

Systematic Analysis of National CRIS on the euroCRIS DRIS to Inform the Development of the Ukrainian National CRIS URIS

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Background

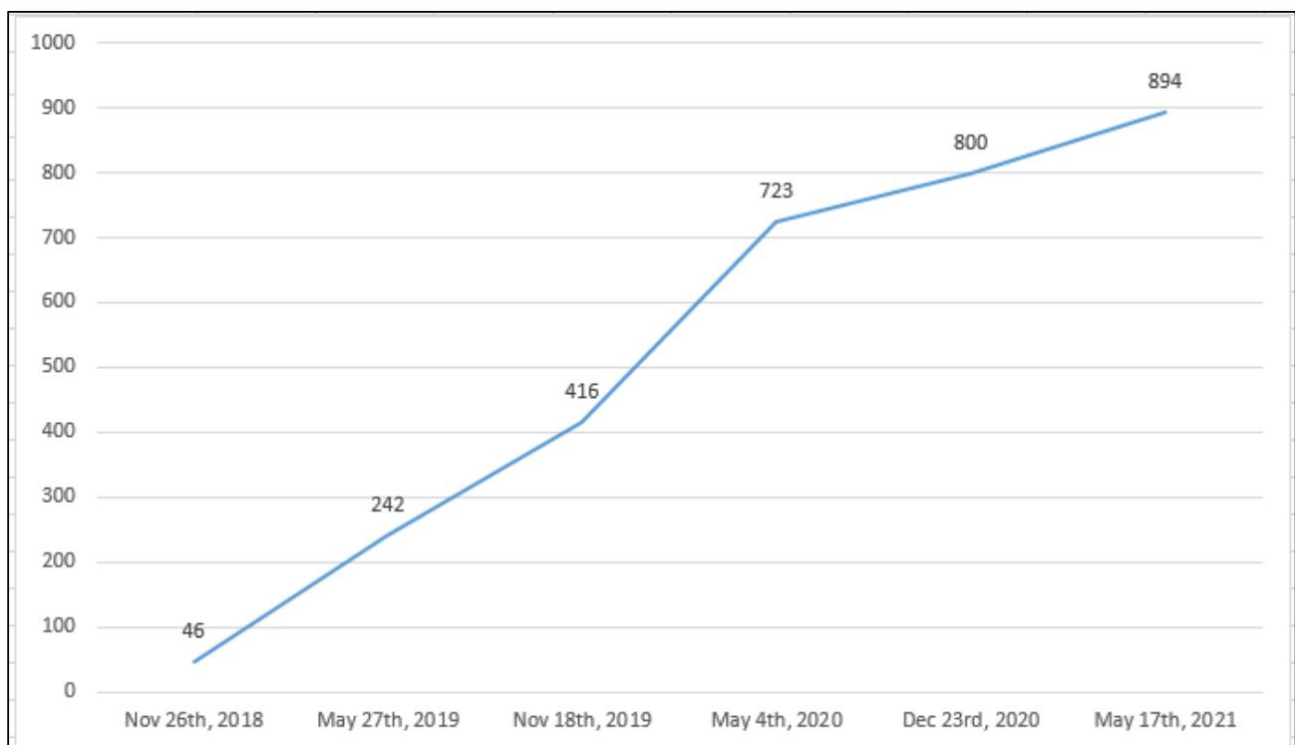
The challenge of ensuring the availability and interoperability of scientific data is well-acknowledged in contemporary research spheres (Globa et al., 2020; Shapovalov & Shapovalov, 2021; Stryzhak et al., 2021). Current Research Information Systems (CRIS) have emerged as crucial tools in addressing this challenge across various academic and research environments. They find applicability in university settings by facilitating efficient research data management (Surla et al., 2013), and in research organizations by offering indispensable administrative support. Furthermore, CRIS systems have been instrumental in advancing systems science and technology while aligning with Open Science principles (de Castro, 2018). CRIS development and implementation is one of the most transparent and accountable approaches to the curation of research information. Back in 2006, researcher S. Hornbostel emphasized that in order to avoid turning a large amount of research information into a data graveyard, it is crucial to introduce CRIS systems as a means to cross-link this information and make it suitable for further use (Hornbostel, 2006).

Global Landscape of CRIS systems: the euroCRIS DRIS

The sole existing directory of CRIS systems at present is the euroCRIS Directory of Research Information Systems (DRIS). An early version of the DRIS was launched in February 2012 at a euroCRIS meeting at UKOLN in Bath as part of an attempt to map the quickly growing CRIS infrastructure in the UK in the wake of the REF2014 research assessment exercise. The initiative saw a limited uptake (around 50 records), partially because it was originally conceived as a service for euroCRIS members only. In its original design, any specific DRIS record was internally linked to the record for the euroCRIS member institution and the contact person (the CRIS manager) within it. This inevitably meant that most CRIS implementations were out of scope for the exercise, since the organisations behind them were not euroCRIS members as a rule.

It was only in early 2018 that the decision was made to leave behind the concept of the DRIS as a service just for euroCRIS members. This opened the door to its expansion via the simplification of the metadata collection process. A minimally sufficient set of metadata elements was defined so that records identifying a specific CRIS system would not quickly get outdated. A process was then started to include as many entries as possible in the directory and to rely on the regular euroCRIS membership meetings to collect comprehensive listings for the available CRIS systems in the countries where these meetings took place. This exercise in community engagement was first put in practice at the Autumn 2018 euroCRIS membership meeting in Warsaw, where a presentation was delivered at a specific interest group meeting describing the new approach and inviting participants to provide their feedback and also their data.

An expanded DRIS with 242 then 416 entries was presented at the two euroCRIS membership meetings in 2019 (Helsinki in May, Münster in November). At the time the proposal for the OpenAIRE-funded DRIS+ project [2] was written in Mar 2020, the number of DRIS records had climbed to 637. As of May 2024, the DRIS contains over 1,400 entries, the vast majority of which record institutional CRISs. It's however the national and regional CRISs collected in the euroCRIS DRIS that this research will be based on.



The DRIS is a permanent work-in-progress exercise, with new entries being added every month as new institutions and initiatives worldwide provide their data via the DRIS form on the euroCRIS website (De Castro & Puuska, 2023; euroCRIS, n.d.). An additional consideration worth raising here – although it exceeds the scope of this short paper – is what a CRIS is and what it is not. As per the euroCRIS Board discussions, any research information management system that includes a sufficient number of CERIF entities qualifies as a CRIS. This actually allows some repositories to make it into the DRIS (same as some CRISs make it in turn into repository directories like OpenDOAR) when they provide a sufficiently comprehensive snapshot of the research conducted at an institution and not just on its publications and authors.

National and Regional CRIS systems in the DRIS: a snapshot

Only national and regional CRIS registered in the euroCRIS DRIS have been considered for this research. This is because the analysis of these systems is aimed at providing a basis for the further development of the Ukrainian national CRIS URIS. By the time the snapshot of the DRIS was taken in Aug 2023, there were **24** national CRIS (ETIS—Estonia, NARCIS—Netherlands, SK CRIS—Slovakia, SICRIS—Slovenia, CRISin—Norway, E-CRIS.MK—North Macedonia, Research.fi—Finland, POL-on—Poland, Sucupira—Brazil, Georgian Digital Repository—Georgia, BrCris—Brazil, Science Latvia, IS VaVal—Czechia, IRIS—Iceland, CRIS-IL—Israel, NRIS—New Zealand, CroRIS—Croatia, E-CRIS.CG—Montenegro, CIÊNCIAVITAE—Portugal, URIS—Ukraine, GRIS—Georgia, MORI—Mongolia, CONECTO—Panama) and **5** regional CRIS (FRIS—Flanders, UnityFVG—Friuli Venezia Giulia, PRC—Catalonia, SICA—Andalusia) registered in the directory.

Globally, Slovenia's SICRIS (Curk, 2019) and Finland's Research.fi (Nikkanen & Puuska, 2022) serve as centralized repositories, showcasing the respective countries' commitment to research transparency and data interoperability. These systems exhibit the potential of adhering to the FAIR (Findable, Accessible, Interoperable, and Reusable) principles in promoting data interoperability (Inau et al., 2021; Skvortsov, 2018; Wilkinson et al., 2017).

Objective

This research aims to conduct a thorough landscape study of the national and regional CRIS systems recorded in the euroCRIS DRIS. The main objective of this study is to use and improve this data when designing the architecture for the Ukrainian research information system (URIS|NAUKA) (<https://nauka.gov.ua/en/>) currently under development as the Ukrainian national CRIS (Kalyuzhna et al., 2022; Shapovalov et al., 2023).

Materials and Methods

A comprehensive analysis of data sourced from the DRIS at <https://dspacecris.eurocris.org/cris/explore/dris> was undertaken during Aug-Sep 2023. The initial focus was the analysis of national CRIS characteristics with a view on the possibility of an international integration. For a deeper understanding and in order to conduct a more precise comparison among different CRIS systems, several key parameters were defined for each system. These parameters include: country, DRIS URL, system URL, region, stored data types, unique IDs and stored (meta)data for each CERIF entity recorded in the system: researchers, projects, publications, journals, institutions, patents, programmes, research groups, research infrastructures, researcher IDs, API availability, API description, external PID usage, software solution and specific features. The DRIS data was transferred to a Google Sheet for analysis and aggregation using Google Data Studio. In addition, geographic aggregation of CRIS systems was conducted to identify regions (countries) with prevailing use of CRIS systems.

Analysis results

The results show that CRIS systems are more frequently adopted in Europe. A notable observation is that some countries show multiple national systems recorded in the DRIS – this is the case for both Georgia and Brazil. It's worth considering whether some degree of interoperability may already be available for these 'multiple national systems' and whether both may qualify as CRIS.

The findings from this research are expected to contribute significantly to the development of a well-structured and interoperable scholarly data ecosystem, especially in the context of improving the Ukrainian research ecosystem. The existence of a DRIS record – created in Nov 2022 – for the Ukrainian national CRIS URIS demonstrates a significant awareness of this system even in its current ‘under development’ state, but the application of the results of this analysis could improve the system and its levels of use.

The structured approach applied to the study has allowed the analysis of the similarities and differences between different national CRIS systems. Furthermore, it has facilitated a better understanding of the diverse functionalities and features offered by these systems. This is instrumental in the designing of an optimal architectural framework for the structural modules of the URIS system (Kalyuzhna et al., 2022; Shapovalov et al., 2023). Through a methodological evaluation, we sought to obtain information that would contribute significantly to improving the interoperability and efficiency of scientific data management in different countries and regions.

The authors are aware of the parallel work in the domain conducted by the CRISCROS WG of national and regional CRIS (euroCRIS, 2022). This working group was only founded after the CRIS2022 Conference in Dubrovnik, and while there are some overlapping areas between both initiatives, it is expected that this paper may contribute additional valuable considerations to the CRISCROS WG activity.

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