## **Interoperability Platform to Support Implementation**

As one major approach on building up the European Publication Information Infrastructure is the bottom-up approach in the coordination between various data providers and agreeing on the included metadata and its standards it is of great importance to have tools supporting this cooperation and interoperability both for technical purposes but more importantly for people working with the research metadata and various source systems. As part of this STSM, a short introduction and use case of the Interoperability Platform is presented, which would be beneficial in implementation phase of this European infrastructure. It consists of short introduction to the platform, but more importantly a couple of examples from research domain on how it could be utilized in the implementation and cooperation of European Publication Information Infrastructure.

## Introduction to Interoperability Platform

The interoperability platform gives you the tools and the method for specifying and managing interoperable data and information content. The platform consists of the terminologies, code lists, and data models needed for flows of data and in other forms of information management. The interoperability method will help you create and maintain the semantic interoperability of information, i.e. data processing where meaning in flows of data remains the same. The interoperability platform is intended for both public administration and the private sector. The tools are available free of charge for creating and editing terminologies and concepts, managing code lists, and creating and editing data models. Data content producers are responsible for their own data specifications and their quality, and for keeping them up to date. You can also use previously created data specifications that are available on the interoperability platform. Using existing code lists and data models in your own system development is cost-effective and improves interoperability between the systems of different actors. The consistent use of concepts makes services easier to plan and understand.



Instead of a situation where each organisation itself decides, for example, the content of a human concept and what information relates to it, it is described for the interoperability platform just once. After that, others can refer to the description and apply it. Technically speaking, the descriptions of terminologies, code lists and data models created or imported into the interoperability platform are linked data, i.e. specific online resources with their own permanent identifier (URI) that can be referred to from elsewhere.

The interoperability method and platform implement the European Interoperability Framework (EIF). According to that, four layers of interoperability are needed to be able to exchange data between information systems in such a way that its meaning remains unchanged. The layers are as follows: legal, organisational, semantic and technical.

At the core of the interoperability method are organisational and semantic interoperability. The interoperability platform offers organisations in public administration an open source online platform where common agreements on the data content used in information systems may be specified and published. The descriptions produced on the platform are also machine-readable data specifications, which can be used to accomplish technical interoperability, i.e. the design and implementation of different information systems.

The interoperability platform is divided into three tool, which are for Terminologies, Reference Data and Data Vocabularies

## Shared data vocabularies

For interoperability and shared understanding on how and what information lies at the core of research information system or CRIS systems in general, the sharing of data vocabularies would be a definitive step towards interoperability and transparency in the research information sector. By having transparent data vocabularies, especially for aggregating and harvesting research information systems, that can be shared, commented and tinkered with would lead to more interoperability and common understanding on how to maintain, integrate and build up research information systems.

One major drawback and resource intensive part on metadata exchanges between research information systems is the mapping of different data models between each other to have correct attributes in both formats. Not only is this intensive in the first phase of implementing integrations, it also requires a lot of work to keep the mapping up-to-date with changes to either of the systems. By utilizing the Data Vocabularies tool, different data models can be described with semantic relations assigned to each class, attribute and association in multiple data models. This greatly helps with the mapping phase and further maintenance of the interoperability between data models and thus various systems in research domain.

Vocabulary tool provides makes vocabularies approachable for all users and makes classes, attributes and associations between different elements visible and understandable. In addition to these basic functions, it also provides quick overviews on if there are shared attributes between various systems, multilingual support and export functions for various outputs.

For research information systems it could provide a basis to share common vocabulary on elements such as editors or classifications which are highly inconsistent between systems.

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Figure 1: Information about Publication class as part of the Finnish Research Information Hub data model. In addition shape information, it also provides information on the attributes and associations (Identifier and Type) of Publication class.

## Common terminology and reference data

By utilizing the Terminologies and Reference Data tools, the interoperability could even further be enhanced. The first allows for cooperation on the terminology by e.g. on defining and suggesting concepts, having the terminology commented on via visualized relationships and in maintaining the terminology. This is especially important for classifications of research outputs, where there should be common grounds on which the outputs are reported or collected to different systems.

Via Reference Data tool it is also possible to publish different classifications and code lists related to data model, e.g. publication types could be maintained and precisely documented. These could then be connected to the proper data model in data vocabulary, and exported in various formats to other stakeholders as well. This even more standardizes the semantic content of databases and makes them more easily approachable via visualization.