The Current State of Research Data Management in Canada: A Report by the Digital Research Alliance of Canada

by Caroline Winter | 3 December 2021 | English, Observations, Observations and Responses | 0 comments

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This observation was written by Caroline Winter, with thanks to Shahira Khair for her feedback and contributions.

At a glance:

Title	The Current State of Research Data Management in Canada: An Update to the LCDRI Data Management Position Paper
Creator	NDRIO (now the Digital Research Alliance of Canada)
Publication Date	November 2020
Keywords	research data management, digital research infrastructure

In September 2021, the Digital Research Alliance of Canada (recently renamed from NDRIO, the New Digital Research Infrastructure Organization) released a report called *The Current State of Research Data Management in Canada: An Update to the LCDRI Data Management Position Paper* (2020). It was authored by the NDRIO Research Data Management Working Group: Shahira Khair, Rozita Dara, Susan Haigh, Mark Leggott, Ian Milligan, Jeff Moon, Karen Payne, Elodie Portales-Casamar, Ghilaine Roquet, and Lee Wilson.

The report introduces and contextualizes RDM within the framework of Open Science and offers a summary of the current state of the RDM landscape in Canada. It also surveys the RDM supports currently available, analyzes the national RDM landscape, and assesses capacity in the areas of storage and computation, interoperability, data services, and governance. The report concludes by outlining key challenges and opportunities and laying out next steps.

The overall goal of the report is to position the Alliance to "build on preceding and current initiatives and chart a path forward that advances RDM in coordination with other DRI elements to support national research excellence" (8), building on the *Data Management Position Paper* (2017) and *Research Data Management in Canada: A Backgrounder* (2019).

The report identifies the key benefits of RDM, including data sharing and reuse, as

- accelerating research and making it more efficient, such as when data can be shared reused rather than generated afresh
- enabling and encouraging collaboration among researchers, particularly when data is interoperable, and through sharing tools and other resources as well as data
- increasing the impact of research, particularly by making data more discoverable and accessible
- enabling the reproducibility of research, and thereby increasing its trustworthiness, including among the public (11–12)

The report also highlights that a focus on openness and following the FAIR Principles needs to be balanced with respect for Indigenous data sovereignty, which "recognizes the inherent rights of Indigenous communities to govern the collection, ownership, and use of their own data" (p. 14). In addition to the CARE Principles for Indigenous Data Governance, which address the values Collective benefit, Authority to control, Responsibility, and Ethics and complement the FAIR Principles (GIDA n.d.), other Indigenous data governance principles have been asserted (p. 15). The OCAP® Principles address Ownership, Control, Access, and Possession, and were developed by First Nations communities (FNIGC 2021). The Manitoba Métis Federation subscribes to the OCAS Principles, which include Ownership, Control, Access, and Stewardship (University of Manitoba n.d.). Inuit Qaujimajatuqangit (IQ) includes six concepts that apply to Inuit data and include the concepts of serving, decision-making by consensus, skills and knowledge acquisition, collaboration, environmental stewardship, and resourcefulness in problem solving (Tagalik n.d.). Respecting Indigenous data sovereignty and these sets of principles are key concerns for RDM best practices, for open scholarship more generally, and for supporting reconciliation in Canada.

The Current RDM Landscape in Canada

In surveying the organizations supporting RDM in Canada that form the foundation for national RDM services of the Alliance, the report highlights the essential work that continues to be done by Research Data Canada (RDC), including supporting collaboration "between RDM and DRI funders" and "between Canadian and global Open Science efforts" (p. 19). It also highlights the Portage Network and its initiatives, including the Data Management Plan (DMP) Assistant, led by Portage, the Federated Research Data Repository (FRDR), the Canadian Scholars Portal Dataverse instance, and the Canadian DataCite Consortium (p. 19–20).

Moreover, the report recognizes that many actors in the current "distributed landscape" (p. 18) offer services and support enabling RDM, which the Alliance must take into consideration. The report provides a snapshot of the RDM landscape in Canada, acknowledging that it is too complex to provide a comprehensive picture. This snapshot comprises seven sectors:

- higher education
- research organizations (which are often hosted by universities and research institutes)
- research funding agencies
- scholarly publishers
- academia-adjacent organizations (e.g., government research centres, health authorities, GLAM, and industry)
- third-party service providers
- international organizations (e.g., national government organizations, international associations)

Within the higher education sector, for example, the RDM landscape includes researchers (many of whom use research from government research centres, GLAM institutions, and other academia-adjacent organizations) and the departments and faculties they work within, systems and IT departments that provide infrastructure (which is sometimes supplemented by third-party service providers), research offices that establish institutional policies and support researchers in complying with research funding agencies' policies (e.g., the Tri-Agency RDM Policy), and institutional libraries and archives that are increasingly offering RDM support and infrastructure, such as institutional repositories. Also within the higher education sector are organizations that provide infrastructure and services to support or enable RDM, including the Compute Canada Federation and the National Research and Education Network (NREN), and regional library consortiums such as the Council of Prairie and Pacific University Libraries (COPPUL). The Scholarly Publishers sector helps to distribute and promote researchers' findings, and publishers are increasingly developing RDM policies and service of their own, in connection with the broader movement toward open access. All of these activities take place in Canada within a global ecosystem of research and scholarship.

The report notes that a better understanding of the landscape of research organizations and their relationships among its sectors and stakeholders is needed, as is a better understanding of the emerging area of publishers' RDM services and policies.

Elements of National-Level RDM Support

In addition to presenting a snapshot of the RDM landscape, the report also classifies key elements required for national-level RDM support: storage and computation, interoperability, data services, and governance.

The storage and compute element supports RDM through the data life cycle. Institutional and domain repositories play an important role in storing and providing access to research data, including federated ones such as Scholars Portal Dataverse and the FRDR. Lack of stable funding makes long-term sustainability and archiving a particular challenge, however, in particular for smaller domain or research-group specific repositories.

The interoperability element of the RDM ecosystem depends on common standards and schemas, policies, and protocols for working with data, including the FAIR Principles. It also extends to infrastructural elements such as as standards and certifications, as well as to identification and access, which includes PIDs (persistent identifiers) such as ORCID and DataCite (see "ORCID: Connecting Research and Researchers," "ORCID Update: Integrating OCRID iDs into Research Funding Workflows," and "The UK Persistent Identifier Consortium").

Data Services have developed in response to researchers' needs, and are provided by institutions,

associations, and commercial providers to address RDM at all stages of the research life cycle. Examples include the DMP Assistant, data repositories for data curation supported by IT services and data librarians, data preservation through support models developed by library consortia, and discovery and exploration tools such as the FRDR. The increasingly data-driven nature of research has revealed a training gap in digital skills, one that institutions, university libraries, and research associations can all contribute to closing.

In terms of governance, the report notes that the policy environment about RDM and related issues is growing increasingly complex. This ecosystem comprises national policy such as the Tri-Agency's RDM policy, institutional policies and publisher policies, and others (see "Update: Research Data Management in Canada"). Tools and resources have been developed by national research organizations in response to members' needs, but resources and practices vary widely across regions and fields of research, as do policies related to RDM.

Challenges and Next Steps

The report identifies three key challenges and opportunities that the Alliance faces in supporting RDM at the national level: coordination, representation and inclusion, and sustainability. Coordination includes continuing the work of integrating elements in the existing landscape—including members of the RDM community—across geographic and disciplinary distances. Representation and inclusion include raising awareness and adoption of RDM and its best practices throughout the research community with attention to under-represented communities. Sustainability involves building strong partnerships and collaborations as well as the technical systems necessary for data preservation. Its stable funding structure will enable the Alliance to address some of the sustainability issues raised by existing ad hoc and short term funding scenarios to optimize the existing RDM ecosystem.

The Report and the INKE Partnership

The report notes that the RDM landscape in Canada has developed in large part through the work of national organizations including CANARIE, RDC, Portage, and the Canadian Association of Research Libraries (CARL), an INKE partner. It highlights Portage's success in coordinating its community's development of tools, platforms, and services to support RDM. In April 2021, Portage integrated fully with the Alliance.

The report highlights other INKE partners' roles in the Canadian RDM landscape as well. In its discussion of the contribution of research organizations, it highlights Coalition Publica, an open access publishing infrastructure developed by INKE partners Érudit and the Public Knowledge Project. It also highlights Érudit's CO.SHS project, an open infrastructure for the production, discovery, and exploration of humanities and social sciences research.

The RDM Report and Open Scholarship

The report notes that RDM is "rooted in the Open Science movement that presents a vision for accelerated scientific discovery and advancement enabled by new information technologies, which will allow research publications, results, and data to be shared openly and accessibly as part of a new social contract for science" (p. 13), noting that "science" here refers to scholarship as a whole, including the humanities and social sciences. In particular, RDM practices founded on the FAIR Principles enable the discovery and accessibility essential to open scholarship.

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