

Report:

CRISCROS: euroCRIS Working Group on National/Regional Research Portals

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Abstract

This paper introduces the CRISCROS project, an international working group that explores the topic of national and regional research portals. CRISCROS brings together various initiatives to collaborate and discuss best practices. Moreover, the members are particularly interested in highlighting the challenges of managing research information on a large scale (national, regional, consortial). In this paper, we present how the working group offers both experienced and new projects a platform for accessible and engaging exchange. Furthermore, we offer insight into CRISCROS' goals and topics and provide a summary of our findings.

Introduction

This document is a result of the collaboration in the international working group CRISCROS. CRISCROS deals with the topic of national and regional research portals. For over two years, the working group members exchanged their experiences in online and face-to-face workshops and discussed best practices as well as challenges. The purpose of this report is to present the results of the working group and, furthermore, to provide those interested in the topic of national and regional research portals with an introduction to this subject.

The CRISCROS origin story starts with an event that the Austrian project RIS Synergy¹ and the international not-for-profit organisation euroCRIS² organised at the CRIS2022 conference in Dubrovnik, Croatia, in May 2022.

RIS Synergy, an Austrian project of 14 universities and three funding organisations, carries out a concept study for a national research portal. As part of the concept study, the project conducted research on 26 national and regional research portals to obtain an overview of the possibilities of implementing an Austrian research portal. This analysis, along with examining presentations and papers, still left questions unanswered. Therefore, the project team initiated a workshop on this topic at the CRIS2022 conference.

Panellists and experts from various initiatives and national or regional portals were invited to share and discuss best practices, lessons learned, challenges and opportunities, which is especially useful for a project at the very beginning of its journey, such as RIS Synergy. At first, it was not clear to the organisers that the workshop could be the beginning of a larger initiative; but when the panellists and workshop participants were asked about their ideas for the future of national and regional research portals, the answers pointed to the overall need for knowledge exchange, a community, and a platform to learn and share - leading to the formation of this working group on national and regional research portals.³

At the euroCRIS Strategic Membership Meeting in Nijmegen in November 2022, the RIS Synergy team introduced the idea of such a working group to euroCRIS members and representatives of national or regional portals. The participants then had the opportunity to exchange ideas and, together, brainstorm topics relevant to the working group.

CRISCROS has been holding quarterly meetings since February 2023. In addition to these online meetings, the group hosted workshops and regular presentations at euroCRIS membership meetings and conferences. Each meeting was preceded by a call for contributions on specific topics, inviting all working group participants to share their knowledge and contribute to the discussion. Alongside the meetings, CRISCROS uses a cloud-based storage service and a mailing list to facilitate online collaboration. The storage contains information on how to use the collaboration space, a code of conduct, collections of ideas and topics for the working group, along with meeting minutes, presentations and

¹ <https://forschungsdaten.at/ris/> (13/02/2025)

² <https://eurocris.org/> (13/02/2025)

³ Neff et al. (2022). Workshop: National Research Portal 101: The Dos and Don'ts of Building a Sustainable Portal. *Procedia Computer Science* 11, p. 126-133.
<https://doi.org/10.1016/j.procs.2022.10.184>.

accompanying material. The organisational team also created a meet-and-greet document to give participants the opportunity to introduce themselves to the group.

CRISCROS in the context of euroCRIS

Providing a platform for networking is an essential goal of the working group. It became clear, both at the CRIS2022 conference in Dubrovnik and at the Strategic Membership Meeting in Nijmegen, that the community is eager to connect and establish points of contact with other initiatives across the globe. From the beginning, one major goal was the creation of an information hub as well as a deliverable in the form of guidelines or best practices for new projects.

Without a doubt, euroCRIS, the international organisation for research information, is the best environment for a working group that explores national and regional research portals. Since its beginnings, one of euroCRIS' core tasks has been to promote communication within the research information management community, which is reflected in the bi-annual membership meetings and the euroCRIS conference organised every two years. Furthermore, throughout the over 20-year history of the organisation, euroCRIS Task Forces have tackled specific topics such as the development of the CERIF standard.

Nevertheless, setting up the CRISCROS working group was a novelty and also a challenge since the requirements of the working group go beyond the previous euroCRIS exchange formats. Fortunately, CRISCROS was able to gain a foothold right from the start with the support of euroCRIS. Members found their way into the working group via euroCRIS membership meetings, conferences, the newsletter, or existing networks. CRISCROS meetings take place online and in regular intervals so that members from all over the world can take part and easily integrate the meeting into their everyday duties. In addition to input in the form of presentations, each meeting offers space for an informal discussion in small groups and in plenary sessions, so CRISCROS members can address current questions and needs.

Organising online collaboration of a constantly growing group demands a great deal of commitment and planning from the RIS Synergy team. At the same time, this type of collaboration has an immediate impact: After two years of exchange, the community of professionals interested in the topic of national and regional research portals is well acquainted and connected with each other, and CRISCROS has made a name for itself internationally as an established and highly productive platform.

Whilst CRISCROS focuses on national/regional research portals, the topic naturally covers all the key areas that euroCRIS has been dealing with for years. In most cases, a research portal is based on several or one research information system (CRIS) that collects, processes, enriches and evaluates research information in a standardised way. CRISCROS therefore not only focuses on the external presentation of research information in a portal (or 'hub' or 'space'), but also on data processing and research evaluation. In their day-to-day work, CRISCROS members often have to deal not only with research portals at national and regional level, but also - like most euroCRIS members - with "general" CRIS topics at institutional level.

The success of CRISCROS is the success of the euroCRIS community and a roadmap for the future to explore new and timely ways of collaboration within the euroCRIS community.

CRISCROS members

CRISCROS started (at that time not yet a working group) with the workshop on national and regional research portals at the CRIS2022 conference with representatives of established portals: Finnish Research Hub Research.fi⁴, Flanders Research Information Space (FRIS)⁵, Croatian Research Information System (CroRIS)⁶, Norwegian National Repository and Research Information System (NVA)⁷ and CRIS⁸, the Catalan Research Portal (PRC)⁹ and the RIS Synergy project.

After the workshop, further national and regional systems were identified and recruited with the help of the Directory of Research Information Systems (DRIS). The working group grew to include several euroCRIS Board members as well as other well-known initiatives such as the Czech Information System IS VaVal¹⁰, the national systems of the COBISS network such as E-CRIS.al and SICRIS¹¹, the Slovakian SKCRIS¹², the Estonian ETIS¹³, the Italian portal UnityFVG¹⁴ and the Portuguese system PTCRIS¹⁵.

Over the two years, several projects in the CRISCROS network have successfully launched their portals, such as CRISrael¹⁶, the Polish system Ludzie Nauki¹⁷, the Spanish initiative Dialnet CRIS¹⁸ (incorporating the Hércules Project), the Serbian eNauka¹⁹, the Brazilian BrCRIS²⁰, Research Portal Denmark²¹, the Ukrainian research information system (URIS/NAUKA)²² and the Icelandic research portal IRIS²³. CRISCROS members reported on releases and further developments of their portals at meetings or via the mailing list and were also able to request feedback from the community if required.

⁴ <https://research.fi/en/> (13/02/2025)

⁵ <https://researchportal.be/en> (13/02/2025)

⁶ <https://www.croris.hr/?lang=en> (13/02/2025)

⁷ <https://nva.sikt.no/> (13/02/2025)

⁸ <https://www.cristin.no/english/> (13/02/2025)

⁹ <https://portalrecerca.csuc.cat/?locale=en> (13/02/2025)

¹⁰ <https://www.isvavai.cz/> (13/02/2025)

¹¹ <https://www.cobiss.net/> (13/02/2025)

¹² <https://www.skcris.sk/en/> (13/02/2025)

¹³ <https://www.etis.ee/> (13/02/2025)

¹⁴ <https://ricerca.unityfvg.it/home> (13/02/2025)

¹⁵ <https://ptcris.pt/> (13/02/2025)

¹⁶ <https://cris.iucc.ac.il/> (13/02/2025)

¹⁷ <https://ludzie.nauka.gov.pl/ln/home> (13/02/2025)

¹⁸ <https://fundaciondialnet.unirioja.es/servicios/dialnet-cris/> (13/02/2025)

¹⁹ <https://enauka.gov.rs/> (13/02/2025)

²⁰ <https://brcris.ibict.br/en> (13/02/2025)

²¹ <https://forskningsportal.dk/> (13/02/2025)

²² <https://nauka.gov.ua/en/> (13/02/2025)

²³ <https://iris.ra.is/en/> (13/02/2025)

Last but not least, the CRISCROS community also welcomes projects and initiatives that, like the coordinators from the RIS Synergy project, do not (yet) operate a national or regional portal or CRIS themselves but make a significant contribution to the topic through their work. These include CRIS.NRW²⁴ from Germany, the New Zealand NZRIS²⁵, the initiative “Strengthening CRIS” of the Leibniz Association²⁶, the non-profit member organisation Lyrasis²⁷, the PID Network Germany²⁸, the Danish Association of Research Managers and Administrators (DARMA)²⁹ and, of course, euroCRIS.

CRISCROS brings together 65 people from 37 initiatives and 26 countries. The projects and portals are primarily centered in Europe, but the working group pursues an inclusive approach and already registers a few projects outside Europe including representatives from Brazil and New Zealand.

CRISCROS goals

From the start, the working group's agenda was a participatory process. The first meeting served to define the members' expectations and objectives, using the following questions as a discussion guide:

- What are your expectations of the group for your own initiative?
- How will you benefit from this group?
- What are the most important topics you hope to discuss in the group?
- What can you bring into this group?
- What are your non-goals for this working group?

One of the most frequently mentioned points was the participants' expectation to use the working group as a platform to learn from each other in the form of best practices as well as learning from the mistakes of others. The working group aims to foster this sense of networking by connecting representatives from different initiatives with each other.

Other key phrases dominating the discussion were “sharing experiences” and “reusing experiences”. Participants were also keen on meeting with “real” people who share similar agendas in their daily work and to receive feedback from other experts. The intimate setting of the working group and the use of a restricted collaboration space allows participants to share individual requirement specifications and other materials pertaining to building national/regional research portals.

Participants also brainstormed non-goals for the working group. One of the key findings supports the idea that the working group's focus is on collaboration and there should be no space for competition. Although some portal providers use, or plan to use, commercial software solutions from third-party vendors, representatives of these companies should not

²⁴ <https://www.uni-muenster.de/CRIS.NRW/> (13/02/2025)

²⁵ <https://www.mbie.govt.nz/science-and-technology/science-and-innovation/research-and-data/nzris> (13/02/2025)

²⁶ <https://ida-wiki.leibniz-gemeinschaft.de/die-initiative-strkung-von-cris> (13/02/2025)

²⁷ <https://lyrasis.org/> (13/02/2025)

²⁸ <https://www.pid-network.de/en/> (13/02/2025)

²⁹ <https://darma.dk/> (13/02/2025)

be invited to join the conversation since they are already present at euroCRIS events. Nonetheless, working group participants are invited to talk about their experiences with different software solutions in working group meetings. The working group can thus serve as a neutral space inviting open discussion in the absence of third-party vendors.

The most important topics participants named were persistent identifiers (PIDs), system solutions, interoperability and CERIF. In the case of the latter, the working group is mindful of the fact that CERIF is already discussed in other euroCRIS task forces and activities, which the working group does not intend to replace. CERIF should thus not take up too much space in the CRISCROS working group.

Lastly, the question about how to measure or evaluate the impact of a national research portal was raised, since the different initiatives in the working group all bring different views on the use, goals and target groups of a national/regional portal into the discussion.

The collection of key findings also included a preview of the next steps for the working group: The participants indicated a desire to examine the ecosystem of research information at a global level, and to potentially invite new members from different regions (e.g., South America) so as to avoid a Eurocentric participant list. The working group's deliverable should include an open science agenda and a set of best practices. Participants also suggested that the working group could be an opportunity to think ahead and collect prerequisites and parameters for an international CRIS.

CRISCROS topics

Following the discussion of the working group's objectives, the working group defined and prioritised the topics for the working group meetings. The first two topics, lessons learned from successful and failed projects, and persistent identifiers, came up several times at the kick-off and were therefore prioritised. With the third topic, advanced functionalities, the working group addressed a very current issue, namely the use of AI in the context of research information management. The RIS Synergy team identified the fourth topic, use cases, addressing the added value of a national portal compared to individual institutional CRIS in the RIS Synergy concept study. Finally, based on the discussion of the topic of use cases, the working group looked at the reporting features of national and regional portals.

The following chapter summarises the CRISCROS meetings on the individual topics and provides key takeaways.

Lessons learned

At the plenary discussion of the CRISCROS kickoff meeting, the breakout groups reported that among other things in this working group they would like to:

- learn from each other and from best practices
- examine the dos and don'ts
- learn from the mistakes of each other and others

- use this working group as a platform for sharing information that is usually not shared at events such as conferences

These expectations were met with two presentations on lessons learned in the context of national and international research portals. First, a representative of an unsuccessful project reported their experiences before another working group member shared insights into a successful ongoing research portal. The following breakout session was designed to encourage the participants to share similar experiences or other lessons learned.

Michele Mennielli (Lyrasis) and Joonas Nikkanen (CSC - IT Center for Science) presented lessons learned from two different projects: The SELRIM (South European Link for Research Information Management) project, which ran from 2015 to 2016, and the implementation of Research.fi, which was launched in 2021.

Lessons learned from the SELRIM project³⁰

The SELRIM project was launched by Cineca (Italy), CSUC (Catalonia), EKT (Greece) and FCT/FCCN (Portugal) in November 2015 to share views on the development of Research Information Management Systems (RIMS) in their respective countries. The main focus of the project was on collaboration, CERIF, open source technologies and standards, and on how to identify differences and commonalities.

The unique selling point of the project was that it required each project partner to contribute specific knowledge on a topic and offer it to the others. At the same time, each project partner expressed an interest in the experiences of the other partners, including topics they themselves were not yet familiar with.

Although the SELRIM project did not last for as long as the project partners had initially hoped for - due to a lack of resources and changed priorities - the partners were able to benefit from the cooperation, especially by exchanging specific knowledge on the topics of CERIF, ORCID and DSpace-CRIS. Additionally, the experiences from the SELRIM project are important lessons learned for the members of the CRISCROS Working Group.

Takeaways identified by the working group concerned:

- the challenge of setting common goals
- the advantage of identifying the individual goals and contributions of each project partner
- the lack of funding for project management
- the lack of formalised collaboration supported by leadership at the organisational or national level

Lessons learned from Research.fi³¹

The National Research Information Hub project is led by CSC - IT Center for Science aimed to implement the Finnish national CRIS Research.fi. It was launched in 2017 and financed

³⁰ Mennielli, M. (2023). Cross-Country Collaboration: The SELRIM Experience. Slides. <http://hdl.handle.net/11366/2695>

³¹ Nikkanen, J. (2023). Research.fi and the lessons learned so far. Slides. <http://hdl.handle.net/11366/2694>

by the Ministry of Education and Culture of Finland. Research.fi went live in 2021 and currently presents data on Finnish research publications, funding decisions/grants, funding calls, research data, research infrastructures, research news and researchers. Parts of the portal are still in development and constantly updated. The national CRIS serves four different but connected goals:

- to describe the Finnish research ecosystem and act as an information base for science policy
- to help find Finnish research and researchers
- to support the reuse of existing research information in other services and systems
- to support the merit of researchers and increase the visibility of their research output and activities.

These goals correspond with the common topics identified by and discussed in the CRISCROS working group. They describe the added value of national and regional research portals as a complementary extension of institutional research information systems. Research.fi is one of the showcases for current national research portals, especially as the portal operators transparently communicate information about implementation and operation. The lessons learned from the initiative are important guidelines for other CRISCROS members, in particular those who are at the beginning of implementation:

1. “Cooperation is key”: Research.fi relies on a clearly structured project team as well as new and established working groups.
2. “Keep current processes running”: Existing workflows at partner institutions should not be neglected, but instead further improved. The additional work that this entails for the institutions must be considered from the very beginning.
3. “Sustainability and longevity matter”: Initial goals continuously generate new goals, which is why strategic prioritisation and project management remain relevant even during regular operation and after the initial goals have been achieved.

Key takeaways

CRISCROS members discussed the topic in breakout sessions and shared their findings with participants in the plenary discussion using the following questions as a discussion guide:

1. Which lessons learned do you share with the projects presented today? What did you take away from this experience?
2. What are additional lessons learned that you want to share with the group?

They identified the most important points from the presented projects and additionally named lessons learned from the experience gained in their own projects:

- **Define clear and limited goals** and prioritise: Say “no” to certain things and have at least one tangible output goal.
- **Cooperation is key:** National, regional and international systems are dependent on various and often heterogeneous underlying systems, workflows and institutions. The quality of the product relies very much on the cooperation of all stakeholders.
- **Streamline models and systems:** Despite international standards, systems are usually not fully compatible. Mappings and adaptations are time-consuming procedures.

- **Structure:** Formalised structures and leadership are necessary to launch projects that build on voluntary partnerships and a bottom-up approach as sustainable products. This also requires top-down support from organisations such as the responsible ministry.
- **Documentation is key:** An implementation project is usually a long and tedious process, which is why decisions, workflows and technical details must be documented consistently.
- **Use Persistent Identifiers:** They eliminate the process of manual data input - which is time-consuming and susceptible to errors - as much as possible.
- **Prepare for the production phase:** In particular the launch of a new system requires more resources.
- **Be prepared for success!**

Persistent identifiers

Persistent identifiers are not only a core component of open science,³² they are also an excellent tool to identify and deduplicate different types of data. National and regional research portals usually rely on different, independent data sources and it is a strenuous task to consolidate the data for the benefit of the central portal.

Persistent identifiers are of particular interest for the RIS Synergy project and are also a regular topic at euroCRIS events. Moreover, the participants of the CRISCROS meeting on “Lessons learned” identified PIDs as an important issue for the implementation of national/regional research portals, which is why the topic received the necessary attention in the working group.

PIDs for regional and national CRIS

euroCRIS secretary Pablo de Castro (University of Strathclyde) kicked things off with a presentation on “The role of national and regional CRIS in the implementation of PIDs”³³. Drawing upon his input, the participants then discussed several questions relating to their experiences from their work with PIDs.

In his presentation, Pablo de Castro highlighted the relevant role that CRIS systems – specifically those on a national or regional level – are expected to play in the adoption and implementation of persistent identifiers.

The report “Building the plane as we fly it: the Promise of Persistent Identifiers”³⁴ and several case studies were presented, which provide recommendations and operational pathways and uncover the challenges of the international PID infrastructure.

³² <https://www.project-freya.eu/> (13/02/2025)

³³ De Castro, P. (2023). The role of national and regional CRIS in the implementation of PIDs. Slides. <http://hdl.handle.net/11366/2485>

³⁴ De Castro et al. (2023). Building the plane as we fly it: the promise of Persistent Identifiers. <https://doi.org/10.5281/zenodo.7258286>

Furthermore, four case studies were presented in more detail: DAI Netherlands³⁵, NVA organisation IDs³⁶, PT-CRIS SciPROJ funding IDs³⁷, FRIS metadata model³⁸. All of them are examples of national/regional CRIS that have adopted, registered or implemented PIDs at an inter-institutional level.

Another point that was stressed in the presentation was the question of maturity of different PIDs. As identifiers are needed for CRIS systems, implementation projects often use internal IDs for various entities to adequately depict institutional/national workflows and data standards. They later move on to the adoption of “international PIDs” once the standard is mature, thereby replacing or enriching internal IDs. This, of course, raises the question of how long it takes for a “new” PID to consolidate and to be ready to be used, e.g., ORCID ID being a PID with high maturity vs. RAiD being a PID with low maturity.

The presentation shed light on the issues of a currently rather fragmented PID landscape, with the example of two commonly used organisational identifiers, ROR ID and Ringgold ID. The successful dissemination of a specific PID is mostly dependent on the community using it, although this community is rather heterogeneous including stakeholders such as governing bodies, research institutions, researchers and PID service providers. Moreover, different institutional requirements for the use of PIDs and the variations in international comparison are not to be overlooked. The use of PIDs varies greatly by country; the presentation mentioned Finland as a best practice example.

The presentation’s conclusion and outlook emphasised the importance and potential of CRIS operators collaborating with international initiatives such as the Research Data Alliance and EOSC.

Persistent identifiers most commonly used, use cases and lessons learned

CRISCROS members discussed the topic in breakout sessions and shared their findings with participants in the plenary discussion using the following questions as a discussion guide:

1. Which persistent identifiers do you employ within your CRIS/portal and what specific use cases related to PIDs are you implementing?
2. Which topics can we collaborate on in the working group to enhance the utilisation of persistent identifiers?
3. What challenges related to the implementation of PIDs are you encountering that you would like to discuss in the working group?

The PID most mentioned and most used by the participating institutions is ORCID, followed by DOI. Many are familiar with the discussion whether ORCID is mandatory or just recommended, and what implications this has on data quality and workflows of (national/regional) CRIS.

³⁵ <https://www.wikidata.org/wiki/Q2320521> (13/02/2025)

³⁶ <https://www.wikidata.org/wiki/Property:P2333> (13/02/2025)

³⁷ <https://ptcris.pt/financiamento-registo-nacional-de-financiamento-de-ct/> (13/02/2025)

³⁸ De Bal et al. (2021): Research infrastructures: metadata model & data capturing in FRIS. Slides. <http://hdl.handle.net/11366/1867>

Participants also discussed the implementation of “national PIDs” instead of using PIDs provided by international consortia such as ORCID, DOI or ROR. One solution mentioned in this context is the use of the handle system to manage “in-house” PIDs. Portugal, for example, has its own national PIDs for researchers and researchers’ CVs (also linked to other PIDs) that Brazil plans to adopt in the future. Norway implements its own national solution for organisational IDs and metadata.

The use cases are often similar. Iceland, Spain and Austria, for example, all share a use case: the import of publications from databases via DOI. And in the case of grant IDs, it has become apparent in Austria that funding agencies are (planning on) using CrossRef Grant IDs (DOIs).

Important lessons learned from this working group meeting include:

- The technical implementation of “mature” PIDs, such as ORCID and DOIs, is (mostly) perceived as easy.
- It is better to use an already well maintained PID because maintaining your own IDs costs a lot of time and money.
- Synchronising ORCID and research information systems is perceived as practical.

Challenges and topics to collaborate on in the working group

The discussion showed that there are some common challenges and issues regarding persistent identifiers among the working group participants, and that there is a desire to continue working on these topics.

Participants report difficulties they have encountered in their countries or with their systems, such as the challenge of sustainable stakeholder management. Universities and administrative staff are usually quite involved in the topic of PIDs and the development of services at their organisation. Researchers often tend to be sceptical, for instance when it comes to registering for an ORCID ID. This makes it even more important to share best practices on stakeholder management including successful communication measures for different stakeholders who have specific needs concerning PIDs.

One of the main topics was the use of organisation IDs. Most participants want to move away from the Ringgold ID, since it is a commercial identifier, but they encounter problems using the open standard ROR identifier. The ROR data model does not provide IDs for the whole organisational structure of an organisation but only for the top-level entity. One suggestion was to use WikiData to provide identifiers for organisations but so far, there are no case studies using WikiData IDs among working group participants.

Another identifier that the working group participants are looking at is the RAiD ID for research projects. There are no case studies on the successful implementation of the identifier yet, also because the RAiD data model is not mature enough. The Crossref Grant ID (DOI) also depicts research projects and is not yet used across the board. One suggestion was the use of OpenAIRE services to potentially import grant IDs automatically.

Participants also noted that there is currently no persistent identifier for funding calls and programmes, but that the need for one exists for some initiatives.

Next steps: CRISCROS and persistent identifiers

The discussion among working group participants has shown that while there is a need to further collaborate on this topic and to exchange best practices as well as challenges regarding PIDs, there also is a need to break down the topic and look at identifiers and use cases individually.

The network of various initiatives in the context of national and regional portals that CRISCROS has established is the best starting point for in-depth discussions and hands-on collaboration between individual projects that want to implement a specific PID use case.

Advanced functionalities

The numerous high profile launches of various AI tools have also influenced the discourse within the CRIS community. The CRISCROS working group therefore addressed the timely topic in a session on “advanced functionalities” of national/regional research information systems. The topic of the session was intentionally defined very broadly in order to give the participants of the working group the opportunity and space to express how advanced functionalities such as AI-tools impacts their work.

Since many participants in the working group are experts in regional/national CRIS, but not experts in machine learning, it was important to first broaden the participants’ understanding of the topic with an expert presentation³⁹ before switching to a general discussion.

António Luís Lopes' (ISCTE - University Institute of Lisbon) presentation linked another current topic of the CRISCROS community - the implementation of the Sustainable Development Goals (SDGs) of the United Nations as a keyword group for research information - with the topic of machine learning and was therefore an ideal introduction to the field of “Advanced functionalities” for the target audience.

SDGs and the use of machine learning for classifying research outputs

In his presentation, António Lopes took stock of the methodologies that have been applied to the assessment of research outputs as they relate to the SDGs in the institutional CRIS, Ciência-IUL⁴⁰, at the ISCTE.

The presentation and following Q&A shed light on how machine learning (ML) and large language models (LLMs) can be used to classify and categorise research output and projects. For example, at ISCTE, research groups are classified in different ways:

- customised Fields of Science and Technology (FOS)
- Web of Science citation reports
- research areas to identify specialists

³⁹ Lopes et al. (2023): A machine-learning approach for a CRIS research outputs’ SDG classifications. Slides. <http://hdl.handle.net/11366/2502>

⁴⁰ <https://ciencia.iscte-iul.pt/> (13/02/2025)

In addition to those classifications, by implementing a machine learning approach, the project at ISCTE was able to add SDGs as an additional keyword group to classify research output and projects⁴¹.

Researchers can add SDGs to their data in the CRIS manually. To facilitate this administrative burden, the system automatically suggests suitable SDGs that researchers can accept or reject. To make this possible, in 2021 machine learning algorithms were trained with already classified data. The model was then implemented in the CRIS and researchers have been able to use the automatic suggestions since 2022.

The presented use case of ISCTE served as an inspiring example for CRIS managers who are planning to implement advanced functionalities for their CRIS. Especially for the management of national/regional CRIS, the use of innovative technologies is essential, as the enormous amounts of data in these systems cannot be maintained and enriched manually.

The use of AI tools in the CRISCROS context

As stated above, no use cases comparable to the example of the ISCTE are currently in place in the CRISCROS community, which is why it was important to open up space for new ideas and possibilities. Following the presentation, an in-depth discussion on the topic of SDGs aimed to assess the status quo of the institutions represented in the working group.

CRISCROS members discussed the topics in breakout sessions and shared their findings with participants in the plenary discussion using the following questions as a discussion guide:

1. What are the most pressing limitations, challenges, and bottlenecks you currently face with your CRIS or your national/regional research portal? How do these impact your work or research outcomes?
2. In envisioning the CRIS systems or national/regional research portals 10 years from now, what advanced functionalities and features should it include to enhance user experience, data quality, and integration?
3. What does the discussion on using SDGs in your (national/regional) CRIS regarding evaluation processes look like?

The working group members have defined various use cases for how existing services can be improved and new services can be defined through the use of AI tools. In doing so, they have focussed on challenges and needs for which there are currently no efficient answers.

One point that has come up is the way we communicate with society or with specific users. When operators of the national or regional research portals try to address the general public with their service, the content might be too complex to navigate, because research information systems tend to be quite “technical”.

⁴¹ <https://ciencia.iscte-iul.pt/sustainable-development-goals> (13/02/2025)

New approaches, e.g. LLMs can be used to make research information more readable and accessible to the public, since they are designed to work with different levels of text and are able to translate text. Implementing features that allow prompts such as “explain it to me like explaining it to a 10-year old” can be used to reach out to the general public and showcase the societal value of research.

The automatic interpretation of text (titles, abstracts, etc.) in research systems can also generate additional benefits for researchers themselves by enabling them to find collaboration partners through a topic or keyword search.

Another point that has come up in the discussion is the fact that we collect enormous amounts of data and text in research information systems and do not fully utilise the potential of this information. AI tools can potentially be used to analyse and predict trending or relevant research topics so that decision makers can better allocate research funding. However, stakeholders should always question automatically generated reports - especially in the context of the distribution of funding - and assess potential risks accordingly.

In envisioning the CRIS of the future, working group members identified several use cases to enhance user experience and data quality utilising advanced functionalities. At present, it is often an administrative challenge for users to navigate research information systems while entering and sharing data. They often have to use different systems for publication and reporting workflows and enter the same data multiple times. Automated processes can make it easier and faster for users to work with the system. Another issue is data quality management, which is usually the responsibility of the system operators. In an ideal future, content or technical validation checks should also be facilitated or even completely performed by AI models.

With an optimistic outlook, the participants defined potential use cases, while also addressing the risks and challenges of new, highly complex technical applications. Some questions remained unanswered in the discussion and will accompany the euroCRIS community on the road ahead:

- How can we validate the output that LLMs create? How do we find out where predictions are wrong?
- Who is qualified to engineer the right prompt to get the right answer?
- How will the information we gain from using AI influence policy making/strategies?
- What measures are necessary to ensure security and transparency?

The added value of SDGs in research information systems

Finally, the discussion explored the topic of SDGs, leading to the discovery that at this point, none of the represented initiatives prioritise the extensive implementation of the keyword group in their systems.

In general, participants reported uncertainty regarding the use of SDGs in evaluation processes. SDGs are considered nice-to-haves but they are not always implemented on the national or regional level the way they are on the European level (e.g. SDGs are available in OpenAIRE).

Some institutions use SDGs for showcasing purposes (e.g. in a dashboard or in researcher's profiles) but currently there are no examples of systems implementing mandatory classification of research output using SDGs. Hence, SDGs do not serve analysis and evaluation of research information.

Use cases

The RIS Synergy project as well as the concept study for an Austrian research portal are bottom up initiatives. The Austrian universities are interested in the topic of a shared platform for the otherwise independent institutions but there is currently no particular need for the implementation of a national research portal on the part of the Austrian research institutions and funding agencies in the project consortium. The project therefore used the CRISCROS platform to consult operators of established research portals to find out what the original objectives were in developing their national and regional portals.

At the round table on “Research Information on an International Level: Understanding the diverse landscape of national and regional CRIS” at the CRIS2024 conference, the experts Ils De Bal (FRIS), Dicte Madsen (Research Portal Denmark), Marika Meltsas (ETIS) and Przemysław Korytkowski (Ludzie Nauki) shared their views on the following questions:

- What is the main use case for the national/regional research portal that you represent?
- How do you measure the successful implementation of this use case?
- Who commissioned the implementation and are they also the main target audience of the research portal?

The main keywords mentioned by the experts were transparency and monitoring. Research is largely financed by public funds distributed by national or regional institutions, e.g., funding agencies. All stakeholders, such as government institutions, research institutions, researchers and the general public, have the right to trace and compare the flow of funds and budget distribution. The national and regional research portals and CRIS represented on the panel were developed in response to the desire to monitor and present research information centrally and to facilitate the comparison of the research conducted by different research institutions.

In order to fulfil this use case, a national/regional CRIS requires the appropriate data and data quality and, in addition, integrate special reporting features to enable comprehensible data analysis.

In addition to the use case of monitoring and reporting at national/regional level, research portals serve to showcase research. On the one hand, this is about research institutions demonstrating transparency, but on the other hand it is also about celebrating and communicating successes and breakthroughs in national/regional research. Research does not take place in isolation at one institution, but across institutions and national funding often serves to connect the expertise of various people in research, business and administration. National and regional research portals are therefore a suitable tool for presenting not only

individual researchers, projects or research output, but beyond that also the interconnectedness of the many different entities in the research cycle.

In the context of showcasing, there is also another use case for public portals: searching for and finding expertise. This use case can address various target groups: Researchers looking for collaboration partners, journalists looking for interview partners from a specific research area, research institutions or funding bodies looking for reviewers. The advantage of managing data centrally in a national/regional research portal is that a large amount of relevant data can be searched using only one search engine.

In the discussion, the panellists also introduced the complex use case that national/regional research portals can be used as a workflow tool. In addition to documenting data, those systems also have the task of managing the administrative tasks along the research cycle. Starting with the application and approval of grants all the way to reporting tasks. It is useful and practical for stakeholders to be required to deal with only one system instead of many different ones.

Based on the discussion of the use cases, it was particularly interesting to find out whether those who commissioned the research portals represented on the panel are also those who actually use the portal. In all four cases, the panellists confirmed that the respective ministry responsible for research had both commissioned and funded the implementation project.

In alignment with the first mentioned use case of a national/regional CRIS - centralised monitoring and reporting of research performance - the institutions who commissioned the portal also use the system for this purpose.

However, the panellists also named other target groups that were considered and included in the implementation, such as researchers, industry, policy makers, funding agencies and the general public.

Last but not least, it is interesting to find out whether the implementation of the use cases mentioned was successful and how success is measured. All panellists have emphasised that the systems must be continuously monitored even after successful implementation. This is particularly important because the requirements for research information systems frequently change or increase and therefore the systems constantly require further development.

The tools for measuring use of and satisfaction with the system are as diverse as the target groups of national and regional research portals. The panellists mentioned, for example, a national/regional advisory board, such as the research council, with representatives from different target groups who monitor the ongoing development of the portal. This board also serves to facilitate decision-making.

As both the data types and the functionalities of national/regional CRIS are complex, it is worth implementing several expert working groups that can provide feedback on individual aspects of the system. In particular, researchers and the research community are valuable consultants for the assessment and further development of research information systems.

A permanent tool to be provided by the system in any case is a helpdesk that all users can contact.

At longer intervals, portal operators should carry out qualitative studies on the use of the portal. These include usability tests, interviews and peer reviewing procedures. Furthermore, the technical data that is collected, such as web statistics, should be reviewed regularly, although these do not always contain meaningful information - at least not without also consulting qualitative studies.

In summary, the panellists characterised the methods for measuring the success of a national and regional portal as a democratic process that should be as inclusive and participatory as possible.

Reporting features

One of the most important use cases of national/regional research portals is the monitoring and evaluation of research institutions, research projects and researchers. In this context, reports may focus on different aspects such as publication strategies, open access publishing, research data management, or the identification of current research questions.

In order to pay appropriate attention to this use case, which was featured prominently in the previous expert panel discussion, we organised a dedicated session on the topic.

Presentation on Reporting Features in the CRISCROS Working Group

In their presentation, Elena Fürst (University of Vienna) and Vanessa Erat (University of Klagenfurt) provided a general overview of reporting features and showcased some national/regional portals from the working group as examples, along with impulses for the following discussion in breakout groups and the plenum.

We must differentiate between the reporting features of a national research portal and those of the national CRIS underlying the portal. Only a fraction of possible evaluation of the data is usually presented to the outside world, partly because only a fraction of the data itself is presented (for example, no sensitive data). The presentation of examples from within the working group inevitably focused on the features of the portal (not the CRIS): What is communicated externally? What figures does a country or region want to present?

Reporting features are quite common on national/regional portals because the processing and reporting of grants and output is one of the major use cases of such portals, along with providing transparency, monitoring and visible money flows. However, the way portals go about reporting are different, for example:

FRIS: FRIS provides graphs on e.g. project statistics, publication profiles and institutional specialisations.

SICRIS: SICRIS provides various statistics on different categories (researchers, projects, organisations, groups, equipment) all sorted according to scientific discipline. The same display is common for other COBISS portals as well.

Research.fi: Research.fi monitors open science and research and provides figures on science and research, including information on research funding, human resources as well as publication activities and scientific impact in Finland.

Beyond the features of the portals, however, the discussion of reporting features in the working group also highlighted reporting features and tasks of the national and regional CRIS, which follow the needs of internal reports for stakeholders.

Reporting features in the CRISCROS context

CRISCROS members discussed the topic in breakout sessions and shared their findings with participants in the plenary discussion using the following questions as a discussion guide:

1. What reporting features are provided in your national/regional CRIS?
2. Which indicators and metrics are relevant?
3. What data in your portal do you take into account for reporting statistics, and how do you analyse it?
4. How is this process organised and who issues the reports?

The participants identified the following types of reports and target groups for their respective systems:

- research evaluations for institutions or individual researchers requested by the ministry, e.g. number of citations per publication, number of research output per project
- reports based on internal indicator system regarding funding, scientific uptake or open science
- reports on research activities and topics for the general public, e.g. science news

The scope of the systems' reporting tools depends heavily on the available data and data quality. Most national and regional CRIS depict the same types of data as institutional CRIS and also enrich those data with external parameters such as bibliometric indicators or national statistics.

Reporting features usually include standardised workflows on who can request a report on what data, e.g. for decision making. In addition to that, CRIS managers use reporting features internally to monitor data quality and support researchers as well as other users.

In the discussion, the following indicators and metrics were mentioned in connection with reporting features:

- number of publications, projects, grants/awards, datasets, patents, spinoffs, DMPs, ORCID IDs
- information on users and user engagement (e.g. downloads)
- number of Open Access publications (OA monitor)
- information on use of open data
- types of research output

- bibliometric indicators (from external data sources)
- information on funding and funders
- collaboration with institutions and countries
- transformative agreements
- Sustainable Development Goals (SDGs)

The discussion also offered insights in potential future use cases and requirements regarding reporting features:

- implementation of dashboards for centralised and easy access to reports
- implementation of standardised reporting templates that can be shared with different stakeholders
- analysis of indicators to measure Open Science and FAIRness of research (e.g. F-UJI⁴²)
- analysis of how societal impact could be measured and which data and indicators should be used for this purpose

The discussion showed that the CRISCROS community benefits greatly from the exchange on the topic of reporting. It is interesting to note that although there are a few common denominators with regard to the reporting features of the various national and regional CRISs, there also exists a plurality in terms of the data types, metrics and analysis methods taken into account.

Recent developments in the context of research assessment in particular are diametrically opposed to established reporting methods (e.g., citation counts), and it is precisely at this point that CRIS managers and experts in the field of research information need to work together to explore new tools to measure success and impact of research.

CRISCROS screencast

As an additional output of the working group, the CRISCROS coordinators of the RIS Synergy team created a screencast⁴³ together with representatives of five national and regional research portals. The collection of portals shown in the screencast represents the latest developments in this sector at the time of its production. The CRISCROS organising team sent an invitation to all working group members, encouraging them to contribute to the screencast. The five portals featured in the screencast were those that had new features to showcase and wished to participate in the presentation.

The video explores current examples of how countries and regions present research information highlighting the unique character of each portal and their special features.

The goal of the five minute video is to provide concise information for people interested in the topic of national and regional research portals. The video gives an overview of use cases, functionalities and (visual) implementation of research portals and can be used as an introduction to a broad and complex subject.

⁴² <https://www.f-ujl.net/> (13/02/2025)

⁴³ https://youtu.be/K_dX9NOr6v4?feature=shared (13/02/2025)

The CRISCROS screencast showcases the colourful landscape of national and regional research portals and serves as - both - starting point and inspiration for others. The video features three national and two regional research portals:

- CroRIS
- Research.fi
- Research Portal Denmark
- FRIS
- PRC

The in-depth collaboration in CRISCROS has shown that national and regional research portals have to constantly evolve in order to meet the needs of the research community. Thus, the CRISCROS screencast is a snapshot of a specific point in time in the landscape of research portals, from which we will most likely have evolved in a very short time.

The future of CRISCROS

After more than two years of collaboration and the completion of the RIS Synergy project at the end of 2024, it was time to evaluate the CRISCROS endeavour and explore the next steps. At the beginning of 2025, a survey of CRISCROS members revealed that there is a strong desire to continue the collaboration in the working group. The survey also offered the opportunity to gather feedback that provides important input for the future of CRISCROS:

The working group is perceived as a great opportunity for CRIS managers, institutions and stakeholders to exchange views on all topics relating to national and regional research portals. The exchange of information regarding the further development of CRIS at national level as well as regarding challenges for the systems in terms of international connectivity should be continued.

Participants also provided feedback on the organisation of CRISCROS collaboration: One idea is to continue the working group as a series of online hangouts, organised by different institutions under the umbrella of euroCRIS. What is more, there is a desire to organise CRISCROS meetings not only as online meetings, but also to give them due space at in-person events such as euroCRIS Memberships Meetings.

In summary, the results of the working group are a valuable contribution to the euroCRIS community, on which both individual and collaborative efforts in the field of national and regional research portals can build up. After more than two years of organising and moderating CRISCROS meetings, RIS Synergy will handover this task to a new host in March 2025.