RIS Synergy Project Consortium
ris-synergy@tuwien.ac.at

Implementing CRIS Interfaces with RIS Synergy: Challenges and Opportunities of a Multidisciplinary Bottom-Up Approach

This paper analyses how RIS Synergy, a digitisation project aiming to synergise CRIS across the Austrian research landscape, will meet this goal by building open, standardised interfaces and by laying the groundwork for a national research portal as a collaborative bottom-up initiative. As such, the project strongly reflects change management as a key theme throughout various aspects, such as the organisation and decision-making processes of a multidisciplinary consortium and the systems architecture. The following abstract provides an overview of the project along with key insights and findings that render RIS Synergy's bottom-up approach an effective method to manage system interoperability and information exchange between different research institutions and funders.

Introduction: RIS Synergy and the Austrian Research Landscape

Austria has a diverse research landscape, owing to the independence of universities as legal entities since 2002. In addition to 22 public universities, a large proportion of research is done by Universities of Applied Sciences, private universities, research institutes, and companies. Meanwhile, publicly financed funds are distributed through various funding institutions supported by the federal government. Due to this diversity, institutional workflows and CRIS are not interoperable, neither between research institutions themselves, nor between funding organisations and research institutions. Building on existing inter-institutional bottom-up initiatives, such as the Austrian FIS/CRIS Network, the project RIS Synergy establishes a new form of collaboration between research institutions and funders. The project seeks to consolidate standardised metadata across diverse CRIS at universities and funding organisations, for instance by deploying the once-only principle, while honouring the status quo of diverse and decentralised systems.

RIS Synergy was launched at TU Wien in March 2020 as part of the Research Data Cluster, which brings together digitisation projects across the project lifecycle. The project is financed by the Federal Ministry of Education, Science and Research (BMBWF) after a successful application to the call for tender "Digital Transformation in Higher Education". As of now, 12 universities and 3 funding organisations from all over Austria are project partners. The TU Wien is the project lead and is responsible for reporting progress to the ministry and the overall project management . Every project partner nominates a project leader who is the key contact regarding project issues for their institution, and who reports to the overall project lead at TU Wien. While the project is financed by the Federal Ministry of Education, Science and Research, each project partner contributes additional in-kind personnel resources.

The project pursues various objectives. Most importantly, it seeks to optimise administrative support for research projects; increase data quality and transparency for research institutions, funding

organisations and public bodies; and raise the international visibility of Austrian research. Subproject 1 of RIS Synergy deals with defining and establishing technical interfaces for exchanging relevant metadata of the research process between universities and funding organisations. The open, standardised interfaces and machine-readable content created in the project will be open source and available for reutilisation. These solutions also contribute to the concept for a national research portal, for which RIS Synergy will lay the groundwork. Subproject 2, then, conducts a concept study defining the framework conditions, requirements and functionalities of a national research portal for Austria, which could serve as a database for innovation research and system evaluation.

In terms of collaboration, RIS Synergy is also embedded in the "Research Data" digitisation cluster together with two other digitisation projects in the higher education and research sectors. The cluster is an opportunity to use synergies and network with the other projects, as all projects in the cluster share work results and build on each other's work packages.

Insights and Findings: RIS Synergy and the Challenges and Opportunities of a Bottom-Up Approach

Whereas previous initiatives with similar goals were devised top-down by university administrations or federal ministries, RIS Synergy utilises a solution-oriented bottom-up approach, thus providing self-acting change management that is largely motivated by internal factors. To this end, collaboration takes place primarily among mid-level management departments, which are involved in the day-to-day operations of CRIS and repositories, and therefore have a better understanding of the tasks at hand. RIS Synergy initiates a process of change that was generated by the needs and requirements of the service units themselves - a classic bottom-up approach where the participating institutions can first voice their needs and then work together in order to implement joint solutions.

This approach is the foundation for all aspects of conducting the project, from the general decision-making processes and project management to the actual implementation of open-source products. In an international comparison, similar projects aiming to build inter-institutional research portals are usually organised top-down. Most of the portals are operated by governmental departments and institutions or the country's largest funding body. However, there are portals that have a similar organisation of project management, such as the Catalan Research Portal (PRC), which is operated by a consortium of universities, thus serving as an ongoing example for RIS Synergy's concept study for an Austrian research portal.

In the RIS Synergy consortium, the participating institutions jointly develop products and solutions within the framework of the project. Decision-making is a shared process from the beginning to the end, and has a ripple effect into the participating institutions, meaning that the implementation of these solutions is facultative and optional: Each institution can implement the changes in their in-house CRIS as they see fit, but they have to approve the general setting.

Various working groups have been formed to implement different work packages, with their topics reflecting the corresponding interface that the group aims to implement as part of RIS Synergy's

objectives. The working groups consist of team members of all participating project partners and can draw on multidisciplinary expertise from across different departments and academic backgrounds.

To come to decisions in a project that involves this many diverse project partners, the project management team established a weighted decision-making process. Two thirds (10) of the project partners being present constitutes a quorum. Resolutions are then approved by a simple majority. The weight of votes for general decisions relates to the commitment of the project partners, i.e. the received grant funds and in-kind commitments. This system ensures that the major partners can realise essential interests, but that smaller partners together have a chance for a veto or can carry through specific needs or requirements.

To successfully carry out a project in a consortium, it is paramount to define a common understanding of key aspects such as terminology, organisational structures, or the different CRIS systems and their requirements. For this purpose, the team first analysed the research information landscapes of all project partners, and discussed common denominators as well as differences. For instance, one of the first objectives to meet was to find a shared understanding of the project life cycle across partner institutions. To achieve this, the project team modelled a meta process that depicts a research project's full workflow. Based on this, the team then wrote use cases to describe the exchange of data between the CRIS of funding organisations and universities. As a next step, the working groups then refined these use cases to describe in more detail the exchange of funding programs, financial data, project data, project output, and organisational data. While requirements were being defined, a project-wide glossary and vocabulary were set up to provide a classification scheme to document a shared understanding of key terms and processes. All project partners bring with them their own unique perspectives and motivations for contributing to this digitisation project. As interests and needs vary between organisations, finding a common ground is both a major challenge and a major opportunity in RIS Synergy.

One of the ways in which the project meets the institutions' system setups is by means of standardisation: The interfaces developed by RIS Synergy conform to the Common European Research Information Format (CERIF) and the OpenAIRE Guidelines. Since research institutions and funding organisations use different data management systems - some are third-party products such as PURE, whereas others are built in-house - one of the challenges in RIS Synergy is to synchronise these systems, and using an international open standard such as CERIF is the ideal way to do so. The interfaces are not based on the data model of one specific data management system; this means that the individual requirements of the project partners can be considered while maintaining the clear structure that is provided by CERIF. The decision to develop data interfaces based on CERIF XML was coordinated by the whole project consortium, which again aligns with RIS Synergy's bottom-up approach and moreover ensures a long-term commitment from all project partners.

The data interfaces developed by RIS Synergy are open-source solutions, meaning that the project partners can implement the interfaces individually. Other research or funding institutions with an interest in using the interfaces can do the same. A decentralised architecture in connection with a centralised registry maintained by the Austrian Higher Education Systems Network (AHESN), where current and future partners share machine-readable descriptions and the endpoints of the specific

APIs they choose to implement, allow for jointly developed products as well as specific solutions based on each institution's individual requirements.

Outlook: RIS Synergy and Sustainable Solutions

This paper sets out to examine RIS Synergy as a collaborative, multidisciplinary digitisation project aiming to connect CRIS across a diverse research landscape on the initiative of universities and funding organisations alike. RIS Synergy offers a variety of components that comprise a toolbox for implementing change and digitisation in the research support sector: a collaborative platform; standards and interfaces; processed data; informative core messages and public outreach practices; the concept for a national research portal; and an invitation to redirect energies and resources in research support services.

It has been shown that the solutions suggested by RIS Synergy result from a user-oriented bottom-up approach that considers the universities' and funders' individual systems on both a technical and an organisational level. In other words: All participating institutions come together to develop solutions that address the needs and requirements identified by the mid-level service units directly involved with operating their institutional research information systems. What is more, the project's integration of standardised and open-source infrastructures, such as CERIF, OpenAIRE and various persistent identifiers, ensures the sustainable handling and reusability of RIS Synergy's interfaces and the independence and continuance of various national CRIS systems. Studying the RIS Synergy approach to project management and implementation is therefore of interest to current or future initiatives with a similar goal of putting system interoperability into practice.