

Research Information Management: Defining RIM and the Library's Role

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INTRODUCTION

Research information management (RIM) is the aggregation, curation, and utilization of information about research and is emerging as an area of increasing interest and relevance in many university libraries. RIM intersects with many aspects of traditional library services in discovery, acquisition, dissemination, and analysis of scholarly activities, and does so through the nexus with institutional data systems, faculty workflows, and institutional partners. RIM adoption offers libraries new opportunities to support institutional and researcher goals.

This report will help libraries and other institutional stakeholders understand developing research information management practices—and particularly the value add that libraries can offer in this complex ecosystem. We also intend that this report and its companion resources can help librarians to effectively communicate this value proposition within their institutions, particularly to stakeholders with limited knowledge of library expertise.

A working group of librarians representing OCLC Research Library Partnership institutions prepared this report, which reflects their perspectives and expertise developing RIM infrastructures on three continents.

Rebecca Bryant, PhD
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What Is Research Information Management? And What Do We Call It?

Broadly defined, research information management (RIM) is the aggregation, curation, and utilization of metadata about research activities. Science Europe, an association of European research councils and institutes, defines RIM as “data about research activities rather than research data generated by researchers.”¹

Research information management systems collect and store metadata on research activities and outputs such as researchers and their affiliations; publications, datasets, and patents; grants and projects; academic service and honors; media reports; and statements of impact.

RIM systems are valuable to research institutions because they combine the local with the global, providing opportunities for new insights at the departmental, faculty/college, and institutional level, as well as the potential for regional, national, and transnational sharing and benchmarking. They can also tell a story about major research issues such as impact and collaboration, and also support reputation management for the institution and its researchers.

Depending upon institutional need, the RIM registry may also capture additional internal information such as courses taught, students advised, and academic committee service (figure 1). Like Science Europe, our discussion here of RIM is distinct from research data management (RDM), a term which is used to describe the processes researchers and institutions use for organizing, securing, archiving, and sharing research data throughout the research lifecycle.

RIM Metadata

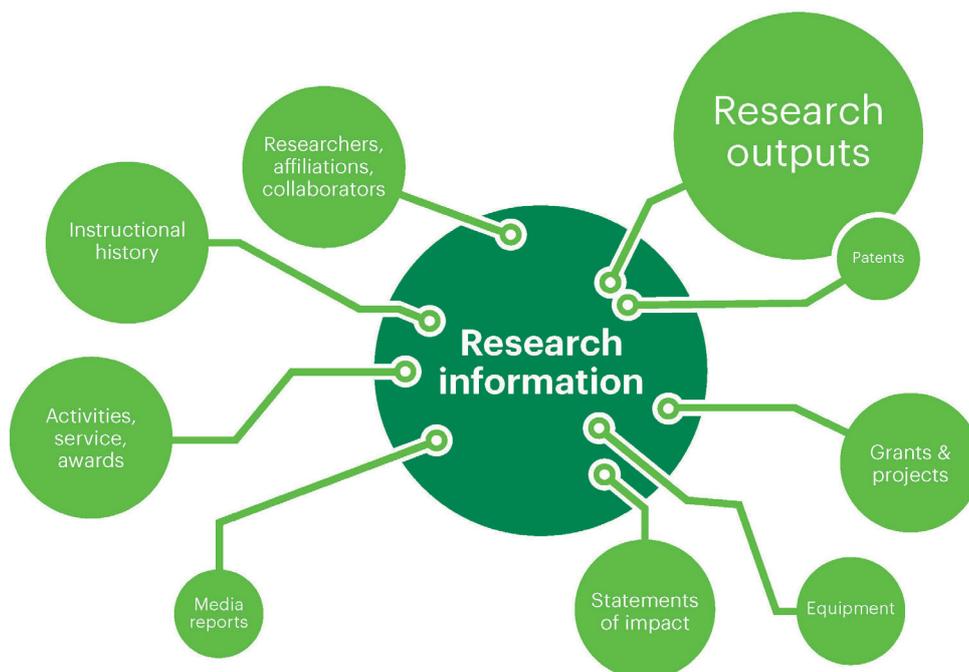


FIGURE 1. RIM METADATA

RIM aggregation is much needed in universities, research institutes, medical centers, national laboratories, and other scholarly institutions. RIM systems enable institutions to collect data from different internal systems and to combine it with external information, such as metadata from publications aggregators like PubMed or Scopus, providing a richer view of the research activity for an institution and its subunits. RIM systems are valuable to research institutions because they combine the local with the global, providing opportunities for new insights at the departmental, faculty/college, and institutional level, as well as the potential for regional, national, and transnational sharing and benchmarking. They can also tell a story about major research issues such as impact and collaboration, and also support reputation management for the institution and its researchers. Institutional RIM adoption, in tandem with activities by publishers, funders, and libraries, can help to reliably connect a complex scholarly communications landscape of researchers, affiliations, publications, datasets, grants, projects, and their persistent identifiers.

The nomenclature surrounding research information management practices is highly regionalized and, to some degree, unstandardized. Europe has consistently called these systems Current Research Information Systems or CRIS. As early as 1991, European research administration managers came together to share practices and standards together, a group that was formalized a decade later as euroCRIS.² For example, by 2008, all 14 Dutch research universities had implemented the nationally developed Metis CRIS system and were able to feed information into the National Academic Research and Collaborations Information System (NARCIS).³ While the term CRIS remains the dominant term in Europe, we observe variations in practice there as well. The “C” for “current” in CRIS is sometimes dropped, as demonstrated in the *Science Europe Position Statement on Research Information Systems*.⁴

North American research administrators and librarians are less likely to use the term *CRIS*, and a multitude of descriptive terms have recently proliferated, such as Research Networking System (RNS), Research Profiling System (RPS), or Faculty Activity Reporting (FAR). While descriptive, these phrases each represent only a specific functional use or workflow within the research information management process. They may also reflect localized implementation within just a portion of an institution, such as the medical center or a specific college, instead of an enterprise-wide solution. US RIM adoption straggles in great part because no single campus unit “owns” interoperability; instead, RIM development often takes place at the college or even department level.⁵

We have chosen to apply the phrase research information management (RIM) here to describe not just a specific use case or workflow, but the ecosystem—the overall process of collecting, managing, and reusing research activity metadata. This rubric is intentionally inclusive of a variety of regionally specific uses and can accommodate new practices to come. We also intentionally substitute the word “management” for “system,” as the word *system* may suggest a single platform or database. Instead, the research information management ecosystem is aggregated from multiple sources in constant flux, and increasingly requires the cooperation of multiple stakeholders: academic and research administrators, librarians, and the researchers themselves.

To be clear, research information management as defined and discussed here is separate from independent academic social networks like ResearchGate or Academia.edu; while these services may support independent researcher career management and networking activities, the content is externally aggregated and separate from any institutional workflows, affiliations, or decision support. RIM instead represents institutional curation of the institutional scholarly record.

FUNCTIONAL USES OF RIM INFORMATION

Research information management may support many activities within an institution. Figure 2 demonstrates the numerous functional uses for research information that *may* be utilized by a specific institution. Practices vary widely by institution, nation, and region, in response to local requirements. No two institutions look exactly alike, but for the purposes of our discussion, any institution applying one or more of these functional use cases is practicing research information management.

These uses are described below:

- **Annual academic progress reviews** collect and manage information about research and scholarship, creative works, teaching and mentoring, and service activities to support promotion, tenure, and annual review activities. It is routinely called Faculty Activity Reporting (FAR) in North America. Examples include UA Vitae at the University of Arizona or eFARS at Virginia Tech.⁶
- **Grants and awards management** systems provide information about extramural research support. Awards management workflows may be closely integrated with other RIM functionality (such as the myResearch workflows at Monash University) or exist completely separately, as is the common practice in North America.⁷

RIM Uses

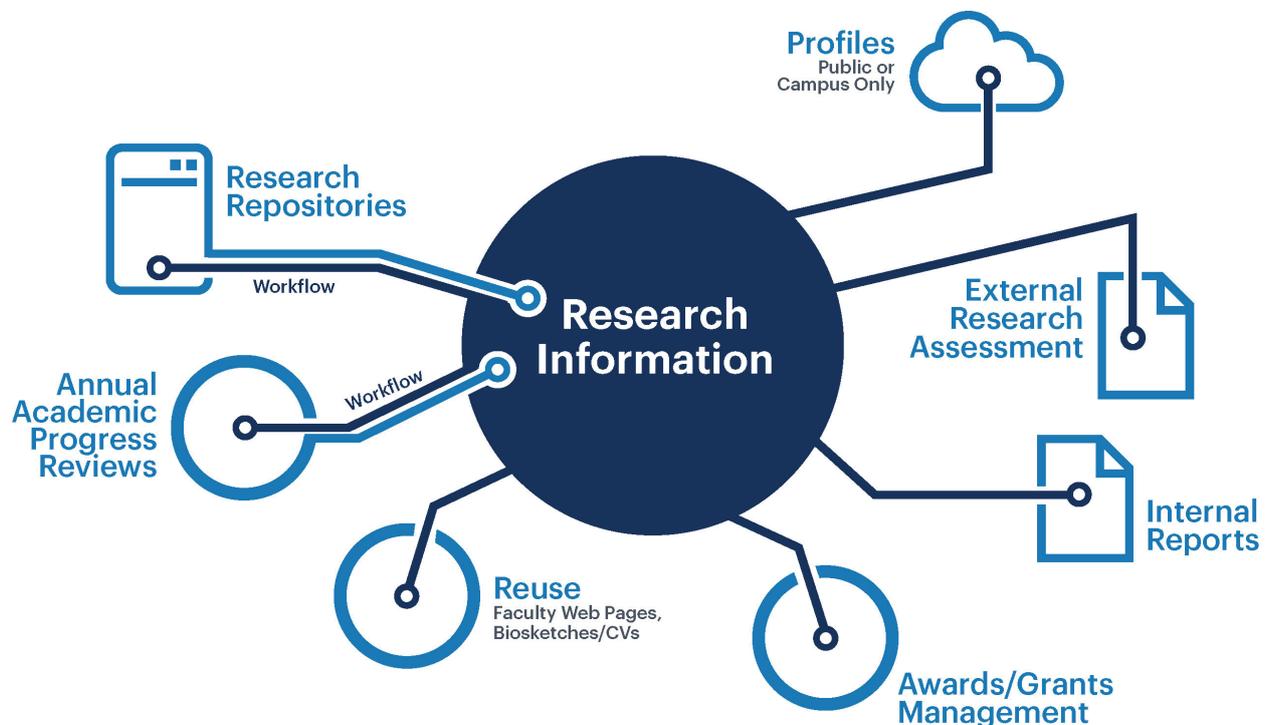
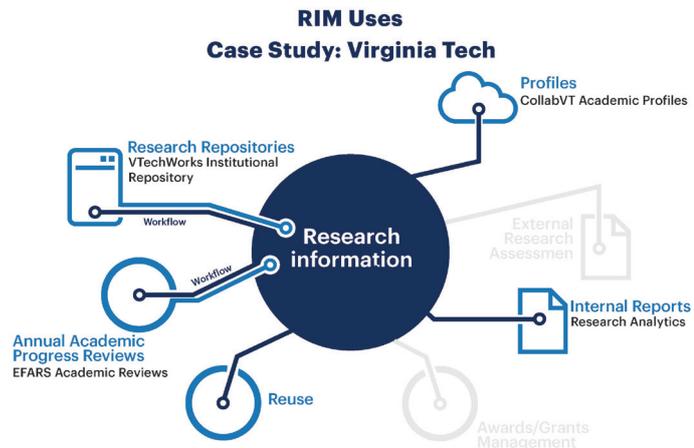


FIGURE 2. RIM USES

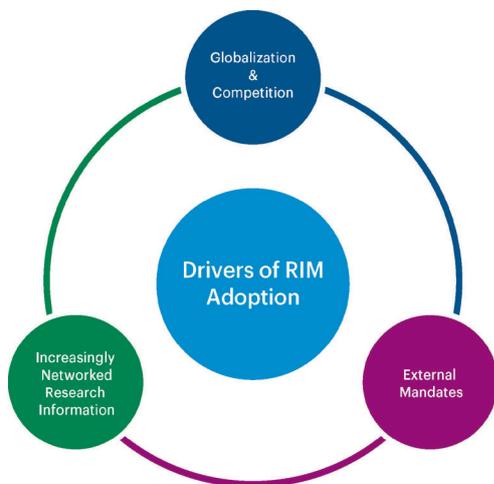
- **Researcher profiles** may operate as locally restricted directories or as public portals to support expertise discovery and reputation management. This infrastructure is developing locally (such as the Experts@Syracuse portal at Syracuse University or Scholars@TAMU at Texas A&M University),⁸ disciplinarily (such as the Direct2Experts network for biomedical expertise),⁹ and nationally (such as the NARCIS portal¹⁰ with profiles of all Dutch researchers in the Netherlands and the ResearchMap portal¹¹ in Japan).¹²
- RIM systems are increasingly supporting the **open access** deposit and discovery of locally produced research publications and datasets, often in response to pressures exerted by scores of institutional, funder, or government policies.¹³ This may be facilitated through RIM workflows that support researcher self-archiving into a separate repository, manual support by the library, use of the RIM system itself as a repository, or in combination. For example, the University of St Andrews has had an integrated research information infrastructure since 2006, in which the full text of research paper may be submitted to the local DSpace research repository via the campus RIM—capturing metadata and content in a single workflow for researchers.¹⁴ Other institutions such as the University of Amsterdam and Monash University use the RIM itself as the content repository. St Andrews uses their RIM as the default repository for datasets only.^{15,16}
- Aggregated information can be **reused** by researchers to save time and add convenience. For example, researchers and organizations profiled in Scholars@Duke¹⁷ can enable a customizable widget to dynamically update a web page (such as a laboratory or personal page) whenever the Scholars@Duke information is updated. Researchers may also be able to produce curriculum vitae or biosketches from system information.¹⁸
- Aggregated metadata may be used to support **internal reporting** for a variety of purposes such as departmental or institutional decision support and planning, academic program review, faculty evaluation/post-tenure review, supervisor selection and management, and accreditation activities. For example, at the University of Arizona, UA Vitae¹⁹ data is used to support program accreditation preparation.
- Depending upon regional, national, or funder requirements, RIM-aggregated information may be used to support various aspects of **external research assessment** practices, such as research impact assessment. For example, the United Kingdom has implemented the Research Excellence Framework (REF)²⁰ for assessing the quality and impact of research at UK higher education institutions, with implications for future support. UK institutions dedicate considerable resources to research information management in advance of the next planned REF in 2021.

Case Study: Research Information Management at Virginia Tech

Most institutions adopt multiple RIM functions. For example, Virginia Tech (US) implemented the locally branded Electronic Faculty Activity Reporting (EFARS) system in 2016,²¹ using the Symplectic Elements vendor product. EFARS facilitates the import of publications from external databases like PubMed, Web of Science, and ArXiv, and combines these data with information harvested from internal human resources, student information, research management, and data warehouse systems. EFARS supports the recording, tracking, and reporting on scholarly activities for faculty annual academic progress reviews; promotion and tenure dossiers; and internal reports for departments, colleges, and the institution. Virginia Tech has also integrated EFARS with the local VTechWorks institutional repository, enabling users to deposit open access content to VTechWorks through a workflow within EFARS. EFARS data is used to create researcher profiles in the CollabVT profiles system.²² As the project matures, researchers will be able to reuse EFARS information to produce CVs.²³



What's Driving RIM Adoption?



Research information management is rapidly growing in importance within the context of a highly globalized and competitive research landscape. Nations at all stages of development are seeking to build knowledge-based economies and to attract and retain knowledge experts, and highly mobile students and researchers are increasingly pursuing opportunities outside their own national borders. Concurrent with increasing **globalization and competition** has been an intensifying preoccupation with “world class” prestige, university rankings, and indicators of research and education impact. Institutions are responding by seeking improved quantitative data for decision support, strategic planning, and benchmarking against peers.²⁴

Governments, policy makers, research funders, institutional leaders, and researchers themselves all seek improved, transparent information about research outputs, quality, and impact.²⁵ This has led to **national mandates to collect and measure the impact of sponsored research** such as through the Research Excellence Framework (REF) in the UK and the Excellence for Research in Australia (ERA) in Australia.²⁶ In addition, scores of funders, research organizations, and national and regional bodies have enacted **open access mandates**.²⁷ For example, national funders such as the Research Councils UK, Australian National Health and Medical Research Council (NHMRC) and Australian Research Council (ARC) and the Canadian Tri-Council agencies require publications (and to a lesser degree, research datasets) resulting from sponsored research to be made available in open access format.²⁸ The 2013 policy memorandum from the US White House Office of Science and Technology

similarly required the public availability of federally funded research.²⁹ By 2020, all European scientific articles and relevant datasets must be freely accessible. Institutions are responding to these external mandates by working to identify works, support OA deposit, and track compliance.³⁰

Advancing technologies, standards, and networked information offer new and improved ways to collect and manage research information, and interoperability is becoming an imperative for institutions, libraries, publishers, and funders as they seek to collect and exchange research information, reduce administrative burden, support institutional decision making, and promote institutional brand and prestige. Not long ago, collecting a “comprehensive faculty bibliography” would have been unthinkable, as it could only have been compiled through the collection of each scholar’s curriculum vitae.³¹ Institutions instead relied upon proxies of research productivity—such as numbers of PhDs awarded or total dollars received in federal research grants—to demonstrate their research strengths. Today the collection of this information can be more easily scaled through metadata harvesting from publication indexes like PubMed or Web of Science. The adoption of globally accepted persistent identifiers (PIDs) like DOIs for digital publications and datasets and ORCID identifiers for researchers provide essential resources for reliably disambiguating unique objects and people, and the incorporation of open and interoperable identifiers into scholarly communications workflows provide growing opportunities for improved metadata quality and interoperability.³²

ORGANIZATIONAL CHALLENGES FOR INSTITUTIONS

Because of the enterprise nature of the data inputs and uses, there are numerous institutional stakeholders in research information management, including the research office, institutional research, provost or rector, library, human resources, registrar, and campus communications. This presents significant barriers for RIM adoption, as cross-institutional collaboration is essential for ensuring project

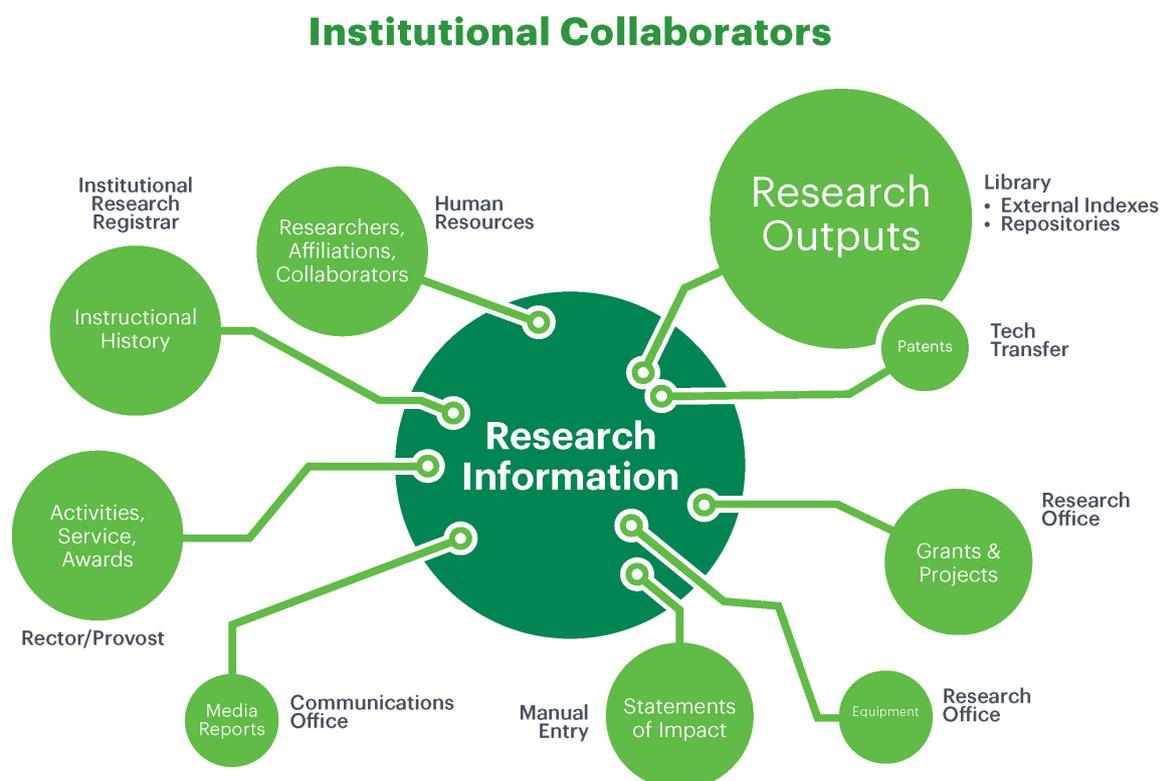


FIGURE 3. INSTITUTIONAL COLLABORATORS

success. Institutional RIM leaders vary widely, but often fall within the office of research, institutional research, or the library. Institutions are increasingly responding to the organizational challenges through service center models that support co-ownership between multiple siloed university units, such as IT, the research office, and the library. For example, at the University of St. Andrews, RIM activities are now supported through co-ownership between the Research Policy Office, Library, and IT Services (ITS), resulting in consistent, coordinated communications and services for researchers and administrators.³³

The Library's Role in Research Information Management

Research information management offers an opportunity for diverse campus units to work collaboratively to collect information, improve processes, reduce duplication, and accomplish goals they couldn't do alone. Today libraries seek to align their activities with broader campus strategic plans, extending their services to support institutional goals and reputation through discovery and preservation of locally produced knowledge. Libraries can offer valuable expertise to help solve institutional problems, but are frequently an unrecognized partner in institutional research information management. New collaborators like HR and institutional research may have had few previous opportunities for collaboration with the library and are likely unaware of growing "inside-out" research life cycle support including expertise in research policies, funding, and compliance; bibliometrics and research evaluation; and research data management. Stakeholders familiar with only traditional library functions such as collection development and literature searching support will dismiss libraries as critical partners. And while the priorities of some RIM partners may differ from those of the library, libraries should not overlook how RIM partnership can help them to further many of their own values and goals, such as supporting open access, discoverability, and individual researchers.³⁴

Today libraries seek to align their activities with broader campus strategic plans, extending their services to support institutional goals and reputation through discovery and preservation of locally produced knowledge. Libraries can offer valuable expertise to help solve institutional problems, but are frequently an unrecognized partner in institutional research information management.

Libraries must understand and articulate the value of librarians' scholarly communications expertise as well as their collaboration and service ethos to other campus stakeholders. Successful library efforts are led by those who are curious learners from other campus experts in areas such as institutional research, research administration, and academic review.

Libraries in Research Information Management



FIGURE 4. LIBRARIES IN RESEARCH INFORMATION MANAGEMENT

We believe that libraries can support institutional research information management in four critical ways:

1. PUBLICATIONS AND SCHOLARSHIP EXPERTISE

Librarians have generations of experience managing bibliographic records, and this expertise can help optimize the quality and completeness of data available for institutional reporting, discovery, and reuse. In broad terms, library professionals have extensive knowledge about scholarly communication, the ecosystem through which research and other scholarly writings are created, evaluated for quality, disseminated to the scholarly community, and preserved for future use.³⁵ For example,

- Librarians are experts on an extensive and complex array of publication indexes and repositories that may serve as sources for metadata harvesting at scale. These indexes serve different disciplines and purposes, and libraries can offer context about coverage, gaps, and accessibility, and they can advise on the challenges and opportunities for harvesting and licensing content from different sources.
- Because many vendors now offering RIM products are situated within the publishing community, the library may have pre-existing relationships and licensing agreements that should be considered holistically.
- Librarians often advise on the complex licensing and intellectual property landscape, with implications for metadata availability and access to full print resources.
- Librarians are knowledgeable about emerging trends in publishing and discovery, issues that are highly relevant for local research information management.

- Librarians can help institutional stakeholders understand the challenges of disambiguation and duplicate management with bibliographic records, and the resources available to manage these challenges. This includes knowledge of current and emerging standards, persistent identifiers (PIDs), and vocabularies and data dictionaries.
- Librarians work to support the adoption and integration of author identifiers like ORCID, in order to improve metadata quality and attribution.

2. DISCOVERABILITY, ACCESS AND REPUTATIONAL SUPPORT

Institutions should consider how they can increase value and impact by using and reusing RIM information in multiple ways. Libraries can particularly offer institutions opportunities to extend the impact of research information management efforts through support for public expertise profiles and open access to locally produced content. For example,

- RIM information can be used to augment current campus directory services, and offers the potential to facilitate more rapid knowledge sharing within an organization as well as beyond it.³⁶
- A public discovery portal for institutional experts can increase visibility and discoverability by potential local and international collaborators, research sponsors, and media contacts. It can also help local and prospective undergraduate, graduate, and postdoctoral researchers identify research opportunities, mentors, and doctoral committee members.
- Institutions and researchers may need to respond to local, funder, or government open access mandates. Libraries are active advocates for open access to scholarly content, and they are essential partners supporting the collection, dissemination, and preservation of locally produced open access content, whether managed in a separate institutional repository or facilitated in the local RIM system itself.³⁷
- These efforts can make the outputs of researchers and the institution more widely available, citable, and impactful, helping to support individual and institutional reputation and prestige. For example, the Duke University Libraries have collaborated with campus communications to support open-access deposit of publications when possible prior to university press releases, optimizing availability and the potential for citation.³⁸
- Researchers and institutions alike are interested in indicators of research impact, and libraries can offer expertise in traditional bibliometrics as well as emerging “altmetrics,” or alternative metrics, which can provide useful indicators about article views, file downloads, and mentions in social and news media. Numerous libraries have taken a leadership role in developing LibGuides, workshops, and training for researchers on these topics. Some institutions, like the University of Waterloo (Canada), also work closely with campus leaders and institutional researchers to provide strategic guidance, data analysis, and impact reports to support institutional needs.³⁹

3. TRAINING AND SUPPORT FOR END USERS

Librarians have always educated and supported researchers, traditionally through the provision of discovery and access to research materials. Support for researchers and other users of the RIM system is an extension of current services and consistent with the library’s service mission to students, scholars,

and the institution. This service mission complements and may contrast with other campus units where the core mission is compliance, reporting, or academic affairs, and library involvement can help ensure the needs of the researcher are considered.

- Many libraries assume leadership for RIM training and support, offering workshops, presentations, and individual guidance and support to researchers and others using RIM infrastructure.
- Librarians train researchers to import publications data from publication indexes and reference management tools, to link their profiles with unique identifiers like ORCID, and to use and understand impact indicators.
- For example, at the University of Tennessee, Knoxville, librarians developed an online resource guide that has been used by the provost, deans, and other campus stakeholders. The library also led train-the-trainer workshops for more than 100 unit representatives in order to scale knowledge and adoption.⁴⁰ The University of Arizona libraries have offered similar training and support for their locally branded UA Vitae offering.⁴¹
- Training support for research information management services can dovetail directly with other library services supporting researchers throughout the research life cycle, such as those offered by the University of Queensland library and the University of Calgary library, including online guides, workshops, and individual support on scholarly communications topics like researcher identifiers, citation management and software, publishing and open access, data management, copyright licensing, reputation management and research metrics.⁴²
- Library support may also extend to helping researchers comply with policies, such as national open access policies, as seen in the UK,⁴³ or local policies and processes for academic review.

4. STEWARDSHIP OF THE INSTITUTIONAL RECORD

Libraries and archives have served as stewards of the scholarly record for centuries. Today they continue this work in a rapidly changing digital environment, where stewardship of the evolving scholarly record is necessarily becoming more cooperative, conscious, and operating at scale.⁴⁴

- Libraries now play an increasingly visible role in stewarding the *institutional record*, seeking to increase the discoverability of institutional outputs and curating a unique collection of institutionally produced items that can be shared via network.

*Libraries are the sole stakeholder that asks,
“Will we be able to find and use this content in the future?”*

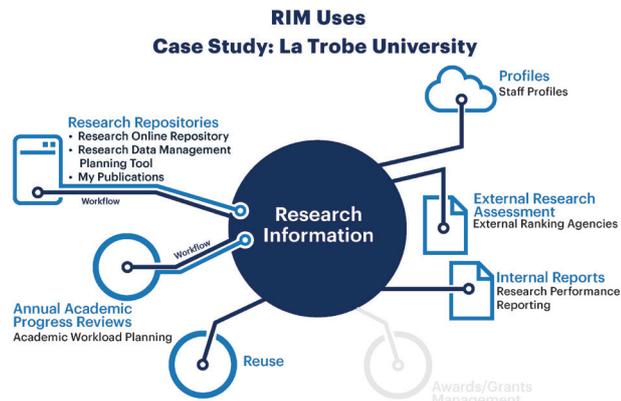
- Different stakeholders across the institution have different needs and goals, which may include compliance, accreditation, reporting, and strategic decision support. Libraries are the sole stakeholder that asks, “Will we be able to find and use this content in the future?” and assumes responsibility for preserving the institutional scholarly record.⁴⁵
- University archives are usually situated within the campus library and can be valuable partners in identifying archival and preservation needs and processes.

- Libraries are also well situated among campus partners to promote appropriate integration of RIM data in other systems, to encourage broader access, availability, and reuse. For example, web plug-ins like those used by Leuphana and Duke Universities facilitate the timely exposure and update of current research outputs on multiple researcher and institutional web pages, saving time and effort for individuals and institutions alike.⁴⁶

Case Study: Research Information Management at La Trobe University

In its 2013-2017 Research Plan, La Trobe University (Australia) defined the need to provide innovative, streamlined and efficient academic and professional services.⁴⁷ Today the institution is investing in new and highly integrated infrastructure to support research information management, replacing at least 15 siloed legacy systems.

La Trobe University library works collaboratively with others at the institution to support the following research information management activities:



Publications and scholarship expertise

- The Library manages the university's My Publications (Symplectic Elements) system used by all La Trobe researchers to claim and verify research outputs. It configures the system for publication harvesting from external sources and utilizes ORCID, Scopus and other identifiers to improve identification, attribution and publication claiming by academic authors.
- Librarians apply their scholarly communications expertise to clean up, assign and de-duplicate identifiers within external systems such as Scopus (which the My Publications system uses as a data source) so that the incoming data can be accurately and automatically assigned to researchers.

Training and support

- Librarians assist researchers with assessing usage and impact of their research, for provision within grant applications, for promotion and assessment purposes, and to guide and assist them with publication and research planning.
- Library staff lead programs to support research data management across the university, providing guidance for La Trobe researchers to record, store, share, collaborate, and publish research data (and metadata).

Discoverability, access and reputational support.

- Library staff manage the Research Online institutional repository in order to collect, store, describe, manage, and publish full-text pre-prints, theses, and other research outputs in order to support the discoverability and broad access to LaTrobe research registered in the RIM.⁴⁸
- Furthermore, Research Online supports internal reporting, compliance with open-access publishing mandates, internal and external research assessment, internal reporting and workload planning, and public researcher profiles.

Stewardship of the institutional record

- Not only does the La Trobe library support efforts to improve and ensure the quality of research metadata, through linkages with the Research Online repository, it also ensures the long-term preservation of the institutional scholarly record.

CONCLUSION

Research information management infrastructures collect data on research activities and outputs from a multitude of internal and external sources and may be implemented at the college/faculty, institution, consortial, and national levels. While RIM adoption is occurring globally, practices vary widely by institution, nation, and region, in response to local requirements. RIM adoption may support multiple functional uses, including annual academic progress reviews, grants and awards management, researcher profiles, open access and repository integration, internal reporting, external research impact assessment, and reuse in other systems and media.

Globalization, intense competition, institutional rankings, and the need for improved data for decision support are driving RIM adoption. In addition, funders and policymakers are seeking quantitative measures to assure that research dollars are yielding the highest impact. Advances in technologies, standards and persistent identifiers are offering scalable solutions for collecting, disambiguating, and making use of research information.

Because RIM collates metadata from many internal and external sources, adoption requires collaboration among numerous institutional stakeholders. The library is a valuable and frequently unrecognized partner in this ecosystem as other stakeholders may not recognize the relevance of library scholarly communication expertise. Libraries can support institutional research information management in at least four critical ways: publications and scholarship expertise; discoverability, access, and reputational support; training and support for end users; and stewardship of the institutional record.

RIM Communities of Practice

These organizations facilitate research and information sharing about research information management practices.

- EuroCRIS
- CASRAI
- OCLC Research Library Partnership, oc.lc/rim
- User group communities—both proprietary and open-source products offer user group communities, usually organized regionally

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12. In most scholarly disciplines today, research is conducted in teams. These teams are increasingly interdisciplinary and international, and this diversity can yield some of the most spectacular and high impact research successes. Institutions as well as researchers themselves are seeking to better understand how to position themselves for success, particularly by facilitating and optimizing collaboration. Scholarly research in the "science of team science (SciTS)" is evolving, and new organizations, infrastructure, and events are developing to support team science. Public researcher profiles provided by RIM systems are an important part of this effort, as one of their goals is to help researchers identify possible collaborators, particularly those outside their own disciplines where their personal networks fail them. See, Contractor, Noshir. 2013. "Some Assembly Required: Leveraging Web Science to Understand and Enable Team Assembly." *Philosophical Transactions of the Royal Society A, Mathematical, Physical, and Engineering Sciences* 371(1987). doi:10.1098/rsta.2012.0385. Vacca, Raffaele, Christopher McCarty, Michael Conlon, and David R Nelson. 2015. "Designing a CTSA-Based Social Network Intervention to Foster Cross-Disciplinary Team Science." *Clinical and Translational Science* 8(4): 281–89. doi:10.1111/cts.12267.
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