Developing Institutional Research Data Management Strategies in Canada: Setting the Foundation for Stronger Partnerships and Collaborations

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Abstract

The Government of Canada's Tri-Agency formally launched the Research Data Management (RDM) Policy in March 2021 with the objective of supporting "Canadian research excellence by promoting sound data management and data stewardship practices". A central component of this policy requires postsecondary institutions eligible to administer Canadian Institutes of Health Research (CIHR), the Natural Sciences and Engineering Research Council of Canada (NSERC), or the Social Sciences and Humanities Research Council of Canada (SSHRC) funds to create an institutional RDM strategy by March 2023.

A national survey was developed to gauge institutions' readiness for developing an institutional RDM strategy required by the Tri-Agency. The survey emphasized increasing participation from diverse institutions to ensure that future support and resources are developed to address the distinct needs of institutions.

Recommendations from the survey report included increasing Tri-Agency involvement as institutions developed their institutional RDM strategies, encouraging institutions to collaborate, and the development of forums to provide support for disciplinary societies to have RDM conversations.

As a result, three panel discussions covering the active stages (Initial, Planning, and Execution) of developing an institutional RDM strategy were successfully delivered through the Digital Research Alliance RDM (Alliance RDM) to a diverse range of institutions. Recognizing the needs of smaller institutions including CEGEPS, colleges, and polytechnics, an additional panel discussion was developed and delivered to this audience.

Keywords

Research data management (RDM), Institutional strategy, Tri-Agency, Digital Research Alliance of Canada, Partnerships, Collaborations

Introduction

Institutions in Canada are being required to develop institutional strategies as part of the evolving research data landscape. This article explores the [Tri-Agency Research Data Management (RDM) Policy](#) and the two surveys conducted to assess institutional preparedness before the policy's release and one-year after, and how recommendations from the second survey fostered stronger collaboration among stakeholders. Copies of both the 2019 survey and 2022 survey can be found in the appendix.

Background

In order to place research within a Canadian context, let's first look at some definitions. Canadian research institutions fall into two categories: post-secondary and research institutions. Post-secondary institutions include universities (degree granting institutions), colleges (certificate and diploma granting institutions that provide primarily technical, academic and/or vocational programs), and CEGEPs (similar to colleges but are only in Quebec) and research institutions.

Researchers in Canada have access to digital tools and services through the Digital Research Alliance of Canada (The Alliance), a non-profit organization funded by the Government of Canada to serve Canadian researchers. It integrates, champions and funds the infrastructure and activities required for advanced research computing (ARC), research data management (RDM) and research software (RS). A group within The Alliance that supports researchers with Research Data Management (RDM) is the Network of Experts (NOE), a national network of professionals supporting RDM across Canada. Several Expert Groups are affiliated with the NOE and one of these groups is the Research Intelligence Expert Group (RIEG) whose mandate is to provide evidence to guide the development of RDM, provide support for institutions around strategies, policies, capacity, and resources related to RDM, and identify gaps in the RDM landscape.

Finally, government funding for research is supplied by the Tri-Agency, which is composed of the Canadian Institutes of Health Research (CIHR), the Natural Sciences and Engineering Research Council of Canada (NSERC), and the Social Sciences and Humanities Research Council of Canada (SSHRC).

In March 2021, the Tri-Agency released the Research Data Management Policy that aims to promote sound RDM practices to support research excellence in Canada. In the policy, the Tri-Agency outlined three key requirements:

1. Institutional RDM Strategy: All research institutions eligible for Tri-Agency funding were required to develop an institutional RDM strategy by March 2023. The published strategies can be found on the [Tri-Agency RDM Policy website](#).
2. Data Management Plans: Researchers must include data management plans in grant proposals. The phased introduction of this requirement began in Spring 2022, with further funding opportunities being introduced over the next few years ([current funding opportunities requiring DMPs](#)).
3. Data Sharing and Access: Researchers are expected to deposit all digital research data, metadata, and code supporting research conclusions in journal publications and preprints resulting from agency-supported research. While data sharing is not mandatory, researchers must provide appropriate access to the data, adhering to ethical, cultural, legal, and commercial requirements, as well as the FAIR principles and disciplinary standards. This requirement will be implemented gradually over the next few years.

In anticipation of the policy's release, RIEG conducted a survey in 2019 to evaluate institutions' preparedness in developing their institutional RDM strategies. The initial survey results indicated that some institutions had initiated the process of formulating a policy, but most had not due to the lack of information regarding the policy's content or the desire for a supportive community of practice to aid in the writing process. In March 2022 (one year after the policy's release), RIEG conducted a follow-up

survey to assess the progress of institutions in creating their institutional strategies and identify any additional resources required to complete their strategy.

2019 Survey results

The 2019 survey was developed prior to the Tri-agency policy being released and was intended to measure progress, if any, was being made and what other supports Portage and other stakeholders could provide. The survey received eighty-eight completed submissions, with the majority of respondents coming from universities, followed by CEGEPs, and the remaining from research centres and other institutions. Regionally, Ontario, Quebec and the West institutions provided about eighty-five percent of the responses and the Atlantic region about fifteen percent.

To start preparing for the policy's release, most respondents reported they had assessed their institution's capacity, reviewed support material for strategy development, and formed, or were in the process of forming, a working group to develop their institution's strategy. Few respondents indicated they were in the final stages of planning partly due to the delay in the release of the Tri-Agency's final policy (see Figure 1). About the delay, one commenter noted « *Compte tenu du report de l'entrée en vigueur d'une politique des conseils sur la GDR, les travaux institutionnels sur cette question ont ralenti ; lorsque les attentes exactes des conseils seront connues, il sera plus facile de s'y remettre.* » [TRANSLATION: Given the delay in implementation of the RDM policy, institutional work on this issue has slowed; when the exact requirements of the Tri-Council are known, it will be easier to continue the momentum].
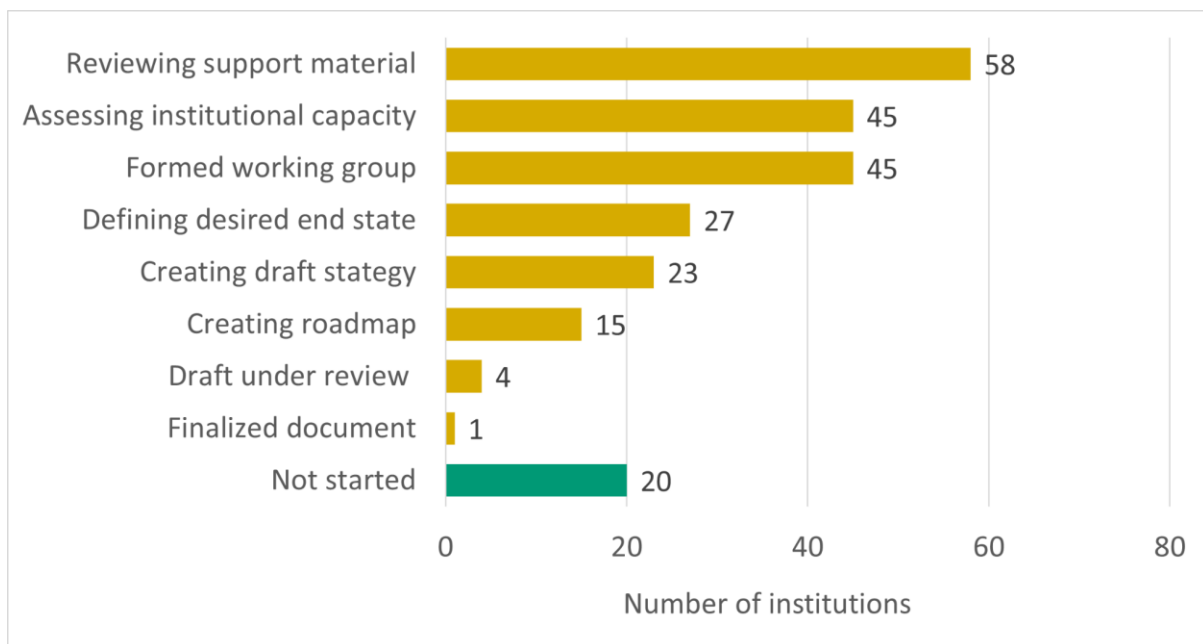

Figure 1. Status of institutional research data management strategies in development by institution.

Most respondents indicated their institution had formed one or more working groups to start developing their institutional strategy. For institutions that had formed working groups, on average more than four different offices were represented. Figure 2 presents the range of offices represented in these groups.
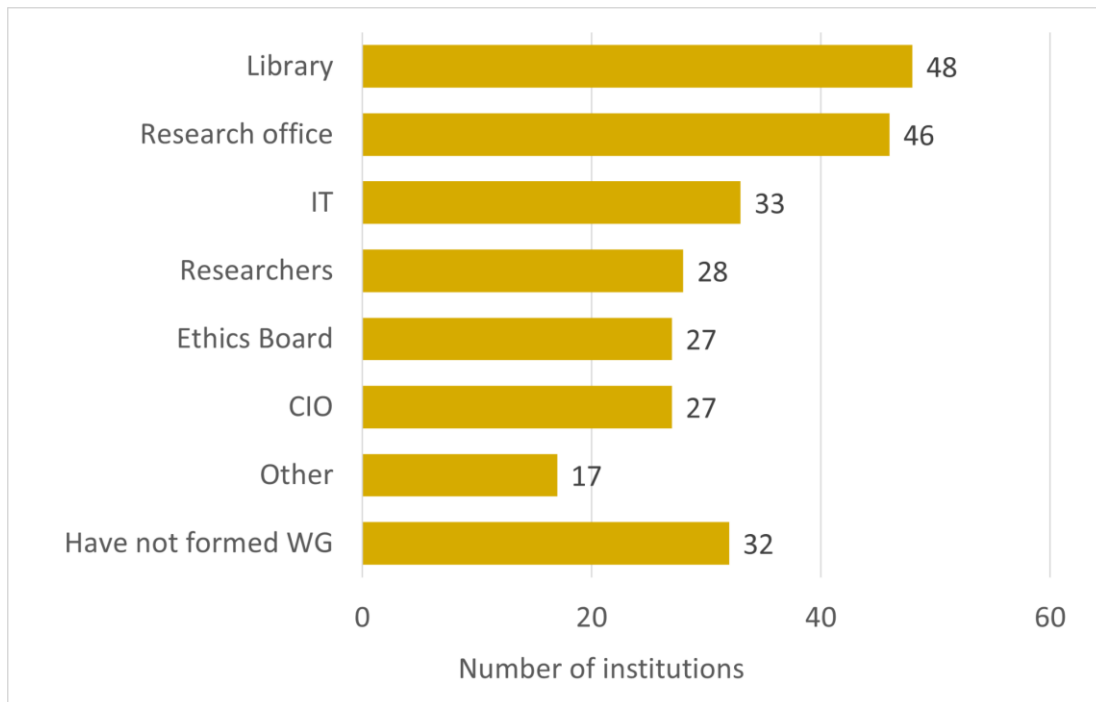
Figure 2. The range of offices or departments represented on working groups tasked with developing institutional strategies at the institutions of respondents.

Portage[3] developed a range of tools to support institutions in writing their institutional strategies. Most respondents were using the Portage Institutional Strategy Template and Guidance Document, which the majority of institutions rated as being helpful or very helpful. As well, many indicated that they were using existing policies at their own institutions to inform their strategies.

Suggestions from respondents for additional guidance and support frequently referenced the need for sample strategies and best practices documents (see Figure 3). Communication tools that institutions and/or departments could adopt in their outreach and promotion were also suggested, for instance, the National Science Foundation's "Dear Colleague" series of letters.

Figure 4 summarizes interest in the various methods of receiving additional support, with webinars and online documentation being of especially high interest. In-person training and local or regional workshops were rated more favorably than national-level training, indicating a possible gap in more localized support/connection. Comments reflected interest in knowing what actions peer institutions in their region/province were taking.

Figure 3. The range of resources being used to develop institutional strategies by survey respondents. Total affirmative responses for each resource type are presented.
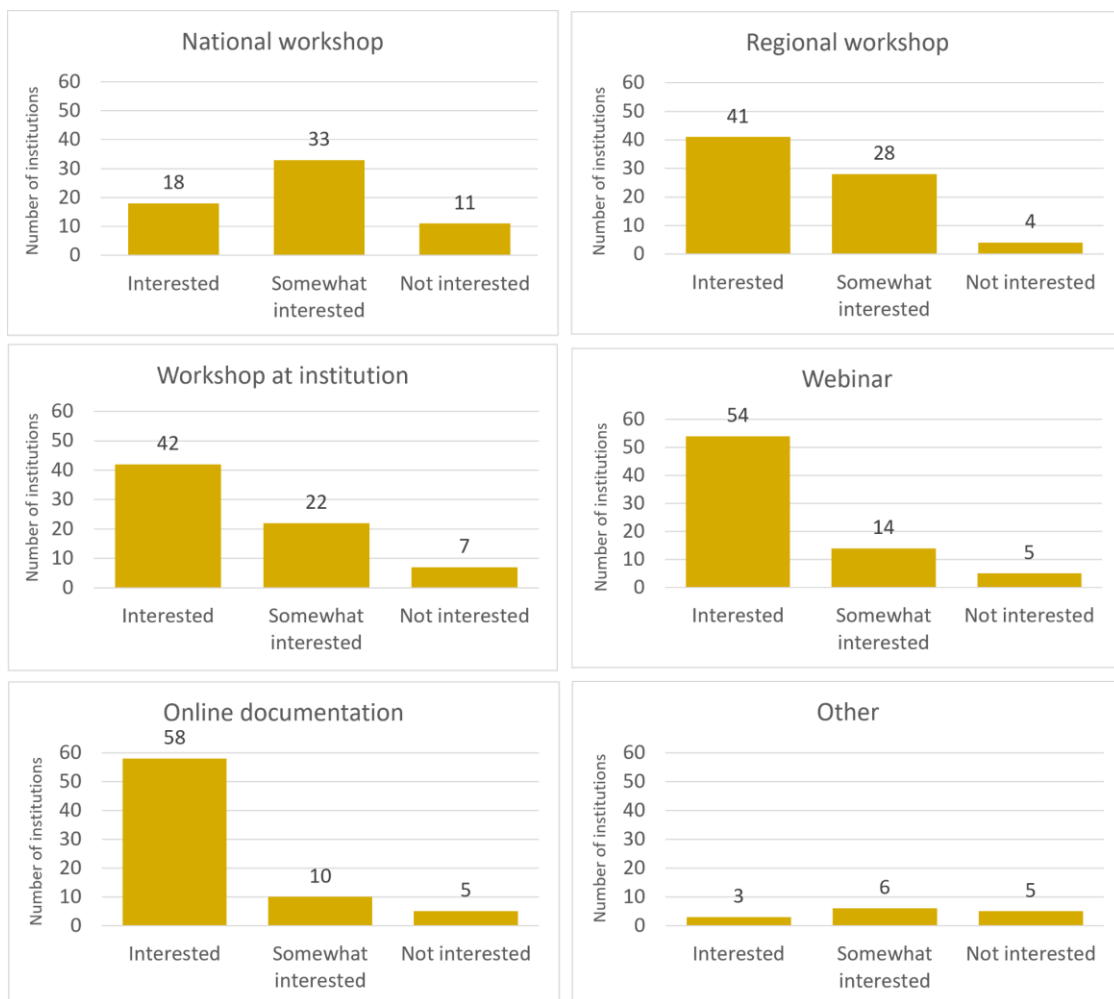

Figure 4. Interest in the method of delivery of training and guidance to support the development of institutional strategies.

2019 Survey Recommendations

This survey found that many institutions were in the beginning of developing their strategy, they were also hesitant to move forward ahead of any final Tri-Agency policy. It was anticipated that the announcement of the policy would spur the institutions into action. The following recommendations provided suggestions that the Tri-Agency, Portage, and other organizations supporting research data management could take to support institutions.

- Collect and share strategies as they become available and make them available in a single online location to improve accessibility.
- Develop communities of practice so that stakeholders and peers have opportunities to meet counterparts at regional and national levels to receive additional guidance, compare notes, learn from one another's approaches, and develop strategies.
- Provide more explicit best practices with clear guidance on how to best meet the requirements outlined in the new policy.

2022 Survey results

The survey received a total of ninety-two responses. Invitations to participate in the survey were distributed through listservs primarily targeting RDM professionals. Institutions were encouraged to collaborate with relevant stakeholders involved in developing their Institutional RDM Strategy while completing the survey.

The largest number of respondents were from universities followed by colleges/CÉGEPs then other institution types which included research centers and research hospitals. Many respondents were from Ontario, which has a greater representation across all institutions compared to other regions. This was followed by both the western and Quebec regions which had a similar number of responses. The Atlantic regions had the lowest responses.

Similar to the 2019 results, the main offices and services contributing to the survey were the Research Office and Library followed by ethics, IT, Researchers, and CIO. In consultation with survey stakeholders, the following office and services were added to the question about institutional stakeholders- Executive Management, Indigenous Office/Representative/Council, Legal, Privacy Office, Graduate Studies, and Records Management.

To get a better idea on how to support institutions in the development of their Institutional RDM Strategies, institutions were asked to report on the barriers they face when meeting the agencies RDM policy requirement. In Figure 5, the top 3 barriers are:

- Lack of time and budget – which is a barrier facing many institutions
- Lack of understanding and awareness of the agencies expectations
- And the lack of supporting materials – more resources are needed to be developed
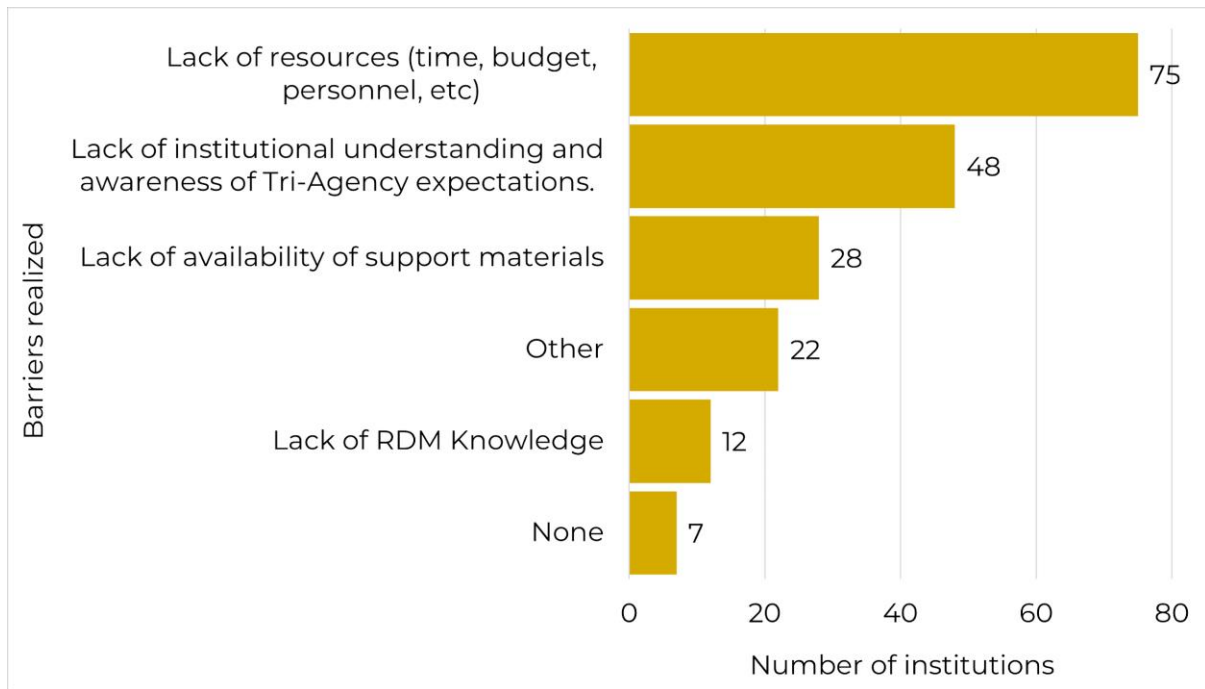
Figure 5: Barriers to meeting the Tri-Agency RDM Policy as reported by institutions.

Knowing these barriers illustrates there is a need to strengthen the relationship between the agencies and institutions and for collaborations to develop materials between all partners including the network of experts. However, lack of RDM knowledge and there being no barriers are at the bottom of the list for institutions.

To determine which resources were used to develop Institutional RDM Strategies, institutions were asked to report which they have used. In Figure 6, the top resources utilized included:

- Alliance RDM resources developed through the network of experts existing policies and resources from other institutions;
- Consulting fellow colleagues at other institutions and maturity assessment models which include MAMIC, RISE;
- The development of these resources relies on existing collaboration between institutions, Alliance RDM team, agencies, and data professionals.
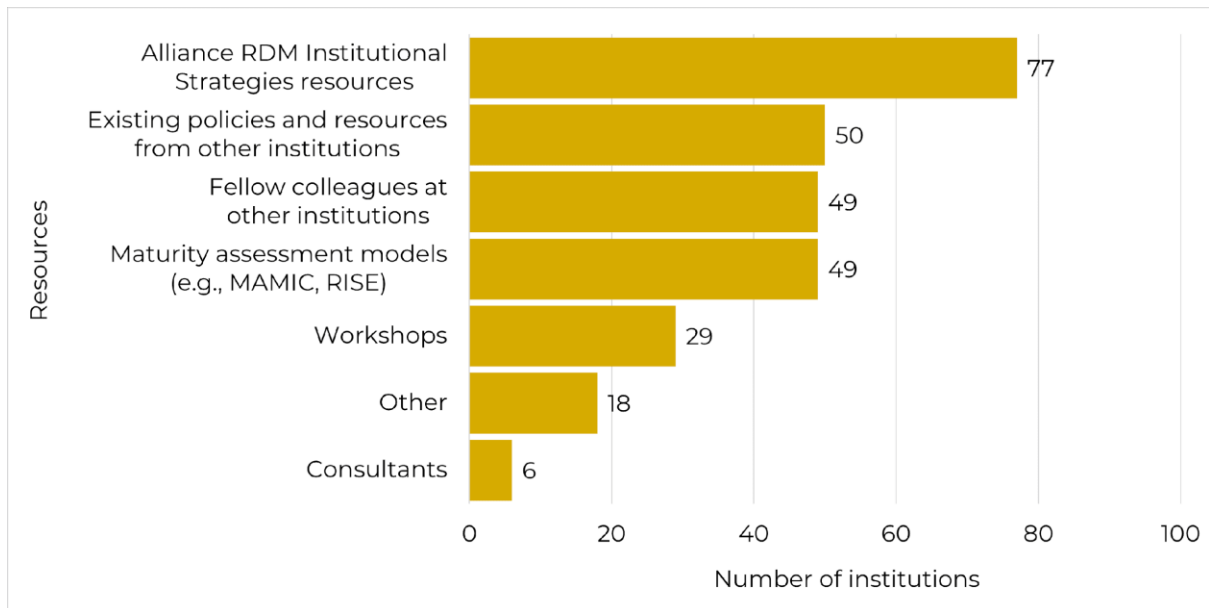
Figure 6: Resources institutions used to develop their institutional RDM strategies.

The survey asked institutions where in the process they were in developing an institutional RDM strategy in early 2022. The coordination of a working group or committee at an institution did not seem to pose much of a challenge, however, for the remaining processes, institutions appeared to have greater difficulties. The most challenging or difficult step in the process was estimating the cost of RDM related activities.

Addressing disciplinary approaches to RDM were reported as difficult, like the other challenges, but also had the highest response of not applicable (almost one quarter of institutions) (Figure 7).
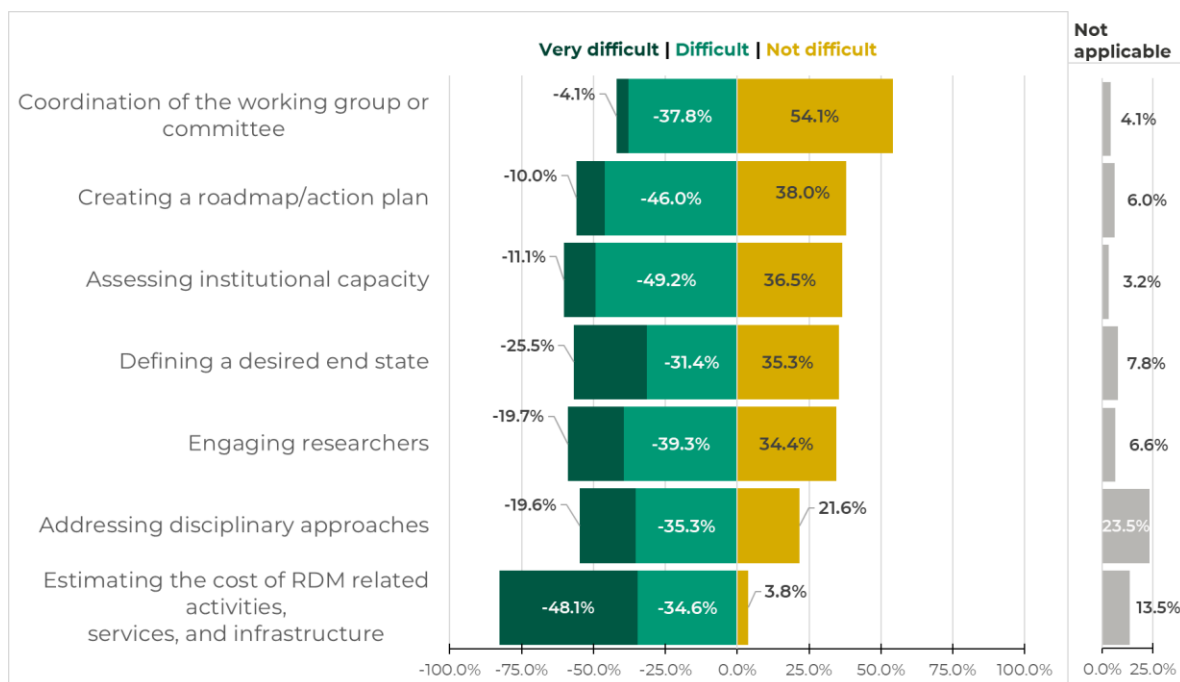
Figure 7. Challenges to developing an institutional RDM policy as reported by institutions.

2022 Survey Recommendations

In 2022, institutions were actively engaging in the process of creating institutional RDM strategies in order to meet the TriAgency deadline of March 2023 to have a strategy posted.

Major stakeholders identified in both the 2019 and 2022 surveys included:

- Libraries who support researchers with the curation, preservation, storage and reuse of research data;
- Research offices who have a broad responsibility for administration of sponsored research and related policies and services;
- Office of CIO who is responsible for almost all areas of IT;
- Ethics board who governs the standards of conduct for researchers;
- Researchers who are the ones conducting the work; and
- IT/Systems who provide the technical infrastructure including storage, security, high performance computing, etc.

Additional key stakeholders also consulted in the 2022 survey included:

- Indigenous office/representative/council who represent the rights of Indigenous peoples to control data from and about their communities and lands, articulating both individual and collective rights to data access and to privacy;
- Privacy office who ensure institutional compliance regarding personal information; and
- Legal office who manage the legal risks arising through the institution's activities and objectives.

By thoughtfully expanding the stakeholder groups to include the new stakeholders, the institutions created a more integrated RDM ecosystem needed to support researchers creating and using research data requiring specific support for care, management or sharing. (Figure 8)
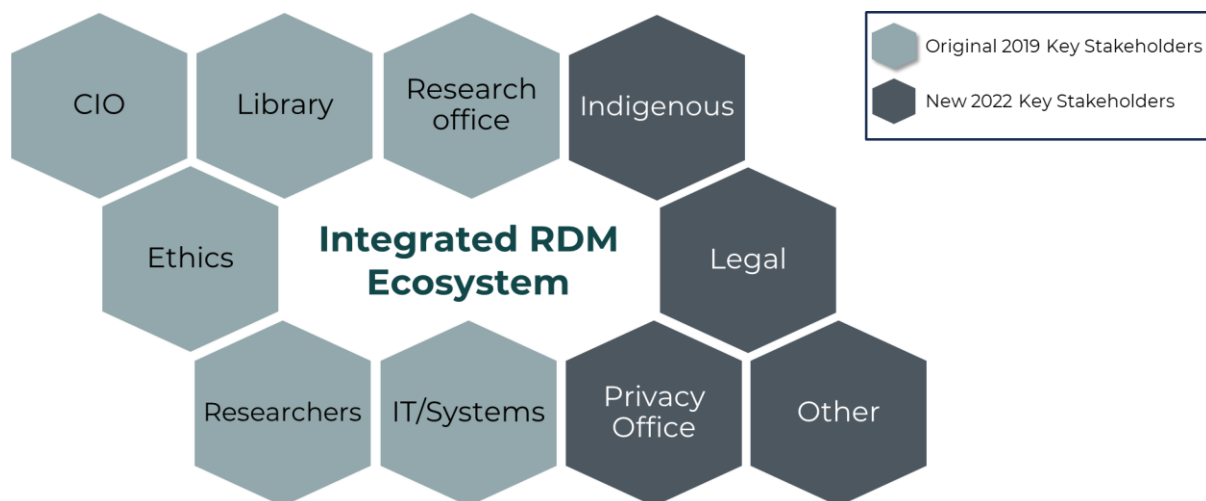
Figure 8: The new integrated RDM ecosystem.

Enhancing collaboration also requires building upon the RDM community of experts that includes Network of Experts, Alliance RDM, Stakeholders, and Tri-Agency. By increasing the involvement of the Tri-Agency in developing these resources, not only is the RDM community enriched, but needed clarity is provided on the expectations of what an institutional RDM strategy should be along with a central location to share all published. Institutions have and will save staff time through the collaborative creation of additional support and resources, as well, this enhanced collaboration allows for the development of forums and support for disciplinary societies to have RDM conversations, express their needs and concerns, and encourage grassroots RDM initiatives within disciplines and across disciplines within the global open science context.

Also recommended in the survey report was that additional resources be developed to address the barriers and challenges encountered by institutions when developing institutional strategies. In response, a three-part online panel discussion series was developed to guide institutions along the three active stages of RDM strategy development:

1. Initial Stage - discussing steps used to complete this stage including forming a working group/committee, reviewing available support material, and assessing institutional RDM capacity;
2. Planning Stage - discussing how to envision the future state of RDM and creating either a roadmap or action plan;
3. Execution Stage - discussing how to create a draft strategy document and articulate the institutional path forward through a roadmap or action plan

During these sessions, it was determined that a fourth session was needed for Colleges, CEGEPs, Polytechnic schools, and other research institutions to discuss their barriers, challenges and shared experiences outside of the university context. Response to these sessions was enthusiastic with about 80-100 people attending each one.

Moving forward, additional projects will be developed to continue the collaboration created as a result of the Institutional Strategy Survey Report. As of the summer of 2023, a working group composed of RIEG, the Alliance-RDM, University of Ottawa Heart Institute, and the Tri-Agency, has

begun reviewing/summarizing all the submitted institutional RDM strategies with an aim to summarize the content covered and assess gaps and needs across institutional type and size and geographic location in Canada. This working group will also include additional members of the RDM community in Canada.

A second project will begin in late 2023/early 2024 to rerun the RDM Capacity Survey originally run in 2019. The survey will evaluate the current efforts of Canadian research institutions in developing and allocating human, organizational, infrastructure, and fiscal resources for research data management (RDM) on their campuses. Information from the results of the RDM Institutional Strategy Review Working Group will be used to help guide the rewriting of the Capacity Survey.

Abstract 1: 2019 Survey Questionnaire

Survey Introduction

The following questionnaire was designed by the Portage Research Intelligence Expert Group (RIEG) to gather information on the successes and challenges of Canadian research institutions in developing an Institutional Strategy for Research Data Management (RDM) in response to the Tri-Agency's draft Research Data Management Policy.

This bilingual questionnaire surveys the progress made by Canadian research institutions in developing an institutional strategy for RDM on their campus, and solicits suggestions for additional support that Portage Network and other stakeholders could provide to assist with these efforts.

This survey consists of 5 questions and is expected to take 5 minutes of your time to complete.

Information gathered by this survey will be used to summarize the state of Institutional Strategy development across Canada, and inform the creation of additional resources to support Canadian institutions in developing RDM strategies.

A report summarizing our survey results will be shared publicly with the research community soon after the survey closes. Individual survey responses will not be shared publicly.

About Us:

The Research Intelligence Expert Group (REIG) is working to gather evidence to guide the development of best practices in RDM in Canada, and inform stakeholder communities about issues in related policy and practices. This questionnaire was developed by members of RIEG's Strategic Planning Working Group:

- Shahira Khair, University of Victoria
- Mark Leggott, Research Data Canada
- Will Meredith, Royal Roads University
- Tatiana Zaraiskaya, University of New Brunswick

For more information on the objectives and membership of this expert group, please consult the Portage website.

If you have any comments or questions about this survey, please contact portage@carl-abrc.ca.

Survey Questions

1. Contact info (Open text fields)
   - Name
   - Institution
   - Position Title
   - Office/Service Department (e.g. Library, Research Office, Systems, Faculty, etc.)
   - E-Mail
   - Phone
2. Check all that apply to indicate where you are in your process of developing institutional strategy for RDM: (Check all that apply)
   - Have not started yet
   - Reviewing available support material (e.g. Portage Institutional [Strategy Template](#) and [Guidance Document](#))
   - Formed a working group/committee
   - Assessing institutional capacity
   - Defining a desired end state
   - Creating a roadmap/action plan
   - Creating a draft strategy document
   - Draft strategy document currently under review by university administration
   - Finalized the institutional strategy document.
   - Posted the Institutional Strategy document on the website.
     If selected, please provide a link. (Open text field)
3. Please provide any additional comments on your progress (Open text field).
4. If you have formed a working group (WG) or committee to develop an institutional RDM strategy for your institution, what stakeholders are currently involved in this WG or committee? (Check all that apply)
   - Have not formed a WG or a committee
   - Library
   - Research Office
   - CIO
   - Ethics Board
   - Researchers
   - IT
   - Other (please specify) (Open text field)
5. If any of options B through H have been selected above, then... Please provide contact information for the appropriate member who we could contact for further information about this working group. (Open text fields)
   - Name
   - Position
   - E-mail
6. What resources are you using to develop an institutional strategy? (Check all that apply)
   - Portage [strategy template](#) and/or [guidance document](#)
   - Existing policies from other institutions

- Guidance documents
- Consultants
- Workshops
- Other (Please specify) (Open text field)

7. If you selected a) in the previous question, please rank your perceived usefulness of the Portage tools (Rating table: not useful, somewhat useful, very useful).
   - Portage strategy template
   - Guidance document

8. Please provide any suggestions for improvement (open text field)

9. Would you be interested in receiving additional guidance during the process of developing institutional strategy? Please rank the following (Rating table: not interested, somewhat interested, interested):
   - A workshop at your institution
   - A workshop at a regional venue
   - A workshop at a national venue
   - A webinar
   - Online documentation with tutorials
   - Other please specify (Open text field)

10. Would you be interested in acting as a Pilot site to develop a strategy, which could be used for exemplar purposes? This could include being part of a small group of institutions working with a core team to develop sample Institutional Strategy documents, which would then be shared with the broader community.

Appendix 2: 2022 Survey Questionnaire

Tri-Agency Institutional RDM Strategy Survey

Introduction

Thank you to all institutions who have already completed the survey. For those who haven't yet had a chance to complete the survey, we have extended the deadline by one week; the survey will now close on Tuesday, April 12th, 2022.

On March 15th, 2021, the Tri-Agency Research Data Management Policy was launched. In preparation for these changes, the Digital Research Alliance of Canada (the Alliance) research data management (RDM) Research Intelligence Expert Group (RIEG) is conducting a brief survey of all Canadian research institutions (colleges, universities or other research institutions receiving research grant funds from the Tri-Agencies) to determine challenges and successes in developing an institutional strategy for RDM.

This bilingual questionnaire surveys the progress made by Canadian research institutions in developing an institutional strategy for RDM on their campus and solicits suggestions for additional support that the Alliance and other stakeholders could provide to assist with these efforts. This survey was previously conducted in June 2019 and a report summarizing the findings was generated by RIEG.

The survey consists of 8 questions and is expected to take 15-20 minutes of your time to complete. We encourage this survey to be completed in coordination with institutional stakeholders who may be involved with developing your Institutional RDM Strategy (one response per institution). The survey will remain open until April 5th, 2022 and a PDF version is available for previewing.

Information gathered by this survey will be used to summarize the state of institutional strategy development across Canada, and inform the creation of additional resources to support Canadian institutions in developing RDM strategies.

Individual survey responses will not be shared. They will be used for program planning and evaluation only. A report summarizing the survey results will be shared publicly with the research community soon after the survey closes.

Any questions can be directed to Alexandra Cooper, Chair of RIEG (coopera@queensu.ca) or Lucia Costanzo, Research, Intelligence, and Assessment Coordinator (lucia.costanzo@engagedri.ca).

Thank you for taking the time to complete and share this survey.

Survey Questions
1. Province
   Choose one
       ● Alberta
       ● British Columbia
       ● Manitoba
       ● Newfoundland and Labrador
       ● New Brunswick
       ● Northwest Territories
       ● Nova Scotia
       ● Nunavut
       ● Ontario
       ● Prince Edward Island
       ● Quebec
       ● Saskatchewan
       ● Yukon
       ● Other
2. Institution type
   Check one
       ● University
       ● College/CÉGEP
       ● Research institute
       ● Government
       ● Research hospital
       ● Other
3. Institution name

4. Office/Service(s) contributing to survey response
   Check all that apply
   - Library
   - Research Office
   - Office of CIO
   - Ethics Board
   - Researcher
   - IT/Systems
   - Legal (office)
   - Other

5. What barriers are you realizing in meeting the Tri-Agency RDM Policy requirements for an institutional strategy?
   Check all that apply
   - Lack of institutional understanding and awareness of Tri-Agency expectations. Please explain
   - Lack of RDM knowledge Please explain
   - Lack of resources (time, budget, personnel, etc) Please explain
   - Lack of availability of support materials. Please explain
   - None
   - Other. Please explain

6. Check all that apply to indicate where you are in your process of developing an institutional strategy for RDM:
   - Not yet started
   - Formed a working group/committee
   - Reviewing available support material (e.g. Alliance-RDM (Portage))
   - Assessing institutional RDM capacity
   - Envisioning the future state of RDM
   - Creating a roadmap/action plan
   - Creating a draft strategy document
   - Articulating the institutional path forward through a roadmap or action plan

7. Process Part Two
   (check one)
   - Draft strategy document currently under review
   - If you have launched your strategy, please provide a link

8. Please provide any additional comments on your progress.

9. If you have formed a working group or committee to develop an institutional RDM strategy for your institution, what stakeholders are currently involved in this working group or committee?
   Check all that apply
   - Have not formed a working group or a committee [if checked, no other options can be checked].

10. If you have formed a working group or committee to develop an institutional RDM strategy for your institution, what stakeholders are currently involved in this working group or committee?
    - Institutional library systems
    - Research office/Institutional research
    - Office of the CIO

- Research ethics board
- Researchers
- IT services
- Graduate studies
- Executive management
- Records management
- Privacy office
- Legal services
- Indigenous office/Representative/Council
- Other (please specify)

11. What resources are you using to develop an institutional strategy?
Check all that apply
- Alliance RDM (Portage) Institutional Strategies resources List which ones
- Existing policies and resources from other institutions List which ones
- Maturity assessment models (e.g., MAMIC, RISE)
- Consultants
- Workshops
- Fellow colleagues at other institutions
- Other (Please specify)

12. Please rank your perceived usefulness of the Alliance RDM (Portage) tools.

	have not used	not useful	somewhat useful	very useful
Strategy Development Template, V3 (released November 2021)				
Strategy Template and Guidance, V2(prior to November 2021)				
Maturity Assessment Model in Canada (MAMIC)				
Videos				
Discussion Prompts				
Brief Guide				
Primer				

- Please provide any suggestions or other tools you would like to see developed.

13. What challenges or difficulties have you encountered during the process of developing your institutional strategy?
Please rate the following

	will not be doing	not started	not difficult	difficult	very difficult	not applicable
Coordination of the working group or committee						

Engaging researchers					
Addressing disciplinary approaches					
Assessing institutional capacity					
Creating a roadmap/action plan					
Defining a desired end state					
Estimating the cost of RDM related activities, services, and infrastructure					

- Other, please specify

14. If you have answered difficult or very difficult, please explain why.

15. Would additional guidance and support be helpful as you continue to develop your institutional strategy?
    Check one
    - Yes
    - No

16. What type of guidance or support would your institution need? Please rank the following options.

	not interested	somewhat interested	interested
A workshop for your institution			
A workshop at a regional venue			
A workshop at a national venue			
A webinar			
Online documentation with tutorials			
Videos			

- Other, please specify.

17. Would you like to provide additional comments?

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[1] University of Guelph

[2] Queen's University

[3] The Alliance RDM was known as Portage at the time of this survey.