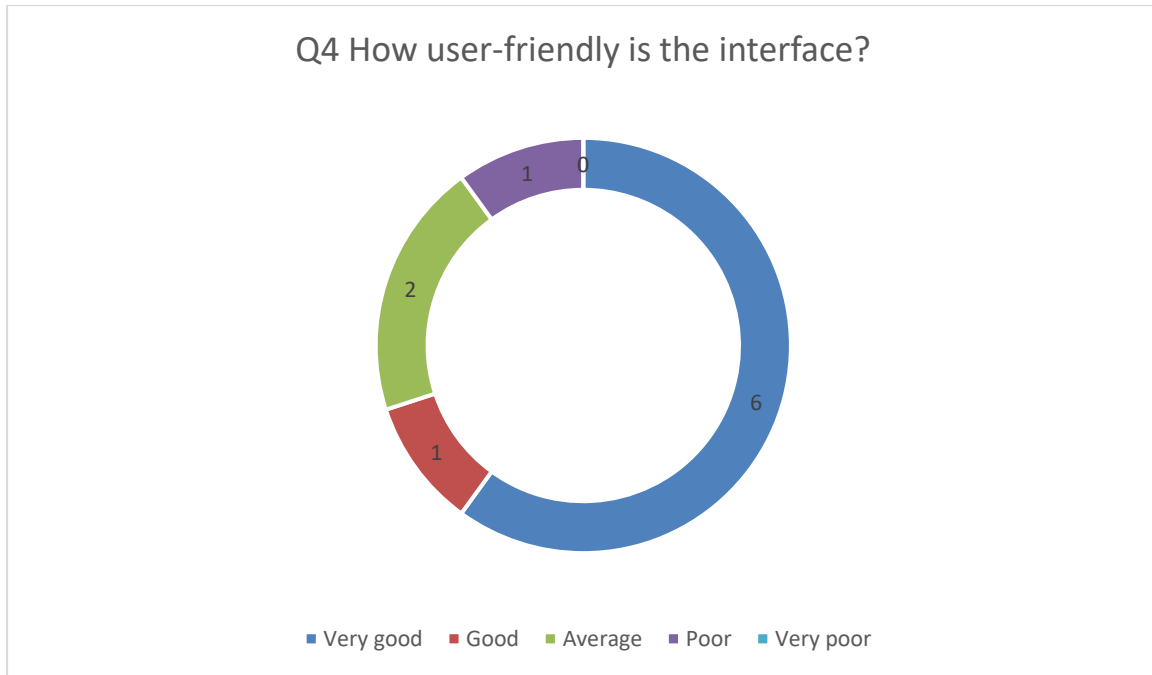
Answers show that users had a good perception of the coverage of research products of the TOPOS4Orgs, considering that there are still opportunities for improvements as detailed in the previous section. 10 users replied to the question: Poor (1), Average (1), Good (3), Very Good (5). To better analyse the answers, it is interesting to correlate the Q3 with Q2. 6 participants replied to this question, as detailed in **Error! Reference source not found.** It is worth to note that the only “Poor” replied is related to a keyword search that is not relevant for Transport Research: being “poor” in the coverage of results about “Mental Health” is actually a good evaluation for the TOPOS4Orgs.

	Q2	Q3
1	From mobility patterns to behavioural change	Good
2	N/A	Average
3	Open Science in Transport Research	Very Good
4	N/A	Good
5	maritime transport, short sea shipping, shipping, safety	Very Good
6	My name	Very Good
7	Mental Health	Poor
8	sustainability, autonomous vehicles, activity-based models, traffic, transport planning, transport modelling	Very Good
9	N/A	Very Good
10	N/A	Good

Table 2 Answers to Q2 and Q3 of the survey

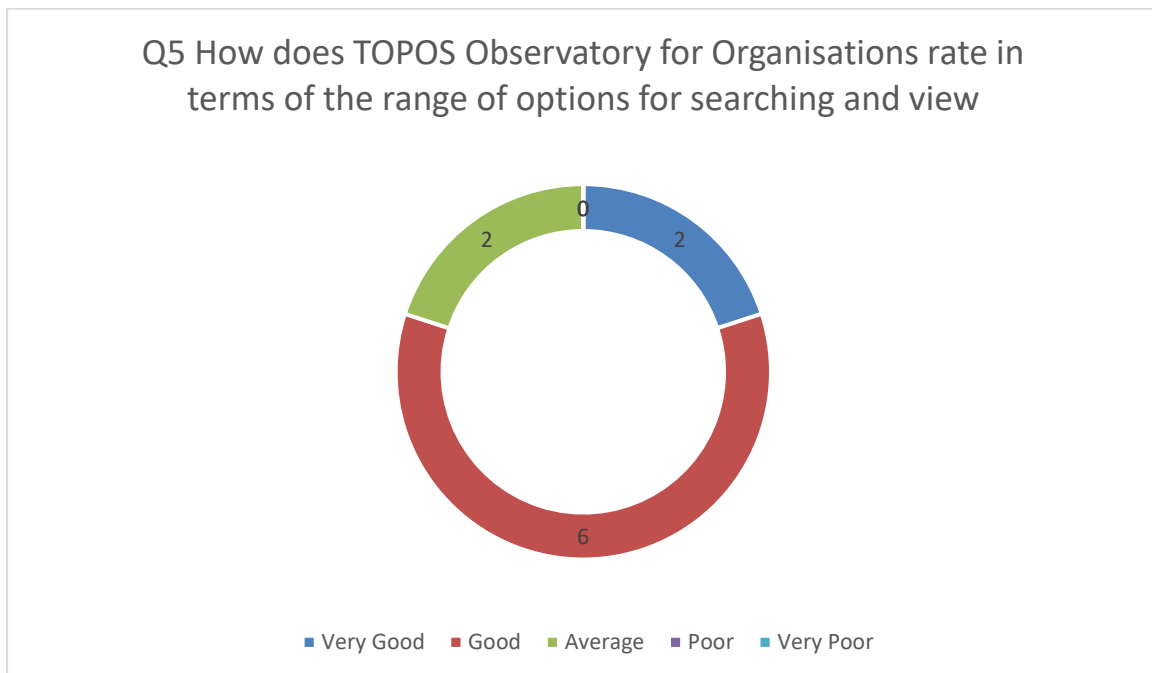
Q4 How user-friendly is the interface?

Nine out of the ten respondents to Q4 give a positive feedback on the user-friendliness of the user interface. The same user who searched for “Mental Health” and graded the coverage of the TOPOS4Orgs as “Poor” rated as “Poor” also the user-friendliness of the interface.



Q5 How does TOPOS Observatory for Organisations rate in terms of the range of options for searching and view

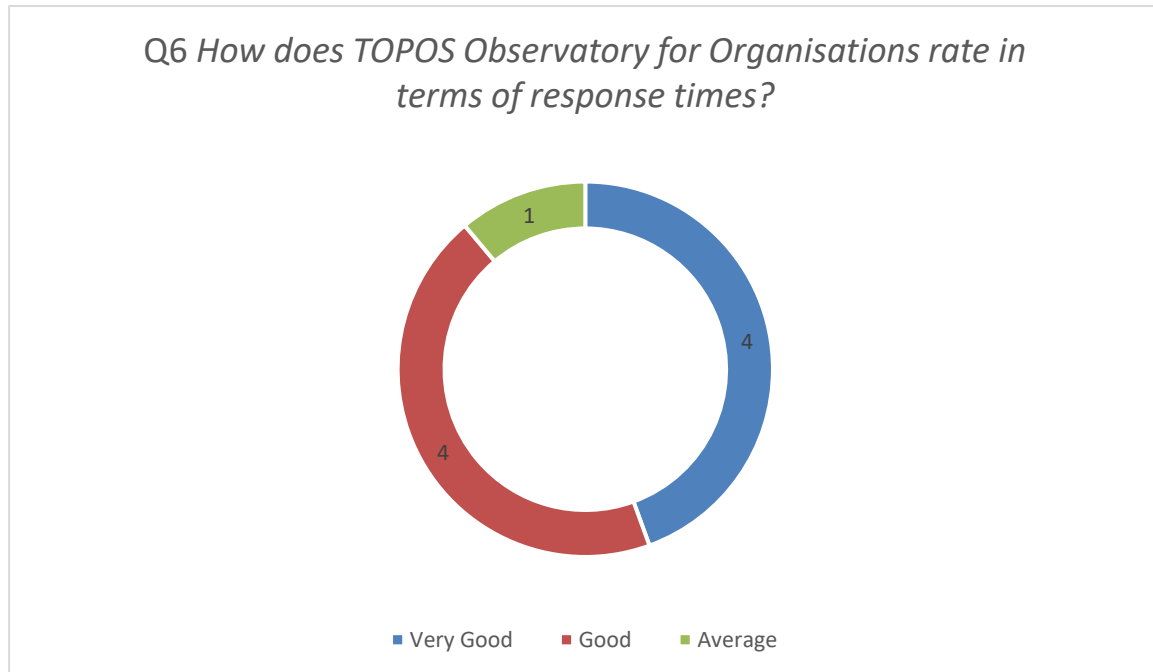
All ten respondents to Q5 gave a positive feedback on the available search options (8 “Good” or “Very Good”, 2 “Average”). Only one specific suggestion on how to improve the search and visualization options was provided in the open question Q10 (*Suggest how to improve the TOPOS Observatory for Organisations*): “Be able to search for organisations and not only for providers”.



Q6 How does TOPOS Observatory for Organisations rate in terms of response time?

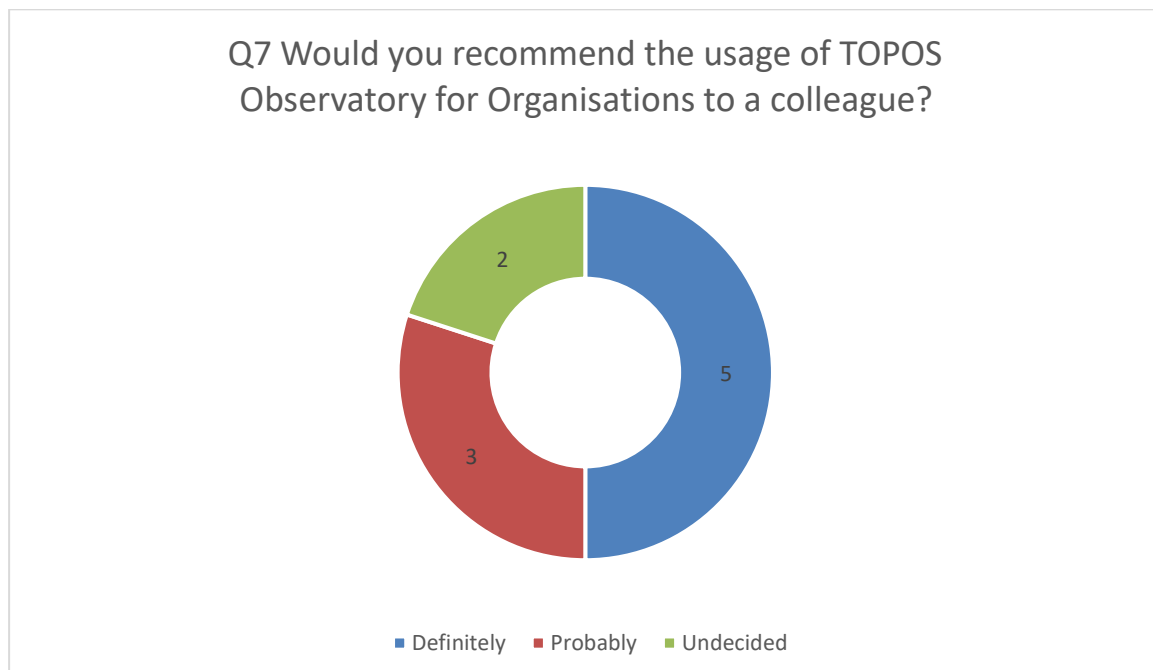


Participants appreciated the response time of the TOPOS4Orgs. Over a total of 9 respondents, 8 rated “Good” or “Very Good”, one “Average”.



Q7 Would you recommend the usage of TOPOS Observatory for Organisations to a colleague?

Out of the 10 respondents, only the 50% would definitely suggest the TOPOS4Orgs to colleagues. The remaining 50% replied “Probably” or “Undecided”, revealing a sort of uncertainty that could be addressed by providing focused guides and more in-depth documentation about the OpenAIRE Research Graph that is at the heart of the TOPOS4Orgs.



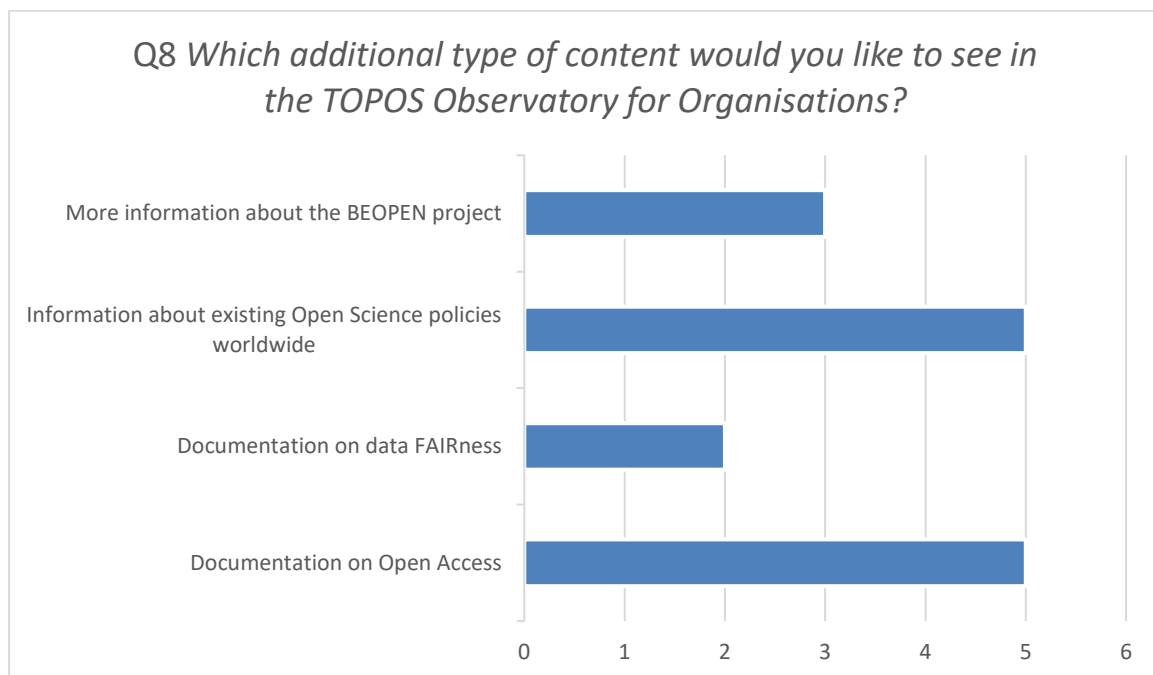


Q8 Which additional type of content would you like to see in the TOPOS Observatory for Organisations?

Users could select multiple options among:

- Documentation on Open Access
- Documentation on data FAIRness
- Information about existing Open Science policies worldwide
- More information about the BE OPEN project
- Other (please specify)

10 users selected at least one option. None suggested other type of content (i.e., none chose the “Other” option). 5 respondents expressed interest in Open Science and Open Access policies. 3 suggested to include more information about the BE OPEN project. Only 2 showed interest in having documentation about FAIR data. This result is somehow unexpected, being BE OPEN a project about Open Science in Transport research and data FAIRness is one of the main pillars of Open Science. Clearly, the number of responses is low and far from being representative for the whole BE OPEN consortium but, considering also the low level of FAIRness of important transport research data reported in Deliverable D4.2 “Transport Open Data: Properties and Specifications for Open Science”, the BE OPEN project may want to increase its effort at raising awareness about FAIRness.



Q9 Order the functionality below from the most to the least relevant according to your opinion

Respondents ordered the following six functionalities:

- F1 Search & browse for research products
- F2 Download report for organization
- F3 Download report for project
- F4 Link functionality
- F5 Citation button

## F6 Access to the PDF or landing page of a research product

Overall, the ranking obtained by calculating the average is as follows:

1. F1 Search & browse for research products
2. F3 Download report for project
3. F2 Download report for organization
4. F4 Link functionality
5. F6 Access to the PDF or landing page of a research product
6. F5 Citation button

F1 (Search & browse for research products) ranked on top three for 10 participants (first rank for 8 users, 1 did not give a rank to it). F3 (Download report for project) ranked first for 2 participants and, in average, gets the second rank among the most relevant functionality. F6 (Access to the PDF or landing page of a research product) ranked first for one participant but, in average, it is the functionality that was ranked as the second least relevant.

### *Q10 Suggest how to improve the TOPOS Observatory for Organisations*

Three participants replied to this last open question.

One participant asked to “Be able to search for organisations and not only for providers”.

Another suggests to have a video guide to the TOPOS4Orgs and appreciated the UX/UI of the TOPOS4Orgs. He/she also adds comments that suggest that it should be a closer integration between the TOPOS for organisations and the TOPOS for individuals: “Also I did not see why all the information on the open publications and infrastructure is in the Organizations. As an individual researcher I would probably enter the individuals and not see all the options for using open datasets or reading publications. The same with publishing. Individual researchers may have datasets and as far as I understood it I could not upload that in the individual?”.

The third user posed several questions that suggest that some key points about the TOPOS4Orgs were not clearly explained and/or understood. The questions may serve as an initial list of FAQs that could be added to the TOPOS4Orgs as a new “FAQs” menu item under “About” and/or contextually in the specific pages of the TOPOS4Orgs the questions apply. In the following, user’s questions and brief answers are provided.

*“Quality of publishing by organization, are there criteria or specifications for that?”*

The question may be interpreted in different ways such as: (i) How the TOPOS4Orgs measure the quality of research outputs of an organisation before including them? Or (ii) Which criteria does the TOPOS4Orgs use to measure the quality of publishing in a given organisation? An answer to (i), can be the reminder to the OpenAIRE Content Acquisition Policy: OpenAIRE aggregates research outputs available from trusted scholarly communication sources. If an output is available via one of such sources, it is also included in the OpenAIRE Research Graph and, therefore, to the TOPOS4Orgs. As for (ii), instead, the TOPOS4Orgs does not aim to measure the quality of organisation or the quality of their publications. Some indicators are available to monitor the accesses and views of research outputs (via the UsageCounts service), but those are quantitative indicators that

cannot be used to rank organisations in any meaningful way. Policy-wise, OpenAIRE goes against the monopoly of organization and researchers' rankings based on merely quantitative indicators, including the (in-)famous Impact Factor.

*"All data in the BE OPEN should be published elsewhere (i.e., journals, conferences, etc.) before uploading to the TOPOS?"*

In order for something to be findable in the TOPOS4Orgs, it must be available on a trusted content provider. One functionality of the TOPOS4Orgs (DEPOSIT) allows users to discover which are those trusted providers that can be used for deposition. In addition, the TOPOS4Orgs gives easy access to domain specific Zenodo communities that users can choose to deposit research products of any type and let them automatically discoverable via the TOPOS4Orgs.

*"The publishing will be in Multilanguage or only English and how we manage that in the platform?"*

The TOPOS4Orgs service for publishing is Zenodo. Zenodo accepts contributions in any language and metadata information can be provided in any language although, given the internationality of the research community, it is suggested to provide metadata information in English. The TOPOS4Orgs itself is not multilingual and, although users can perform searches using terms in any language, the back-end technology that implements the search is configured to work best with English.

*"The accessibility to organization data or to other features is done from everywhere? or is it customized to be available within region or EU, for example?"*

OpenAIRE includes only publicly available information and does not apply any criteria (geographical or any other) to block access to any of its services and portals.

*"What is the definition of organization (i.e., how do you recognize a fake organization?)?"*

OpenAIRE collects information about organisations from trusted and authoritative sources like funders' databases (organisations participating to funded projects), registries of data sources (organisations that operates a repository or a journal), registries of research organisations (grid.ac, Microsoft Academic Graph).

## 5.2 TOPOS Observatory for Individuals (Scipedia platform)

The aim of communication and dissemination in BE OPEN project is to comprehensively disseminate the technical and scientific advancements developed in Transport Research. The following sections highlight the main vision and goals of the TOPOS Observatory for Individuals and how communication and dissemination can help to fulfil the objectives of the project.

The TOPOS Observatory for Individuals is focused on individual users from the science and technology areas that are looking for sharing information. Scipedia, as the platform of the Individual TOPOS Observatory for Individuals, is an open professional network where professors, students, scientists, researchers and professionals in science and technology can share and access knowledge, expertise and the outcome of their work.

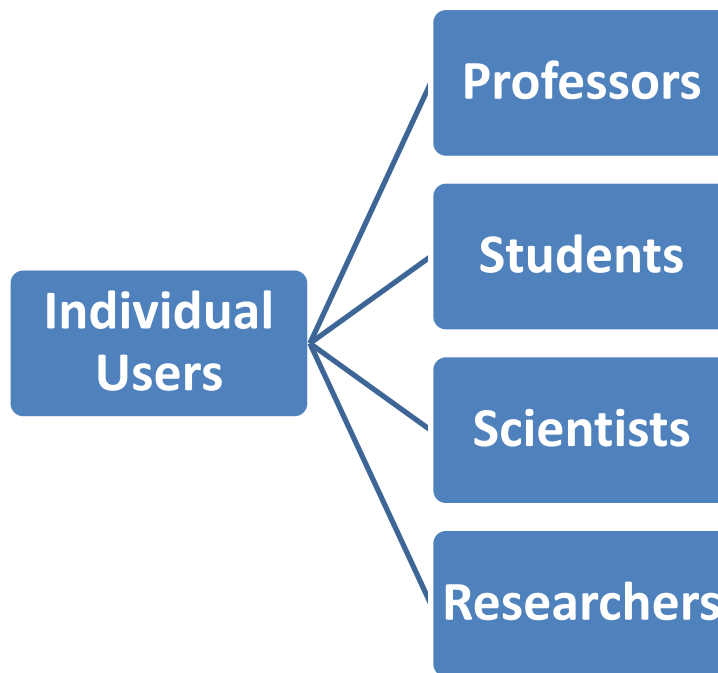


Figure 22 Individual's End Users

### 5.2.1 General overview

Scipedia solution integrates an advanced online publishing and data management platform within a collaborative social network.

Scipedia platform offers the following main functionality:

- Explore: search and discover research products of any type in the field of transport research.
- Discuss: add comments on published documents and datasets.
- Provide: provide metadata, content or datasets.
- Link: link a research result to its funding project through the project profile curator.

Even if some of the functionality requires login the platform (e.g., discuss about the contents, provide new contents or link a research result to its funding project), the search and navigation of the results in the field of transport research is open to any user without the need of register.

The platform allows enriched web format and provides an online editor to fulfill contents with text, references, links, datasets, video... Research results can be submitted from Word and Latex formats and are internally convert into enriched web format improving the user navigation experience and allowing browsers search engines to manage the whole document content.

The TOPOS Observatory for Individuals offers different online social network tools such as following/follower option, activity panel, dedicated discussion forum associated with published documents or internal messaging. These collaborative tools are the key to getting close professors, students, scientists, researchers and professionals in science and technology and give them a framework to share their knowledge and expertise.

All transport research contents available in the platform include metadata, keywords, DOI -if it is available-, document information and license definition. The metadata associated with an entry is available for browser indexing tasks.

Research contents in Scipedia provide revision history with all changes made to the content of a document. Further, documents can be shared in well-known social networks like Facebook, Twitter or LinkedIn. Some other useful utilities are available for platform users such as exporting research content from enriched web format to PDF and EPUB.

#### ***5.2.1.1 TOPOS Observatory for Individuals Open Portal***

The TOPOS Observatory for Individuals Open Portal is available in the following link:

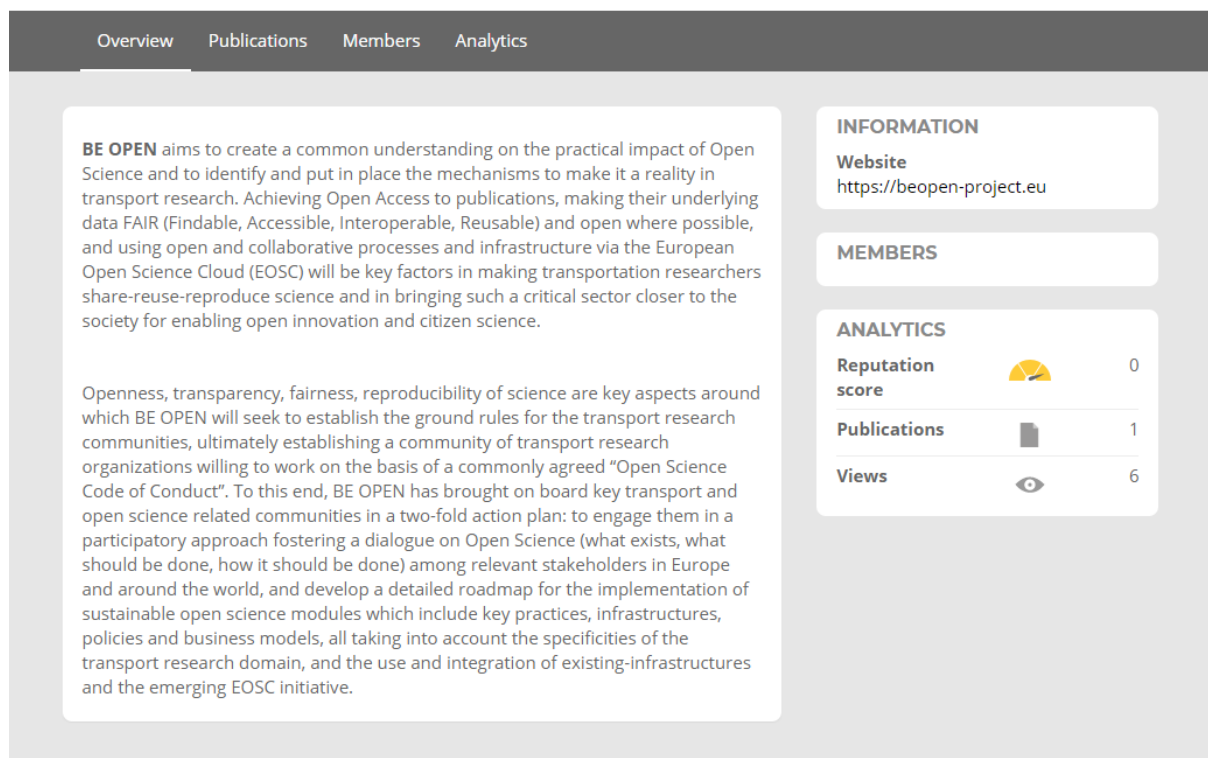
<http://scipedia.topos-observatory.eu/>

<https://www.scipedia.com/institution/beopen-project.eu>

The Open Portal has a customized design and a dedicated institutional URL. The home page provides an overview of the Be Open project and useful information about it. The links to the transport research repositories that contains the documentation are also available from the home page. The Open Portal is managed by a curator. The curator has the permissions to modify both design and contents of the TOPOS Observatory for Individuals Open Portal. Moreover, the Open Portal curator can associate new repositories to the TOPOS Observatory for Individuals.



## European forum and oBsErvatory for OPEN science in transport (BeOpen)



The screenshot shows the 'BeOpen' portal interface. At the top, there is a navigation bar with 'Overview', 'Publications', 'Members', and 'Analytics'. The main content area is divided into two columns. The left column contains a large text block with the mission statement of BE OPEN and a paragraph about its goals. The right column contains three summary boxes: 'INFORMATION' with the website URL, 'MEMBERS', and 'ANALYTICS' which displays a reputation score of 0, 1 publication, and 6 views.

**Overview** Publications Members Analytics

**BE OPEN** aims to create a common understanding on the practical impact of Open Science and to identify and put in place the mechanisms to make it a reality in transport research. Achieving Open Access to publications, making their underlying data FAIR (Findable, Accessible, Interoperable, Reusable) and open where possible, and using open and collaborative processes and infrastructure via the European Open Science Cloud (EOSC) will be key factors in making transportation researchers share-reuse-reproduce science and in bringing such a critical sector closer to the society for enabling open innovation and citizen science.

Openness, transparency, fairness, reproducibility of science are key aspects around which BE OPEN will seek to establish the ground rules for the transport research communities, ultimately establishing a community of transport research organizations willing to work on the basis of a commonly agreed "Open Science Code of Conduct". To this end, BE OPEN has brought on board key transport and open science related communities in a two-fold action plan: to engage them in a participatory approach fostering a dialogue on Open Science (what exists, what should be done, how it should be done) among relevant stakeholders in Europe and around the world, and develop a detailed roadmap for the implementation of sustainable open science modules which include key practices, infrastructures, policies and business models, all taking into account the specificities of the transport research domain, and the use and integration of existing-infrastructures and the emerging EOSC initiative.

**INFORMATION**

**Website**  
<https://beopen-project.eu>

**MEMBERS**

**ANALYTICS**




Reputation score		0
Publications		1
Views		6

Figure 23 TOPOS Observatory for Individuals Open Portal

### 5.2.1.2 Analytics

The TOPOS Observatory for Individuals has analytical information about views of the contents of transport research, number of total publications and total citations to the TOPOS Observatory publications (the total citations are obtained from Web of Science Core Collection).

Analytical information about views of the contents is shown in different formats giving an overview of the impact of the publications:

- Views by country
- Views by month
- Data evolution
- Total reputation score of members
- Total publications
- Total views of members publications
- Total citations to the members publications

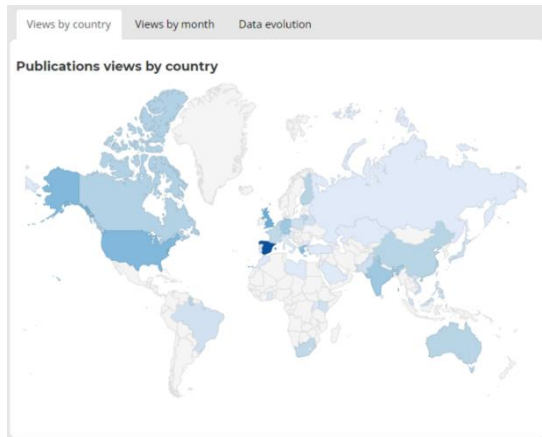


Figure 24: Views by country

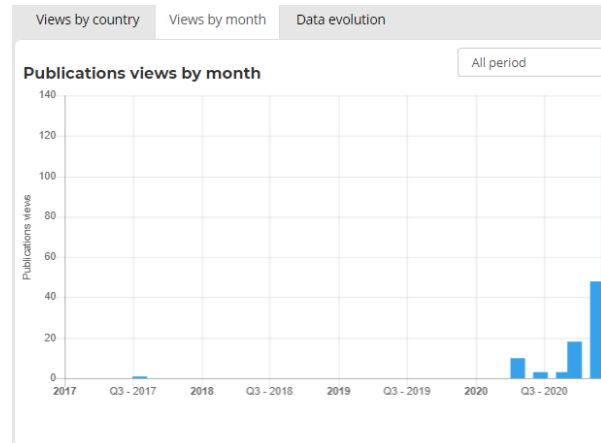


Figure 25: Views by month

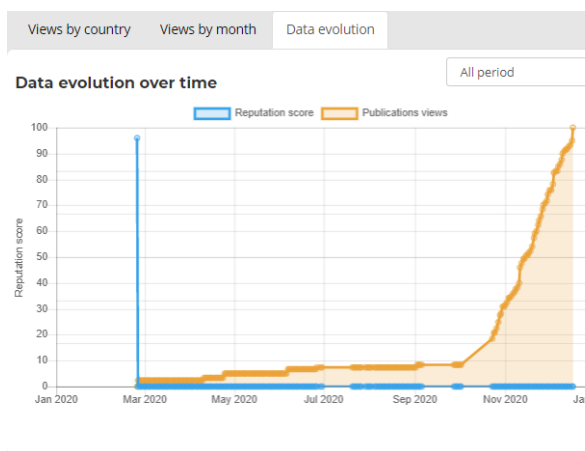


Figure 26: Data evolution

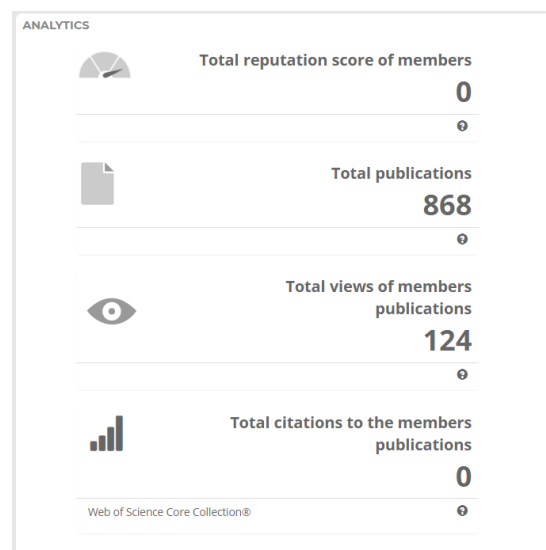


Figure 27: Publications analytics

### 5.2.1.3 Transport Research Repository

A Transport Research Repository is a thematic collection of any type of technical and scientific document (such as thesis dissertations, state-of-the-art review papers, datasets, historical papers or research reports, parts of books, articles, conference object...) in the field of transport research. Collections give the opportunity to researchers and technologists to freely publish and facilitate open access to their research activities' results. It is also a good opportunity for scholars and research communities to increase their visibility and global impact.

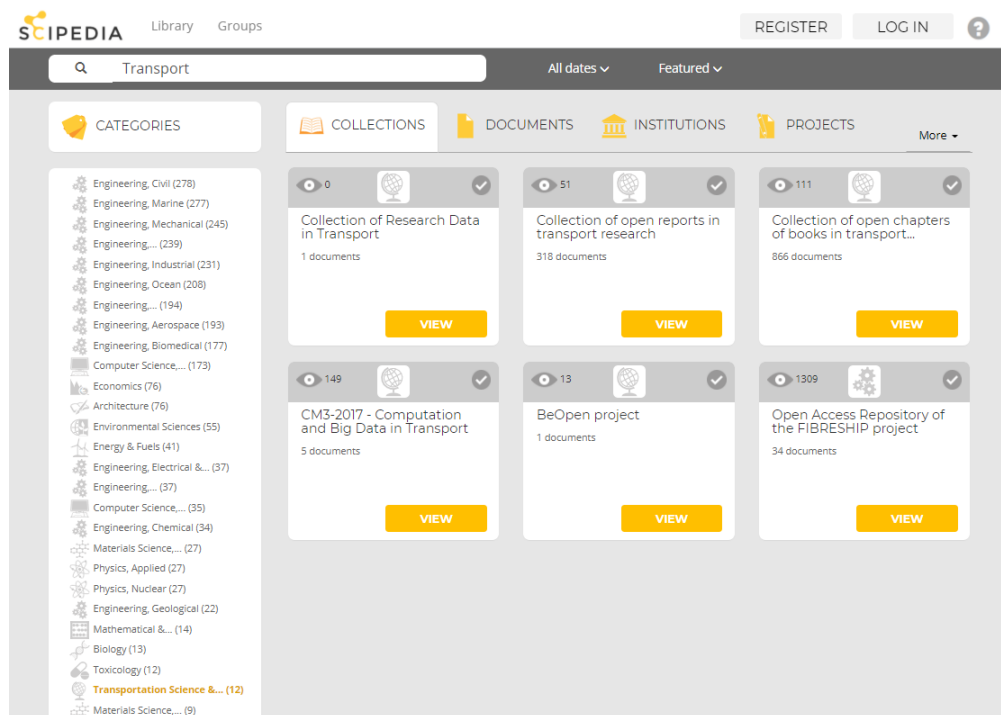


Figure 28: Search engine

The TOPOS Observatory for Individuals' repositories have the following advantages:

- Immediate access to content in multiple ways
- Full-text search engine (Solr)
- Any text search is performed in milliseconds through all the content, including title, abstract, full text, references, authors, categories and any additional fields defined.
- Content indexed by categories (scientific fields), keywords, authors and publications.
- Additional filtering utilities (such as dates, featured, most viewed, etc.)

## 5.2.2 Harvesting contents from OpenAIRE

Transport research contents for the TOPOS Observatory for Individuals are harvested from the official dump of the OpenAIRE Research Graph for research communities in JSON format on Zenodo at:

<https://doi.org/10.5281/zenodo.3974604>

Metadata records are also available through the OpenAIRE Selective Access API:

<https://api.openaire.eu/search/publications?community=beopen>

The metadata records available are categorized in different types: dataset, publication, software, etc. However, internally these entries collect different versions of the same document.



Type	Num. documents
Article	50504
Conference object	26579
Book	8129
Thesis	2420
Report	1457
Dataset	135
Other	10025

Table 3 Transport Research type of content

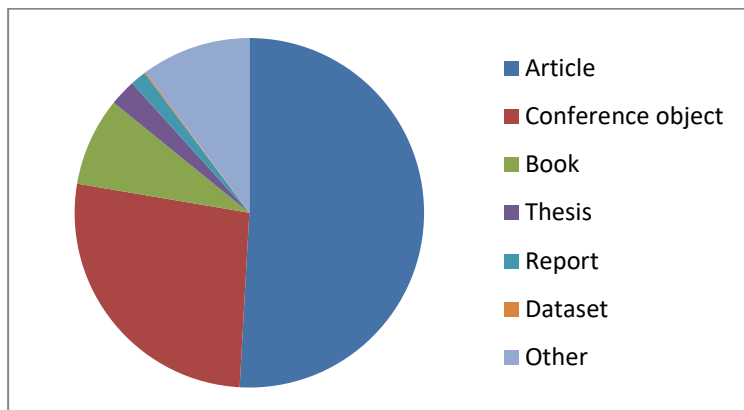


Figure 29 Transport Research type of content pie chart

Using a combination of categories and access right (type + best access right - e.g., Open Access Articles, Restricted Articles), taking into account the type of the first version of each entry, the distribution of contents will be as follow:

	OPEN	CLOSED	RESTRICTED	EMBARGO	NONE	TOTAL
<b>Dataset</b>	72	16	6	4	37	135
<b>Article</b>	15059	267	34745	9	424	50504
<b>Book</b>	678	253	7099	0	99	8129
<b>Thesis</b>	2160	61	194	0	5	2420
<b>Report</b>	700	16	733	0	8	1457
<b>Conference</b>	1247	72	25068	0	192	26579
<b>Patent</b>	1	0	0	0	0	1
<b>Research</b>	637	1	4	0	9	651
<b>Other</b>	5465	19	195	0	4346	10025

Table 4 Transport Research contents by type and access right

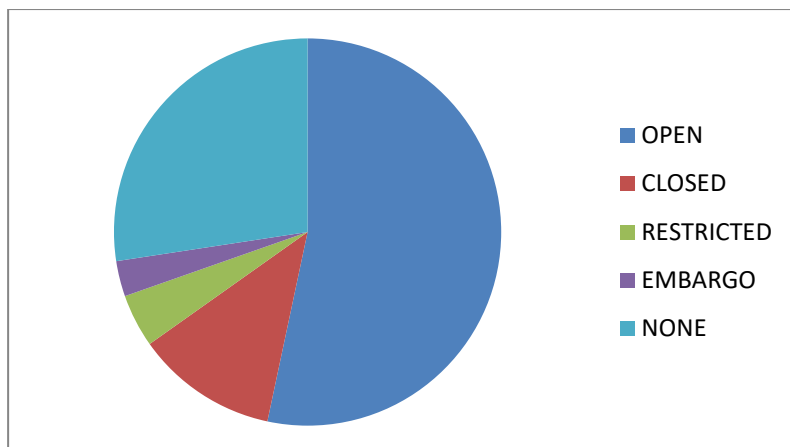


Figure 30 Transport Research contents by type and access right pie chart

Moreover, some of the entries have a direct link to the open access content in PDF format. In those cases where the license allows the document to be harvested in addition to the metadata, it will be submitted in the TOPOS Observatory for Individuals with the goal of providing the maximum information to the transport researchers.

The following table shows the number of open access documents in PDF format available in the TOPOS Observatory.

Type	Number of documents
Articles	27676
Book or part of book or chapter of book	1017
Conference object	4045
Thesis	595
Preprint	952
Report	607
Research	67
Unknown	1495
Other	248
<b>Total</b>	<b>36702</b>

Table 5 Open PDF Transport Research content by type

Following these criteria to start the import of documents of transport research in the TOPOS Observatory for Individuals, several repositories have been created in Scipedia. These repositories include the documents harvested from the official dump of the OpenAIRE Research Graph for research communities. The collection process is ongoing at the time of delivery of the current document.

The TOPOS Observatory for Individuals also offers:

- Metadata based on OAI-PMH standard format (Dublin Core) and following best practices (Google, OpenAIRE, ...)
- **Pull service** based on OAI-PMH /for context syndication
- Offers support for full text / data mining
- Support exportation in JATS / XML formats and RSS syndication

- **Push service** based on OAI-PMH to designated open data repositories (Zenodo, ...)

### 5.2.3 Webinar Feedback

Two BE OPEN TOPOS Webinars have been carried out in order to present all the functionality available on the TOPOS tools. These webinars were aiming at BE OPEN partners to obtain the first feedback about the usability and functionality of the TOPOS tools. The TOPOS development team created a survey to be filled in during the last 10-15 minutes of the webinar to identify opinions and improvements to enhance the experience of sharing and searching research information. In this context, 11 users answered the 10 survey questions related to the TOPOS Observatory for Individuals:

#### 1. Actor

The first question was oriented to know the profile of the platform user. Among the users who answered the questionnaire there were: 8 researchers, 1 scientist, 1 professor and 1 other profile.

#### 2. What keywords did you use on your search?

Some of the users searched keywords related to transport (maritime transport, safety, sustainability, sustainability, transport planning, transport modeling, onboard activities, multitasking onboard, MATSim, Cube Voyager). These users had a good or very good opinion about the depth of coverage, usability of the interface, options of searching and response time.

One of the user searched keywords not related to transport research, in this case the search results ended with a lot of articles not relevant for transport research but directly related to the keywords introduced. The opinion of this user was poor in all the questions related to the navigation experience.

#### 3. How does TOPOS Observatory for Individuals rate in terms of depth of coverage?

Regarding the depth of coverage of the TOPOS Observatory for Individuals, most users consider it good or very good. Some users rated it as average and in one case the user rated it poor. It should be noted that at the time of the webinar, OpenAire's transportation research content was still in the process of begin collected. The depth of coverage is expected to increase as harvest progresses.

#### 4. How user-friendly is the interface?

When users were asked about the user-friendliness of the interface 4 users rated it very good, 2 as good, 3 average and 1 poor.

#### 5. How does TOPOS Observatory for Individuals rate in terms of the range of options for searching and view...

When users were asked about the range of options for searching and view, 2 users rated it as very good, 2 good, 3 average and 1 poor

6. How does TOPOS Observatory for Individuals rate in terms of response times?

In general, the opinion on the response times of the TOPOS Observatory for Individuals is good (answers: 4 very good, 2 good, 2 average).

7. Would you recommend the usage of TOPOS Observatory for Individuals to a colleague?

Some of the surveyed users will definitely or probably recommend the TOPOS Observatory to a colleague. Nevertheless, the most of them are undecided about this question (answers: 3 definitely, 3 probably, 4 undecided).

8. What functionality is the most interesting for you?

- 4 users are especially interested in **navigate to explore transport research contents without login in the platform.**
- 2 users find the capability to **register to share comments with other researchers** especially interesting.
- 2 users would be interested in **providing new metadata, content or database to the platform.**

9. Which of the following fields is the most relevant in your opinion? (order them from the most relevant to less relevant)

Type (*)	Access right (**)	Publication date	Country	Publisher
2	1	3	4	5
2	1	4	3	5
1	2	4	3	5
1	3	2	5	4
1	3	2	5	4
3	1	2	4	5
4	1	2	3	5
1	2	3	5	4
1	2	3	4	5

(\*) e.g., article, book, thesis, report...

(\*\*) e.g., open, closed, restricted, embargo

10. Suggest how to improve the TOPOS Observatory for Individuals

One of the most interesting part of the questionnaire are the suggestions of the users to improve the TOPOS Observatory for Individuals.

Some users consider a lack of information and contents about transport research in the platform. At this moment the harvest of the contents from OpenAire is still in process, so it is expected that this aspect improves as information is collected.

The login via eduGAIN or via EOSC AAI is suggested in order to help the promotion of BE OPEN services in the European Open Science Cloud.

Some conclusions have been observed from the answers of the survey participants. As it was expected, the target of the platform are researchers, professors, scientists, students and professionals looking for sharing knowledge in the field of transport research. In this context all the platform capabilities are



relevant for the end users: navigation to explore transport research results, provide new contents and share the expertise through the social network tools.

The navigation experience of the platform is highly dependent on the accuracy of the search. Search results are key to the success of the TOPOS Observatory of Individuals.

Finally, the most relevant metadata for the platform users is the type of the document (e.g., article, book, thesis, report...) when filtering results. Publications date and access right are other key data when searching for transport information.

## 6 TOPOS Forum

TOPOS Forum aims to exchange ideas and share best practices for operationalising Open Science principles in transport research. The main goal is to capture and present the common culture and practices of data stewardship in transport research. Representatives of transport stakeholders (of all modes i.e. road, air, rail and water transport, and both private and public) are encouraged to endorse the principles of the TOPOS Forum declaration and its principles to guide the implementation of TOPOS Forum, and to commit to take up some of the specific actions declared in the roadmap and guidelines of the BE OPEN project so as to show their tangible support to the common effort to make the TOPOS Forum a reality and support the practical use of the EOSC.

### 6.1 Technical aspects

The forum implemented using the open-source NodeBB forum software. NodeBB meets the needs required for the TOPOS forum i.e., modern responsive design, posting topics and replies, real-time chat and notifications, advanced search, moderation, spam protection etc. Moreover, NodeBB has large community and it gets often updates with new features and bug fixes.

For hosting the TOPOS Forum, we have chosen Microsoft Azure Cloud Services. The selected datacenter is in Central Europe providing low latency and high bandwidth to European users. Also, we use the Content Distribution Network (CDN) of Cloudflare to provide reliable connections to users outside Europe.

Statistics based on the Google's analytics service allows us to analyze in-depth detail about the visitors on our website. It provides valuable insights that can help us to revise features, understand users' needs and support the strategic decision of our tool.

The TOPOS Forum is accessible only via https for secured and encrypted connection. The domain is: [forum.topos-observatory.eu](https://forum.topos-observatory.eu).

### 6.2 Interface and features

The homepage contains the 5 categories, the most recent Topic/Reply for each category, the menu, and the footer.

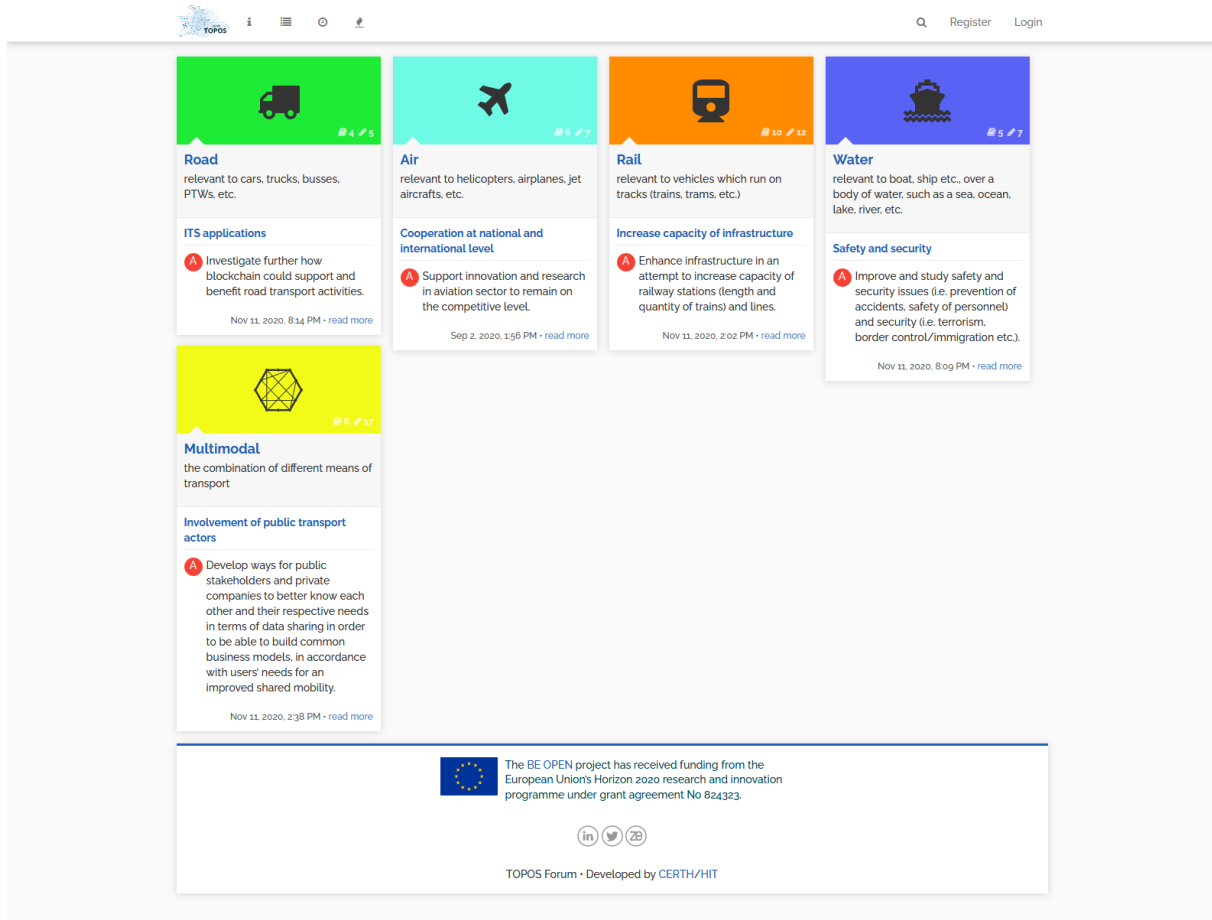


Figure 31 Homepage and the Main Categories

Categories represent transport modes (Road, Air, Rail, Water, Multimodal) to cover all transport sectors and the subcategories represent the competence areas (Legal/Regulatory, Technological, Transport planning, Business modelling, Socioeconomic, Environmental) as defined in the deliverable 1.1 “Taxonomy of actors, terminology and experimental tools” of the BE OPEN project.

The 5 categories of the forum are:

- Road
  - relevant to cars, trucks, busses, PTWs, etc.
- Air
  - relevant to helicopters, airplanes, jet aircrafts, etc.
- Rail
  - relevant to vehicles which run on tracks (trains, trams, etc.)
- Water
  - relevant to boat, ship etc., over a body of water, such as a sea, ocean, lake, river, etc.
- Multimodal
  - the combination of different means of transport

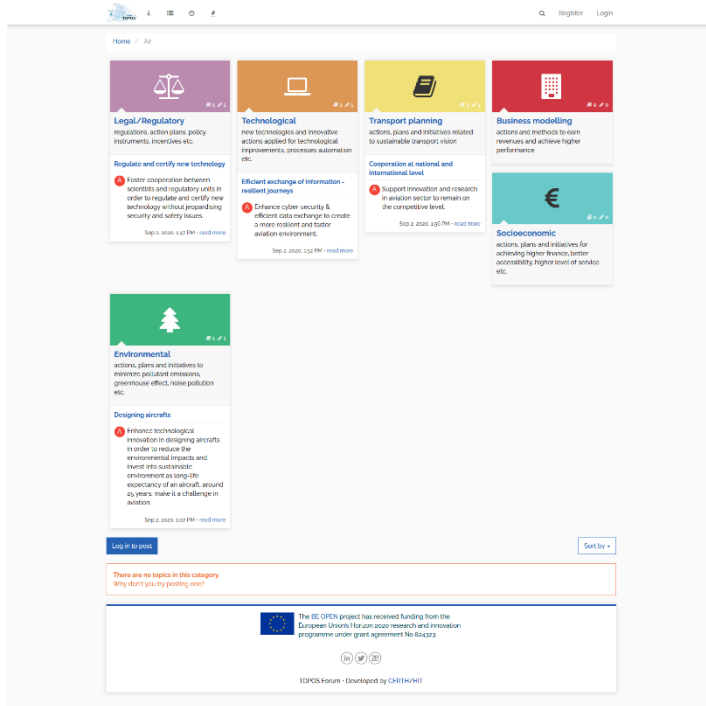


Figure 32 Subcategories in Main Category

- Environmental  
actions, plans and initiatives to minimize pollutant emissions, greenhouse effect, noise pollution etc.

Each category contains all the subcategories. Users can not create new topic under a Main Category, but they must select a subcategory.

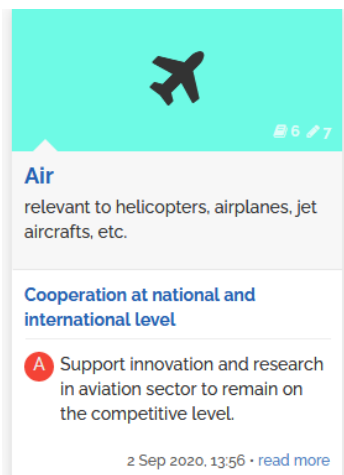


Figure 33 Category icon

The 6 Subcategories.

- Legal/Regulatory  
regulations, action plans, policy instruments, incentives etc.
- Technological  
new technologies and innovative actions applied for technological improvements, processes automation etc.
- Transport planning  
actions, plans and initiatives related to sustainable transport vision.
- Business modelling  
actions and methods to earn revenues and achieve higher performance.
- Socioeconomic  
actions, plans and initiatives for achieving higher finance, better accessibility, higher level of service etc.

A category/subcategory contains an icon, a title, a description, and the last topic/reply.



The menu is on the top of the website. Contains the logo, links to about page, categories, recent, popular, and search icon, Register/Login links.



Figure 34 Menu for guests

When the user is logged in the Register/Login links are replaced with notification, chat, and user icons.



Figure 35 Menu for users

In the about page, the TOPOS Forum and its goal are presented to inform interested visitors and potential users. For the Forum we created an email address ([info@topos-observatory.eu](mailto:info@topos-observatory.eu)) where users can contact us for questions and feedback. We provide useful links for the users where they can find information for the TOPOS Observatory and BE OPEN Project and we display basic statistics.

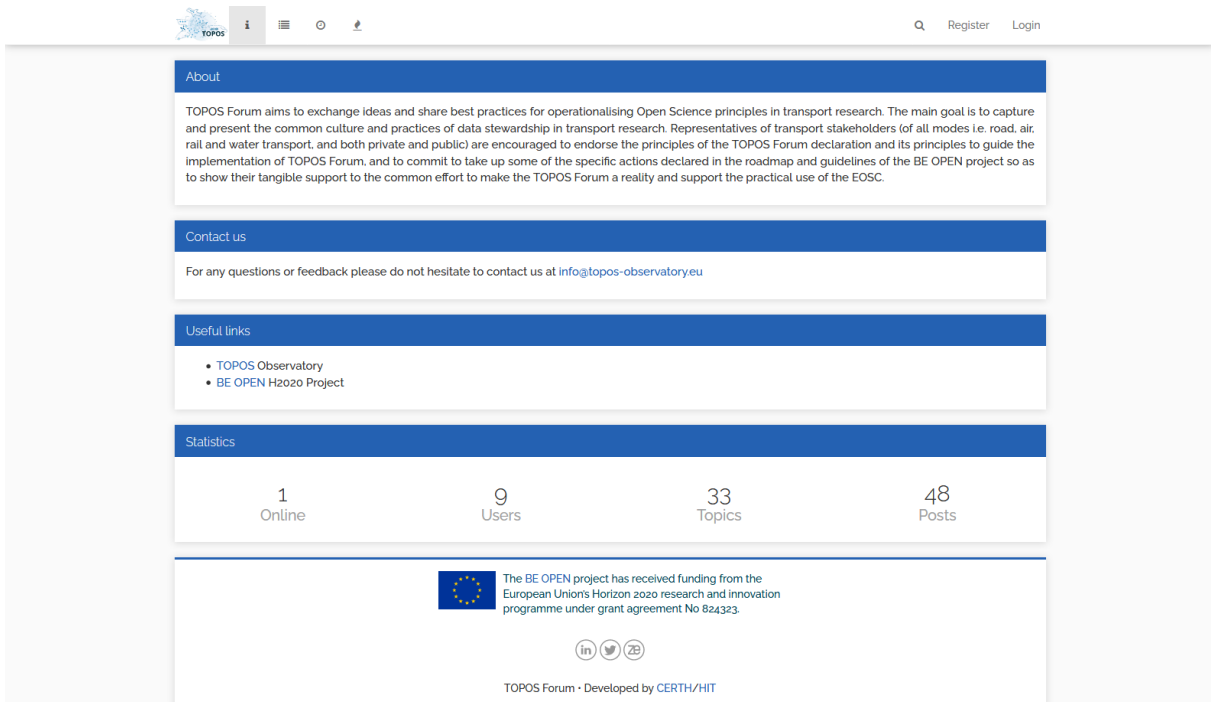


Figure 36 About Page

The category page is the same as the homepage.

The recent page contains a list of the most recent topics. User can filter to All Topics, New Topics, Watched Topics, Unreplied Topics and filter to specific Category/Subcategory.

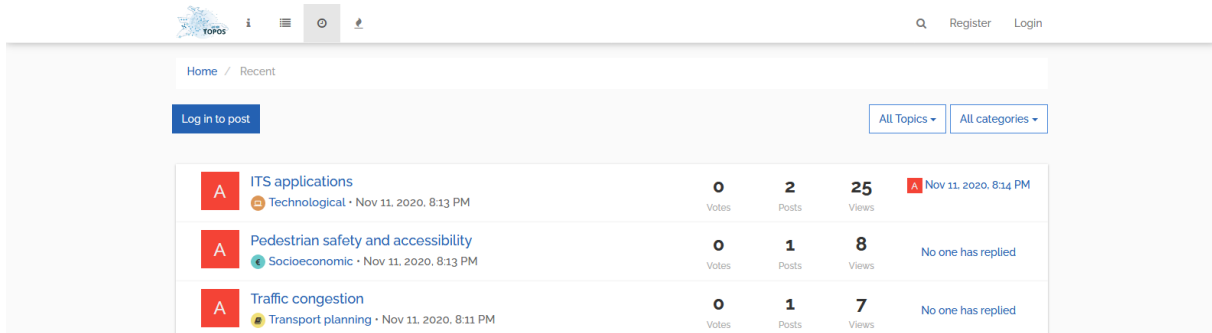


Figure 37 Recent Topics page

The popular page contains the most popular Topics of the forum. The filters are the same as in recent page, with additional filter to Day, Week, Month.

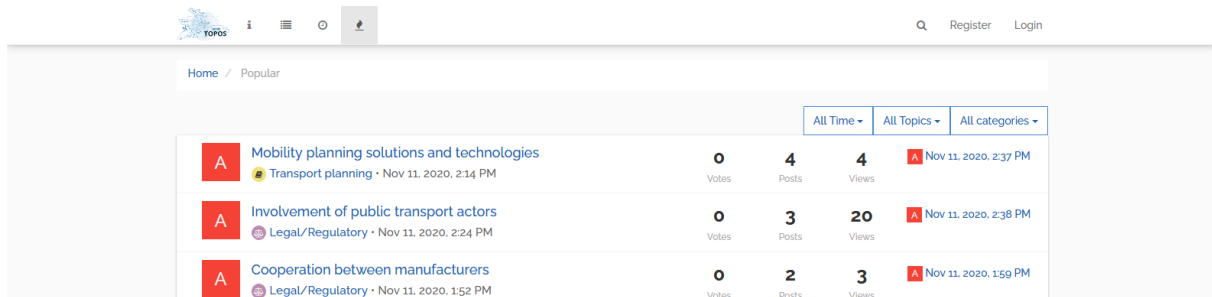


Figure 38 Popular Topics page

User can use search from the menu or can search via the advanced search applying various filters.



Figure 39 Search functionality in Menu

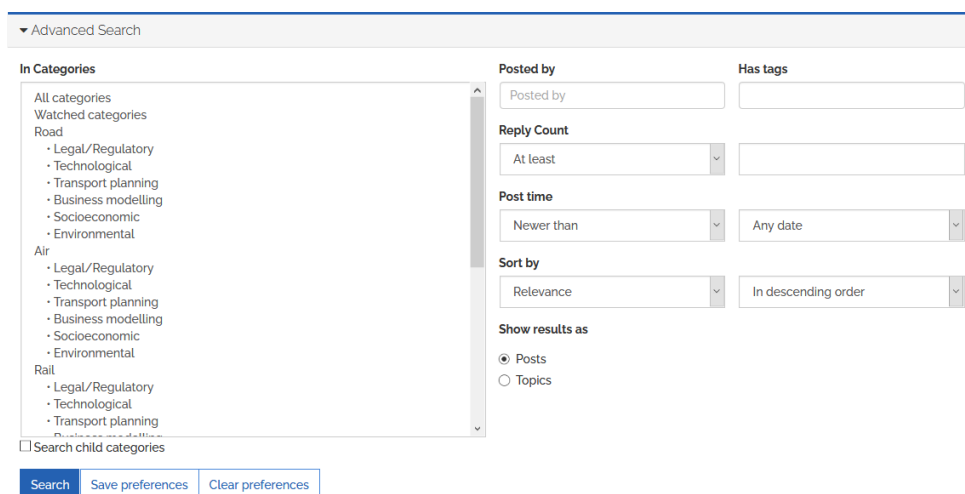
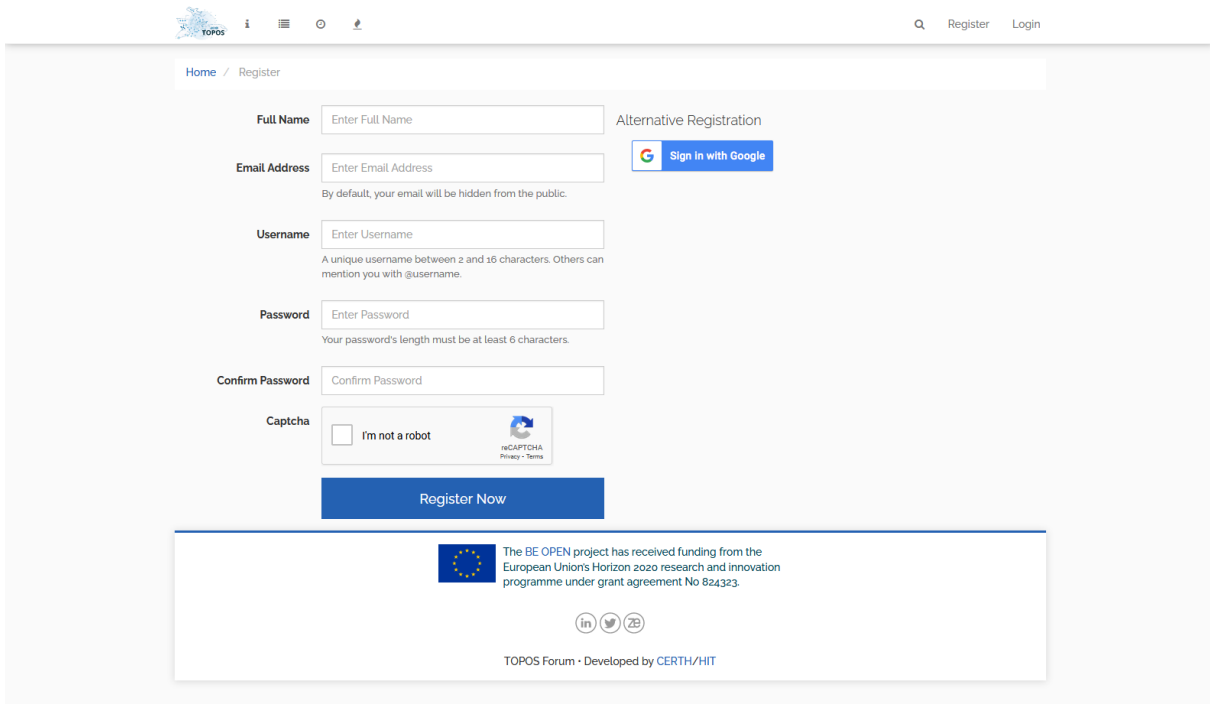


Figure 40 Advanced search page

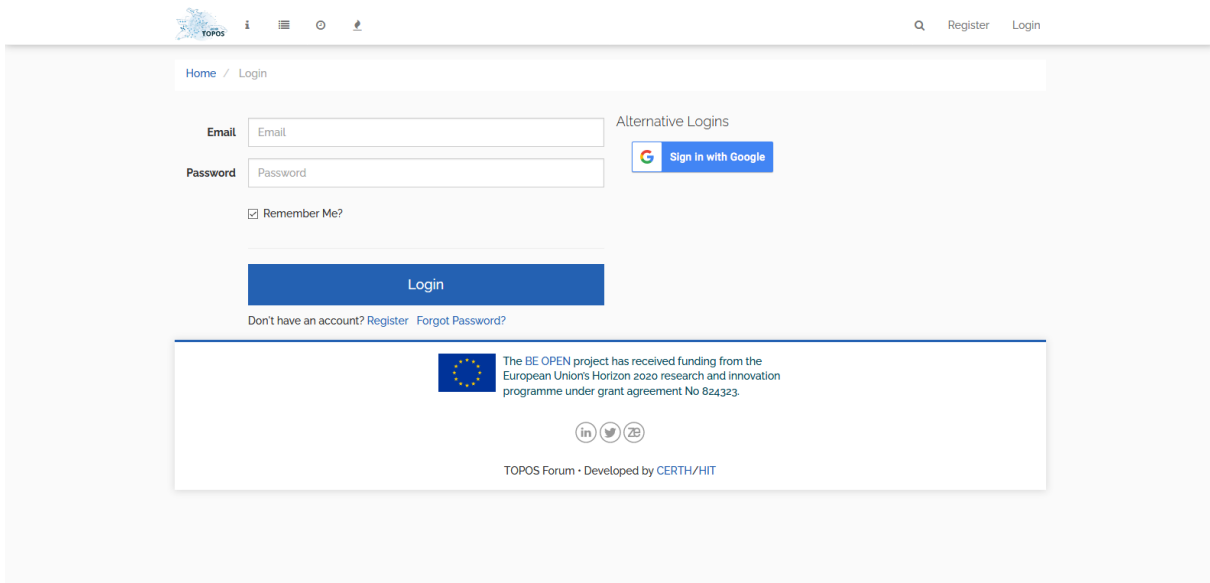
Users can register in by filling a form with their Full Name, Email Address, Username, Password/Confirm Password and Captcha. Alternative, now, users can register with their Google account using the “Sing in with Google” button.



The screenshot shows the registration page of the TOPOS forum. At the top, there is a navigation bar with the TOPOS logo, a search icon, and links for Register and Login. The main content area is titled "Home / Register" and contains a registration form. The form includes fields for Full Name, Email Address, Username, Password, and Confirm Password. There is also a Captcha field with a checkbox labeled "I'm not a robot" and a reCAPTCHA logo. An "Alternative Registration" section features a "Sign in with Google" button. Below the form is a blue "Register Now" button. At the bottom of the page, there is a footer section with the European Union flag, text about funding from the Horizon 2020 programme, social media icons for LinkedIn, Twitter, and YouTube, and the text "TOPOS Forum · Developed by CERTH/HIT".

Figure 41 Registration page

Users may login either with their email/password or their Google account. The forum supports the “password reset” functionality.



The screenshot shows the login page of the TOPOS forum. At the top, there is a navigation bar with the TOPOS logo, a search icon, and links for Register and Login. The main content area is titled "Home / Login" and contains a login form. The form includes fields for Email and Password. There is a checkbox labeled "Remember Me?". An "Alternative Logins" section features a "Sign in with Google" button. Below the form is a blue "Login" button. At the bottom of the page, there is a footer section with the European Union flag, text about funding from the Horizon 2020 programme, social media icons for LinkedIn, Twitter, and YouTube, and the text "TOPOS Forum · Developed by CERTH/HIT".

Figure 42 Login page

Creating new Topic is only available to registered user. Each Topic must contain a Category, a Title and content. The text in content supports can be rich text, i.e., **bold**, *Italic*, ~~Strikethrough~~, etc. Also uploading image and files, such as pdf, doc, etc., is available.

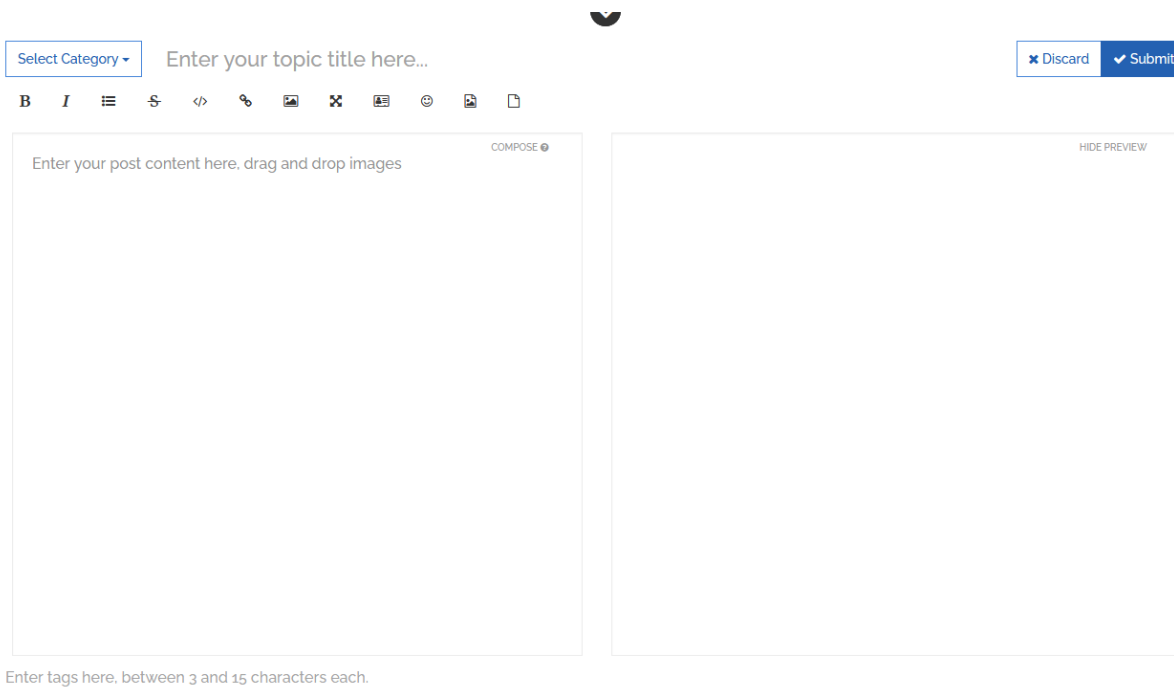


Figure 43 Creating a Topic

User can reply to a topic, downvote/upvote share, report, etc.

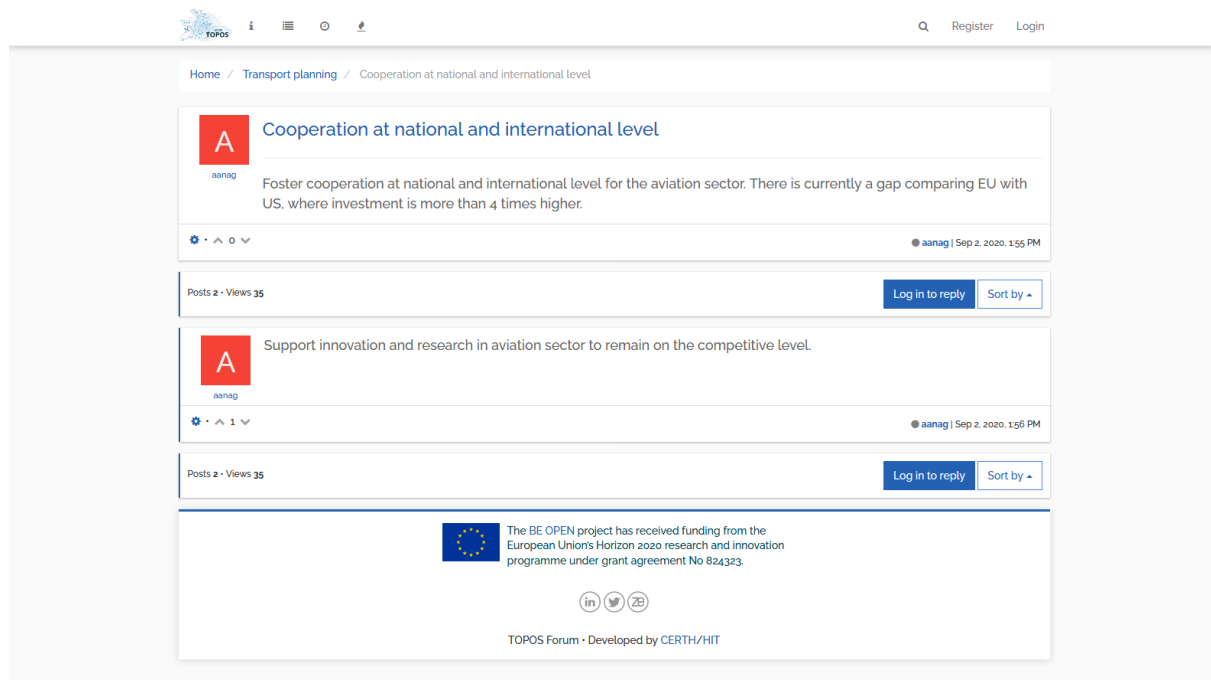


Figure 44 Example of a Topic

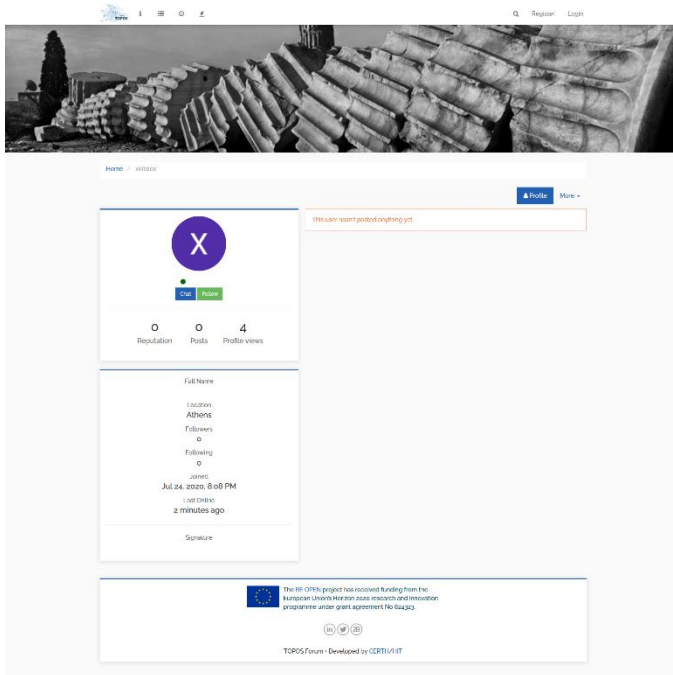


Figure 45 User's profile

Each user has his own profile. User can follow each other, see other users' activity etc.

Moreover, users can use forums chat to exchange message.

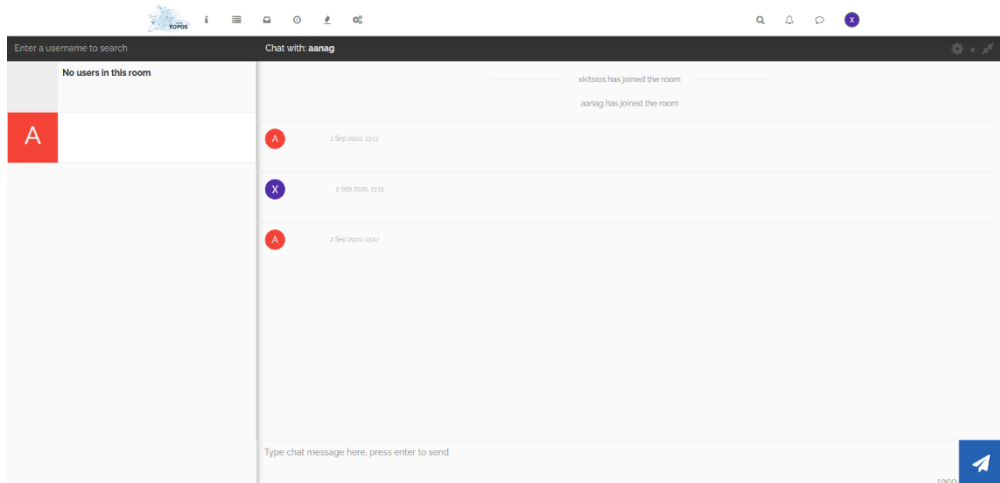
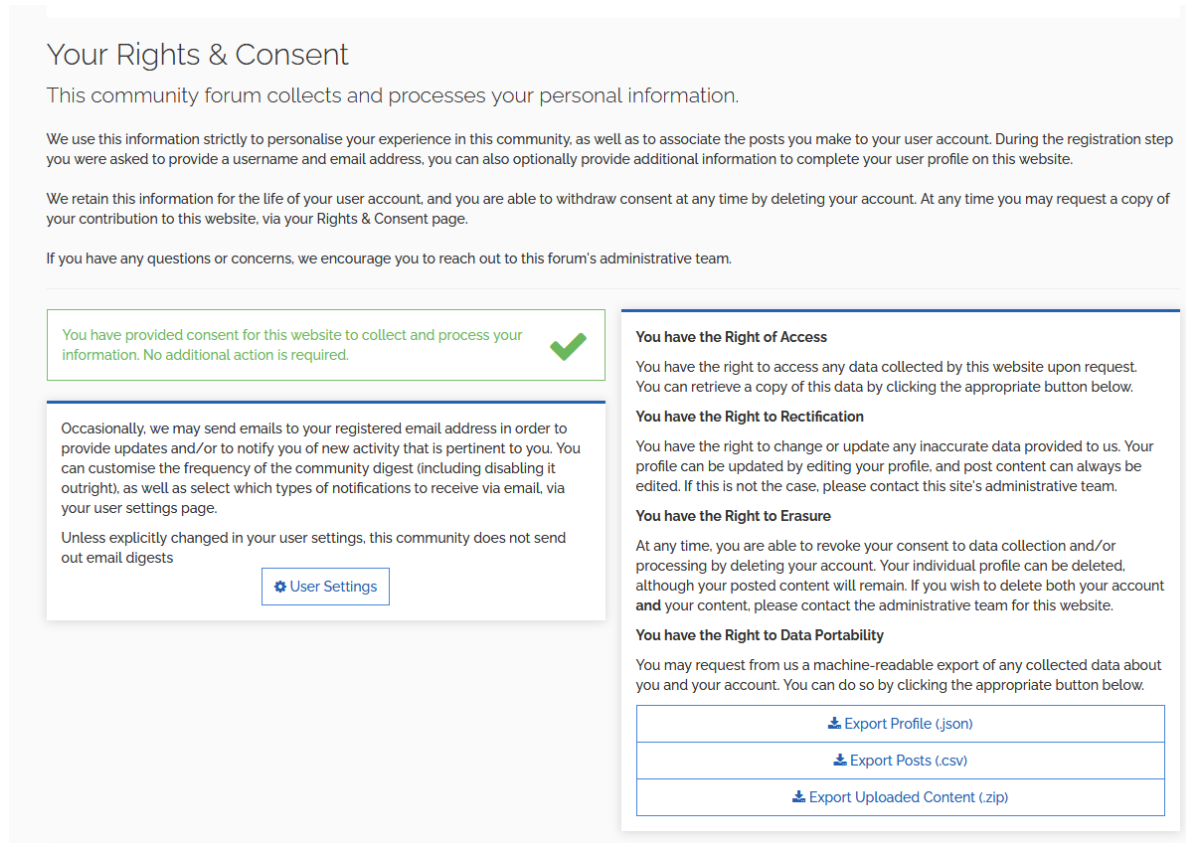


Figure 46 User chat

The forum complies with EU regulations about privacy. Users can download their data that are collected, can delete their accounts, can define which information are public etc.

When a guest visits for the first time the forum gets a notification informing that the website uses cookies.



The screenshot shows a web page titled "Your Rights & Consent". At the top, it states: "This community forum collects and processes your personal information." Below this, there are three paragraphs of text explaining the use of information, retention policies, and contact information for questions. A green box with a checkmark indicates that consent has been provided. The page is divided into two main sections. The left section discusses email digests and includes a "User Settings" button. The right section lists user rights: "Right of Access", "Right to Rectification", "Right to Erasure", and "Right to Data Portability". Under "Right to Data Portability", there are three buttons: "Export Profile (.json)", "Export Posts (.csv)", and "Export Uploaded Content (.zip)".

Figure 47 Your Rights & Consent Page

In this deliverable we cannot neither cover all features of the forum nor give you a rough guide. We present the basic features that are implemented by the date of writing.

## 6.3 Webinar Feedback

A review webinar has been conducted to inform BE OPEN partners and present TOPOS forum in the associations (i.e., ECTRI, DLR, EATEO, WEGEMT, EURNEX, UITP, FEHRL, HUMANIST) participated in the BE OPEN project. In addition, a questionnaire has been developed to examine users' experience, detect usability problems and determine how users deal with the new tool.

During the phase of questionnaires, we received feedback from 9 persons. It is worth to mention that this number of the users that tested the new tools, including TOPOS Forum, is enough to detect possible usability problems as also presented in figure 48 following also Nielsen's (1990) position.

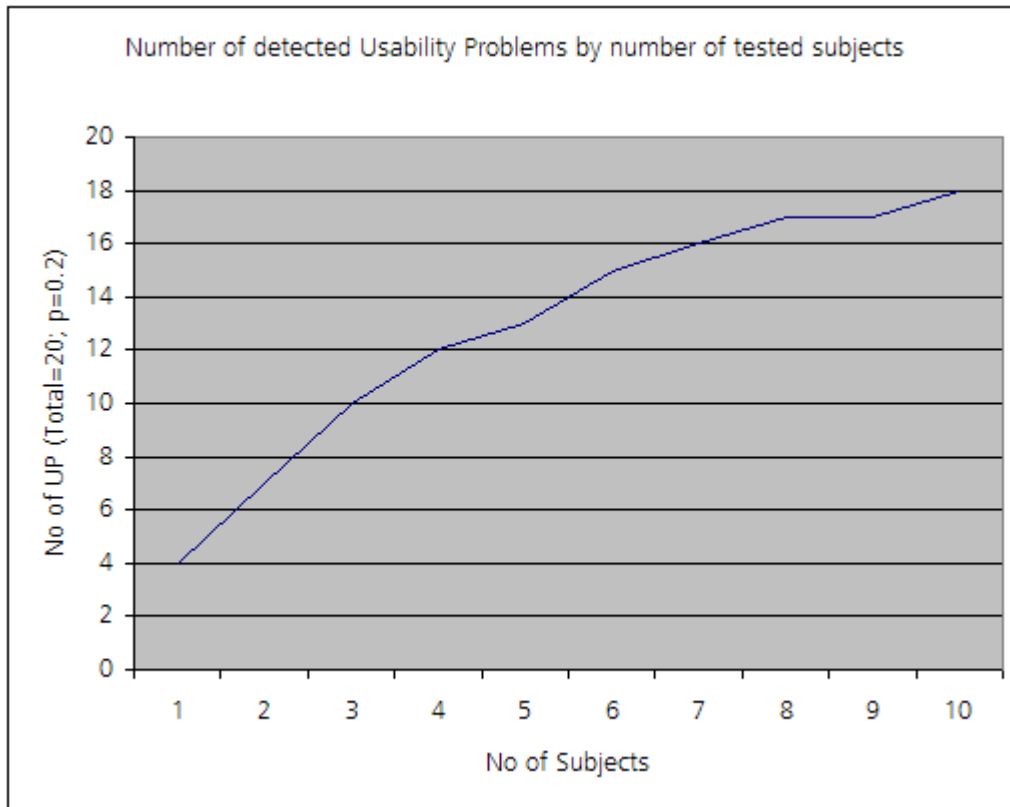


Figure 48 Real usability problems and the number of subjects<sup>23</sup> (with Virzi's binomial model)

The structure of the questionnaire and the corresponding answers are provided bellow.

**Question 1** How does TOPOS Forum rate in terms of depth of coverage?

**Question 2** How user-friendly is the interface?

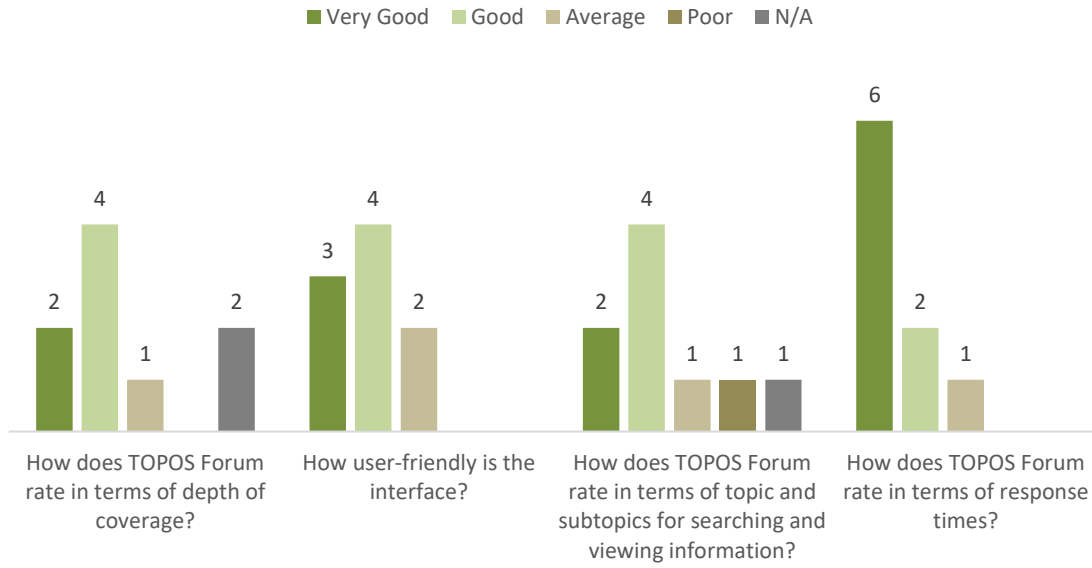
**Question 3** How does TOPOS Forum rate in terms of topic and subtopics for searching and viewing information?

**Question 4** How does TOPOS Forum rate in terms of response times?

For the first 4 questions the possible answers are, 5 Very Good, 4 Good, 3 Average, 2 Poor, 1 Very Poor and N/A.

<sup>23</sup> Available on line at [http://en.wikipedia.org/wiki/Usability\\_testing](http://en.wikipedia.org/wiki/Usability_testing) (accessed on 08/02/2021)

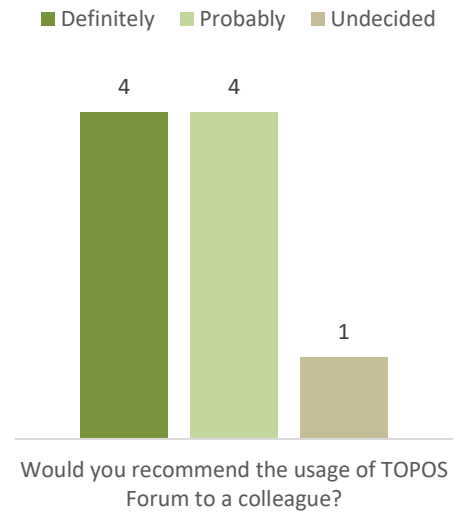
### Questions 1 - 4



### Question 5 Would you recommend the usage of TOPOS Forum to a colleague?

For the 5<sup>th</sup> question the possible answers are, 5 Definitely, 4 Probably, 3 Undecided, 2 Probably not, 1 Definitely not and N/A.

### Question 5

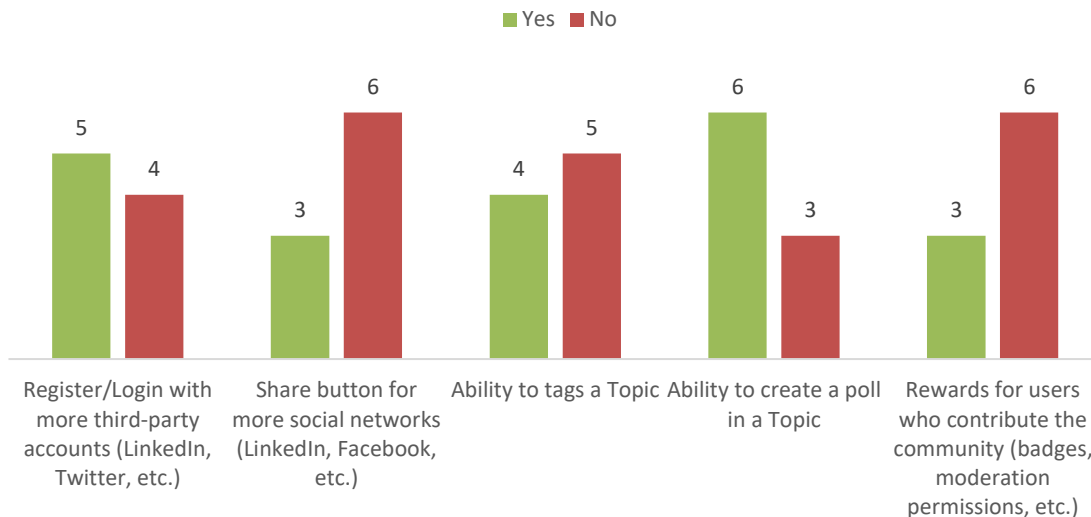




**Question 6** Which of the followings features you consider helpful to be integrated:

- Register/Login with more third-party accounts (LinkedIn, Twitter, etc.)
- Share button for more social networks (LinkedIn, Facebook, etc.)
- Ability to tags a Topic
- Ability to create a poll in a Topic
- Rewards for users who contribute the community (badges, moderation permissions, etc.)

Which of the followings features you consider helpful to be integrated



Last, in the final Question 7: “Suggest how to improve the TOPOS Forum” two persons wrote us their suggestion to interconnect with more AAI providers and their concern about the categorization of the forum.

Overall, we observe that most of the answers to Question 1-5, who are quality indicators, are Good/Probably and Very Good/Definitely. For the Question 6-7, we find out that users need more features, e.g., interconnect with more AAI providers, usage of tags and polls in a Topics, etc.

Even though we could consider the opinion of 9 people an important basis for drawing conclusions, future users of the forum will be able to send us their feedback (at the forum email address) so as to plan improvements and updates in our services based on users’ evolving needs. the goal of the forum is to engage a critical mass of users that will set the basis in order to extend the offered services that will be harmonized with the trends of the new era.

A valuable suggestion that has been received from WEGEMT – Marine University Association, is that the “Water” category should be renamed to “Waterborne”. On this way it will be clearer that the category includes maritime and inland waterways. Moreover, in the Directorate-General for Mobility and Transport of European Commission the category is referred to as “Waterborne”.

## 7 Conclusions

Task 3.2 aimed to design and develop the BE OPEN TOPOS tools. These were the TOPOS Observatory for Organisations, for Individuals and the Forum. TOPOS Observatory main purpose was to support the Open Data idea on the Transportations area where it was not so popular compared e.g., in the programming area.

A webinar has been organized in January 2021 on two different dates where the TOPOS Observatory and Forum were introduced to the partners of the project. The purpose of this webinar was the feedback collection for the further development and the fine tuning of the tools. This feedback has been taken under consideration and the tools have been updated accordingly.

The first presented element on this document was the Gateway of TOPOS where all tools are co-accommodated together with valuable information about the BE OPEN project and TOPOS tools. The user may visit and remember only this website to get access to the TOPOS tools.

Furthermore, the TOPOS Observatory for Organisations has been presented in detail. This is a platform assigned to organisations such institution, authorities, which may share open data on the Transportation area. The main advantage is that their work can become widely known via TOPOS and help the transportation community become more active.

On the same way with the above, the TOPOS Observatory for Individuals has been also advanced introduced. This time, the platform is assigned to individuals such researchers and students who may share open data with the transportation community. Yet again, the main advantage is the TOPOS support on the advertisement of the individuals' work on wide area of users.

Additionally, the TOPOS Forum is the tool that supports the above platforms. The categories have been carefully selected to support TOPOS Observatory and all the issues that may rise. It is a well-structured forum which supports all functionality of a common forum but it is totally focused on transportation.

Finally, it has been decided that a webinar, open to anyone, should be organized before the end of the project. An open invitation will widely be sent, this time to collect feedback from as many attendees as possible. This final webinar will be part of a common workshop that will be co-organised with the OSCAR EU project.

# ANNEX I

Dear BE OPEN partners,

Due to the implementation of WP3 “Open Access in Transport Observatory and Forum”, TOPOS development team would like to invite you to the 1<sup>st</sup> TOPOS Observatory and Forum Webinar which will take place on **Thursday the 21<sup>st</sup> of January at 11:00 CET**.

The main objective of TOPOS Observatory and Forum is to limit existing barriers in Open Science in Transport Research and aligning transport research with EOSC by following FAIR (Findable, Accessible, Interoperable, Reusable) principles. In more detail, the tools provide to the users advance search on open transportation data. The user may, not only find open data on specific topic but also information about the source and the owner of the data. On the other hand, a user may share publicly transportation data (and make them open) and gain advantages from e.g., new collaborations.

Our colleagues from ATHENA, Scipedia and CERTH will present you all the functionality available on the TOPOS tools (registration, advanced search, etc.).

## Agenda

- |               |   |
|---------------|---|
| 11:00 – 11:05 | Welcome – What is TOPOS – TOPOS Gateway – Introduction of the online Feedback Questionnaire ( <i>the feedback questionnaire will be provided in an upcoming separate e-mail</i> )<br><br><i>Pavlos Spanidis (CERTH)</i> |
| 11:05 – 11:35 | TOPOS Observatory for Organisations (plus questions slot)<br><br><i>Alessia Bardi (ATHENA)</i>  |
| 11:35 – 12:05 | TOPOS Observatory for Individuals (plus questions slot)<br><br><i>Clara Garcia (Scipedia)</i>   |
| 12:05 – 12:35 | TOPOS Forum (plus questions slot)<br><br><i>Xenofon Kitsios (CERTH)</i>   |
| 12:35         | End of TOPOS webinar  |

For those who may not be able to attend the 1<sup>st</sup> webinar, we organize a 2<sup>nd</sup> TOPOS Observatory and Forum Webinar between **25<sup>th</sup>-29<sup>th</sup> of January with same content**. This will be confirmed at a later stage!



**\* Restriction – This webinar is an internal one only for BE OPEN partners! Please, do not circulate this invitation outside your company, institution, etc.**

The webinar invitation details can be found below:

**BE OPEN TOPOS Webinar (1st)**

**Thu, Jan 21, 2021 12:00 PM - 1:30 PM (EET)**

**Please join my meeting from your computer, tablet or smartphone.**

<https://global.gotomeeting.com/join/117190589>

**You can also dial in using your phone.**

Greece: [+30 21 0 300 2583](tel:+302103002583)

**Access Code:** 117-190-589

**More phone numbers:**

United States: [+1 \(571\) 317-3129](tel:+15713173129)

Austria: [+43 7 2081 5427](tel:+43720815427)

Belgium: [+32 28 93 7018](tel:+3228937018)

Denmark: [+45 32 72 03 82](tel:+4532720382)

France: [+33 170 950 594](tel:+33170950594)

Germany: [+49 721 9881 4161](tel:+4972198814161)

Italy: [+39 0 247 92 13 01](tel:+390247921301)

Spain: [+34 932 75 2004](tel:+34932752004)

United Kingdom: [+44 330 221 0088](tel:+443302210088)

New to GoToMeeting? Get the app now and be ready when your first meeting starts:

<https://global.gotomeeting.com/install/117190589>

We expect your presence and constructive feedback. Looking forward to our meeting.

Best regards,

## ANNEX II

### Questionnaire - internal data

Apart from your questions, you will find in the data record additional variables, as far as you have not deactivated this option when downloading the data record.

**CASE** Serial number of the subject  
**REF** Reference, if such has been provided in the link to the questionnaire  
**LASTPAGE** Page number of the questionnaire that has been edited and sent last  
**QUESTNNR** ID of the questionnaire that has been edited  
**MODE** Information if the questionnaire has been started by pretest or by a project member  
**STARTED** Time the interviewee opened the questionnaire  
**FINISHED** Information if the questionnaire has been completed up to the last page  
**TIME\_001...** Time that an interviewee has spend on a questionnaire page

Please note that you can not read the internal variables of the questionnaire with the function value(). For interview number and reference there are the PHP functions [PHP function caseNumber\(\)](#) and [PHP function reference\(\)](#)

Details about additional variables can be find in the manual: [Additional Variables in the Data Set](#)

### Section A0: Intro

[A002] Selection

IntroSelection

"Would you like to participate?"

**A002** IntroSelection

- 1 = Yes
- 2 = No
- 9 = Not answered

### Section A1: TOPOS for Organizations

[A101] Extended Selection

Q1a

"1. Actor"

**A101** Q1a

- 1 = Technology platforms
- 2 = Technology platforms → Institutional
- 3 = Technology platforms → Thematic repositories
- 4 = Technology platforms → Data archives and disciplinary web sites
- 5 = Research Organisations (public and private)
- 6 = Research Organisations (public and private) → Research center
- 7 = Research Organisations (public and private) → University
- 8 = Research Organisations (public and private) → Small and medium enterprises (participate in research activities, research projects)
- 9 = Public authorities
- 10 = Public authorities → National research funding organisation
- 11 = Public authorities → International research funding organisation
- 9 = Not answered

[A102] Text Input

Q1b

"Other (actor)"

**A102\_01** [01]

Free text

<b>[A103]</b> Text Input <b>Q2</b> "2. What keywords did you use on your search?"
<b>A103_01</b> [01] Free text
<b>[A104]</b> Horizontal Selection <b>Q3</b> "3. How does TOPOS Observatory for Organisations rate in terms of depth of coverage?"
<b>A104 Q3</b> 1 = Very Poor 2 = Poor 3 = Average 4 = Good 5 = Very Good 6 = N/A -9 = Not answered
<b>[A105]</b> Horizontal Selection <b>Q4</b> "4. How user-friendly is the interface?"
<b>A105 Q4</b> 1 = Very Poor 2 = Poor 3 = Average 4 = Good 5 = Very Good 6 = N/A -9 = Not answered
<b>[A106]</b> Horizontal Selection <b>Q5</b> "5. How does TOPOS Observatory for Organisations rate in terms of the range of options for searching and view..."
<b>A106 Q5</b> 1 = Very Poor 2 = Poor 3 = Average 4 = Good 5 = Very Good 6 = N/A -9 = Not answered
<b>[A107]</b> Horizontal Selection <b>Q6</b> "6. How does TOPOS Observatory for Organisations rate in terms of response times?"
<b>A107 Q6</b> 1 = Very Poor 2 = Poor 3 = Average 4 = Good 5 = Very Good 6 = N/A -9 = Not answered
<b>[A108]</b> Horizontal Selection <b>Q7</b> "7. Would you recommend the usage of TOPOS Observatory for Organisations to a colleague?"
<b>A108 Q7</b> 1 = Definitely 2 = Probably 3 = Undecided 4 = Probably Not 5 = Definitely Not -9 = Not answered

**[A109] Multiple Choice**  
**Q8**  
"8. Which additional type of content would you like to see in the TOPOS Observatory for Organisations?"

**A109\_Q8: Residual option (negative) or number of selected options**  
Integer

**A109\_01** Documentation on Open Access  
**A109\_02** Documentation on data FAIRness  
**A109\_03** Information about existing Open Science policies worldwide  
**A109\_04** More information about the BEOPEN project  
**A109\_05** Other (please specify)  
1 = Not checked  
2 = Checked

**A109\_05a** Other (please specify) (free text)  
Free text

**[A110] Ranking**  
**Q9**  
"9. Order the functionality below from the most to the least relevant according to your opinion:"

**A110\_01** Search & browse for research products  
**A110\_02** Download report for organization  
**A110\_03** Download report for project  
**A110\_04** Link functionality  
**A110\_05** Citation button  
**A110\_06** Access to the PDF or landing page of a research product  
1 = Rank 1  
2 = Rank 2  
3 = Rank 3  
4 = Rank 4  
5 = Rank 5  
6 = Rank 6  
-9 = Not ranked

**[A111] Text Input**  
**Q10**  
"Suggest how to improve the TOPOS Observatory for Organisations"

**A111\_01 [01]**  
Free text

## Section A2: TOPOS for Individuals

**[A201] Dropdown Selection**  
**Q1**  
"1. Actor"

**A201\_Q1**  
1 = Professors  
2 = Researchers  
3 = Scientists  
4 = Students  
5 = Other  
-9 = Not answered

**A201\_05** Other  
Free text

**[A203] Text Input**  
**Q2**  
"2. What keywords did you use on your search?"

**A203\_01 [01]**  
Free text

<p><b>[A204]</b> Horizontal Selection <b>Q3</b> "3. How does TOPOS Observatory for Individuals rate in terms of depth of coverage?"</p>
<p><b>A204 Q3</b> 1 = Very Poor 2 = Poor 3 = Average 4 = Good 5 = Very Good 6 = N/A -9 = Not answered</p>
<p><b>[A205]</b> Horizontal Selection <b>Q4</b> "4. How user-friendly is the interface?"</p>
<p><b>A205 Q4</b> 1 = Very Poor 2 = Poor 3 = Average 4 = Good 5 = Very Good 6 = N/A -9 = Not answered</p>
<p><b>[A206]</b> Horizontal Selection <b>Q5</b> "5. How does TOPOS Observatory for Individuals rate in terms of the range of options for searching and viewin..."</p>
<p><b>A206 Q5</b> 1 = Very Poor 2 = Poor 3 = Average 4 = Good 5 = Very Good 6 = N/A -9 = Not answered</p>
<p><b>[A207]</b> Horizontal Selection <b>Q6</b> "6. How does TOPOS Observatory for Individuals rate in terms of response times?"</p>
<p><b>A207 Q6</b> 1 = Very Poor 2 = Poor 3 = Average 4 = Good 5 = Very Good 6 = N/A -9 = Not answered</p>
<p><b>[A208]</b> Horizontal Selection <b>Q7</b> "7. Would you recommend the usage of TOPOS Observatory for Individuals to a colleague?"</p>
<p><b>A208 Q7</b> 1 = Definitely 2 = Probably 3 = Undecided 4 = Probably Not 5 = Definitely Not -9 = Not answered</p>



**[A209] Selection**  
**Q8**  
"8. What functionality is the most interesting for you?"

**A209 Q8**  
1 = Navigate to explore transport research contents without login the platform  
2 = Register to share comments with other researchers  
3 = Provide new metadata, content or database to the platform  
4 = Other (please specify)  
-9 = Not answered

**A209\_04 Other (please specify)**  
Free text

**[A210] Ranking**  
**Q9**  
"9. Which of the following fields is the most relevant in your opinion? (order them from the most relevant to..."

**A210\_01 Type (e.g. article, book, thesis, report...)**  
**A210\_02 Access right (e.g. open, closed, restricted, embargo)**  
**A210\_03 Publication date**  
**A210\_04 Country**  
**A210\_05 Publisher**  
1 = Rank 1  
2 = Rank 2  
3 = Rank 3  
4 = Rank 4  
5 = Rank 5  
-9 = Not ranked

**[A211] Text Input**  
**Q10**  
"Suggest how to improve the TOPOS Observatory for Individuals"

**A211\_01 [01]**  
Free text

### Section A3: TOPOS Forum

**[A304] Horizontal Selection**  
**Q3**  
"1. How does TOPOS Forum rate in terms of depth of coverage?"

**A304 Q3**  
1 = Very Poor  
2 = Poor  
3 = Average  
4 = Good  
5 = Very Good  
6 = N/A  
-9 = Not answered

**[A305] Horizontal Selection**  
**Q4**  
"2. How user-friendly is the interface?"

**A305 Q4**  
1 = Very Poor  
2 = Poor  
3 = Average  
4 = Good  
5 = Very Good  
6 = N/A  
-9 = Not answered

<p><b>[A306]</b> Horizontal Selection <b>Q5</b> "3. How does TOPOS Forum rate in terms of topic and subtopics for searching and viewing information?"</p>
<p><b>A306 Q5</b> 1 = Very Poor 2 = Poor 3 = Average 4 = Good 5 = Very Good 6 = N/A -9 = Not answered</p>
<p><b>[A307]</b> Horizontal Selection <b>Q6</b> "4. How does TOPOS Forum rate in terms of response times?"</p>
<p><b>A307 Q6</b> 1 = Very Poor 2 = Poor 3 = Average 4 = Good 5 = Very Good 6 = N/A -9 = Not answered</p>
<p><b>[A308]</b> Horizontal Selection <b>Q7</b> "5. Would you recommend the usage of TOPOS Forum to a colleague?"</p>
<p><b>A308 Q7</b> 1 = Definitely 2 = Probably 3 = Undecided 4 = Probably Not 5 = Definitely Not -9 = Not answered</p>
<p><b>[A309]</b> Multiple Choice <b>Q8</b> "6. Which of the followings features you consider helpful to be integrated:"</p>
<p><b>A309 Q8: Residual option (negative) or number of selected options</b> Integer <b>A309_01</b> Register/Login with more third-party accounts (LinkedIn, Twitter, etc.) <b>A309_02</b> Share button for more social networks (LinkedIn, Facebook, etc.) <b>A309_03</b> Ability to tags a Topic <b>A309_04</b> Ability to create a poll in a Topic <b>A309_05</b> Rewards for users who contribute the community (badges, moderation permissions, etc.) <b>A309_06</b> Other 1 = Not checked 2 = Checked <b>A309_06a</b> Other (free text) Free text</p>
<p><b>[A310]</b> Text Input <b>Q10</b> "Suggest how to improve the TOPOS Forum"</p>
<p><b>A310_01 [01]</b> Free text</p>