

Research Software Alliance

Strategic Plan 2021-23

1. Introduction	1
2. ReSA and the research software landscape	2
2.1 The research software community	2
2.2 ReSA achievements	3
3. Strategic goals	4
3.1 ReSA themes	4
3.2 Operational goals	4
ReSA utilises this framework in planning its thematic and operational activities.	6
4. ReSA activities	6
4.1 ReSA themes	6
4.2 Operations	10
5. Evaluation	11
6. Risk management	12

1. Introduction

The Research Software Alliance (ReSA) is an international non-profit organisation with the following vision and mission:

Vision: Research software and those who develop and maintain it are recognised and valued as fundamental and vital to research worldwide.

Mission: To bring research software communities together to collaborate on the advancement of the research software ecosystem.

This strategic plan details ReSA's role in the research sector; strategic goals and activities for 2021-23, including governance and operational structure; and its approach to evaluation and risk management.

2. ReSA and the research software landscape

It is useful to understand the context of ReSA's role in the scholarly landscape, both to explain ReSA's niche within this, and to define the research software community that ReSA's mission seeks to improve collaboration across.

2.1 The research software community

In 2020 a [ReSA blog](#) identified 50+ organisations and communities with aims similar to that of ReSA in increasing recognition and valuing of research software, in aspects such as preservation, citation, career paths, productivity, and sustainability; or at disciplinary or national/regional levels. These organisations are the core of the research software community that ReSA seeks to serve.

In addition to those that focus directly on research software, there is a broader community of others for which software is just a small part of their interest; these are also relevant stakeholders. Some examples are communities that focus on open science, reproducibility, roles and careers for people who are less visible in research, publishing and review, and other types of scholarly products and digital objects.

There are also overlaps with open source software projects in industry, noting that the increasing focus on open source software in research also makes it hard to separate research and non-research initiatives. Consequently, it is very hard to define the “research software community” in a clear-cut way, and ReSA is open to engaging with all organisations that identify themselves as part of this. This identification of stakeholders also did not include the extensive number of organisations, projects and communities that create, maintain and/or utilise research software, within and/or across research software.

This analysis illustrates that there are many communities and organisations that support research software, emphasising the need for a coordinating organisation such as ReSA. Whilst some of these groups come together in different ways, the research software community does not have a coordinating entity that works with all of these in a formal way (as the research data community does through the Research Data Alliance and CODATA) to maximise collective impact.

ReSA is supported by top global research infrastructure institutions to function as a backbone organisation across the research sector to increase the community's ability to collectively impact achievement of the shared vision that research software is recognised and valued as a fundamental and vital component of research worldwide. A wide range of research software organisations and programs exist internationally to address the varied challenges in software productivity, quality, reproducibility and sustainability. Backbone organisations enable collaboration in a synchronised effort across multiple stakeholders to achieve a common goal.

ReSA supports collective impact by providing the social infrastructure needed to foster the cross-organisational communication, alignment, and collaboration required to achieve sectoral change. ReSA's mission is to provide this for the research sector.

There are a number of ways in which ReSA can contribute to research software challenges where international and/or cross-disciplinary consensus would be valuable, ranging from software interoperability to the changing skill sets needed by research software developers. ReSA can play a key role in facilitating convening of international bodies as needed, and to support the sharing of best practices that can improve the ability of communities to advance policy reform to better support technological and social infrastructures:

1. As a lobbying organisation that aims to influence a small number of key high-level stakeholders (such as international policy making bodies).
2. As a community enabler that facilitates projects across organisations. This includes as a coordinating body between national/regional, disciplinary or thematically-focused organisations that are working on related tasks.
3. As a community forum supporting community-level discussions on priorities and goals.

2.2 ReSA achievements

The depth of sectoral support for ReSA can be seen through the range of key influencers and decision makers engaged with ReSA. ReSA sponsors include the Alfred P. Sloan Foundation, Gordon and Betty Moore Foundation, Wellcome Trust, Australian Research Data Commons, Netherlands eScience Center, Research Data Canada, Software Sustainability Institute, The Carpentries, University of California-Berkeley, Stanford University, and University of Illinois.

ReSA's success can also demonstrated through its ability to engage the research community to achieve sector-wide impacts, which include:

- Influencing international [OECD](#) and [UNESCO](#) community consultations and expert groups to include software in key policy documents.
- Development of research software sharing guidelines for policy makers, funders, publishers and researchers for inclusion in the [Research Data Alliance COVID-19 Guidelines and Recommendations](#).
- Co-leading the [FAIR for Research Software Working Group](#) with the Research Data Alliance and FORCE11, which has engaged 300+ people from 110+ organisations in 18+ countries in the creation of international community-endorsed FAIR principles for research software.
- Leadership of the FAIR for Research Software Roadmap to map existing FAIR for research software projects into a longer-term framework to improve strategic alignment that will make FAIR research software a reality. Working Groups within this task force focus on a range of areas that cut across the three ReSA themes, including metrics, discipline adoption, virtual research environments, skills and training curriculums, and governance.

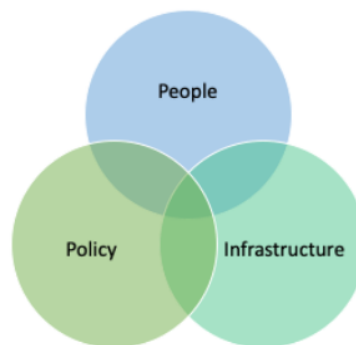
However, there is still more work to be done to ensure that ReSA engages comprehensively with its key stakeholders, and more areas where increased community collaboration would be beneficial.

3. Strategic goals

ReSA's strategic goals are based around its three themes of people, policy, and infrastructure.

3.1 ReSA themes

ReSA's strategic goals are situated within three overlapping themes: people, policy and infrastructure, with the following aims:







1. People - improve social infrastructure to enhance individual skills, facilitate behaviour change and support communities
2. Policy - encourage and support software recognition steps by policy makers, funders, publishers and hiring institutions
3. Infrastructure - identify and support needed infrastructure, including software repositories and registries, tools that enable rewards and recognition, and standards and guidelines

3.2 ReSA goals

There are a range of frameworks delineating how organisations like ReSA can increase outcomes for their communities through their structures and engagement processes; ReSA utilises these in its planning.

The [Tamarack Institute](#) identifies five phases of collective impact that backbone organisations such as ReSA need to work through to increase community mobilisation for success. In the following table, the green ticks identify which phase ReSA is currently at across four components for success, to identify areas that ReSA needs to focus on operationally.

Components for Success	Phase I Assess readiness	Phase II Initiate Action	Phase III Organise for Impact	Phase IV Begin Implementation	Phase V Sustain Action and Impact
Governance and Infrastructure	Convene community leaders	Identify champions and form cross-sector Steering Committee (SC) to guide effort	Determine initial work groups (WGs) and plan backbone organisation 	Launch WGs and select backbone organisation	Build out the backbone organisation, evolve WGs to meet emergent strategy
Strategic Planning	Hold dialogue about issue, community context, and available resources	Map the landscape and use data to make the case 	Create common agenda, clear problem definition, population level goal	Develop blueprint for implementation and identify quick win	Refine strategies and mobilise for quick wins
Community engagement	Determine community readiness; create community engagement plan	Begin outreach to community leaders 	Incorporate community voice, gain community perspective and input around issue	Engage community more broadly and build public will	Continue engagement and conduct advocacy
Evaluation and Improvement	Determine if there is consensus/urgency to move forward	Analyse baseline data to identify key issues and gaps 	Develop high level shared metrics and/or strategies at SC level	Establish shared measures (indicators and approach) at SC and WG levels	Collect, track and report process (process to learn and improve)

4. ReSA activities

There are a number of areas where ReSA will focus its activities in 2021-23, across both the three ReSA themes and operational areas. ReSA utilises the [Turner et al](#) framework on core activities of backbone organisations in planning its thematic and operational activities.

4.1 ReSA themes

To align with the Turner et al. framework on the six core activities of backbone organisations (and associated indicators of success), ReSA aims to evolve its activities in these six areas over the next two years as per the table below. **The table also includes details of proposed projects where resourcing is needed, to highlight funding opportunities for partners.**

These activities will be mostly achieved through community consultations and task forces. Community consultations aim to bring together diverse stakeholders (including organisational members) to identify next steps and challenges for the three ReSA themes. These lie at the heart of ReSA's work, to achieve its mission of enabling collaboration across the community. The community consultations will assist in identifying areas where ReSA task forces could be initiated.

Core activity	Goal
1. Guide vision and strategy	Goal: Member organisations develop and implement a common agenda for the research software community.
Year 1	<p>Convene community consultations on the three ReSA themes to enable the community to identify community-wide issues that would benefit from increased collaboration.</p> <p><i>Current activity: (People theme) The People Roadmap comprises a series of engagements with 25 organisations to identify common issues in the following areas:</i></p> <ol style="list-style-type: none"> 1. Roles/careers/recognition 2. Skills needed and provision of training 3. Community/team development, including diversity, equity and inclusion 4. Policy such as best practice examples relating to personnel issues 5. Infrastructure and standards in areas such as software citation <p><i>Proposed activity: (People theme) Additional resourcing would enable extension of this beyond the initial 25 organisations, and to convene discussions on how to address the community priorities identified in the People Roadmap community consultations.</i></p> <p><i>Proposed activity: (People theme) ReSA will co-lead a hybrid Lorentz workshop in April 2022 to facilitate international discussion on framing diversity, equity and inclusion at the centre of research software engineering. Resourcing is needed for online event management and travel for in-person attendees.</i></p> <p><i>Proposed activity: (Policy and Infrastructure themes) Convene high-level community consultations on the policy and infrastructure themes, as is occurring for the people theme. Resourcing is needed to lead this</i></p>

	<i>engagement and analyse the outcomes for dissemination throughout the community.</i>
Year 2	<p>Deepen and extend these consultations, e.g., focusing on particular elements of the Year 1 consultations and/or extending the range of stakeholders involved, and progressing discussions on how to address the priorities that these identify.</p> <p>Plan how these consultations could build to the creation of a decadal plan for research software (as an equivalent to research data plans such as the International Science Council (ISC) Committee on Data (CODATA)'s Decadal Programme: Making Data Work for Cross-Domain Grand Challenges).</p>
Outcomes	Partners' individual work is increasingly aligned with the initiative's common agenda.
2. Support aligned activities	Goal: Member organisations collaboratively develop new approaches to jointly advance specific issues.
Year 1	<p>Facilitate task forces on priority areas arising from community consultations. The aim is that most of these are run by ReSA member organisations with ReSA serving as a coordinating body between national/regional organisations, disciplinary, and/or thematically focused organisations that are working on related tasks, and that only a few task forces would be led by ReSA (where no other organisation is available). Task forces may enable activities or create resources such as technical papers, standards, white papers, best practice exemplars.</p> <p><i><u>Current activity:</u> (Infrastructure theme) The FAIR for Research Software Working Group is on schedule to complete its goals of developing community-endorsed FAIR principles for research software, and adoption stories guidelines, by March 2022. This ReSA task force is co-led with the Research Data Alliance and FORCE11.</i></p> <p><i><u>Current activity:</u> (Infrastructure theme) The FAIR for Research Software Roadmap is a ReSA task force that is mapping existing FAIR for research software projects into a longer-term framework to improve strategic alignment and potential collaborators/leads for parts of the Roadmap. The Roadmap will enable the adoption and implementation of FAIR for research software to be fast-tracked in an efficient manner across the research community, with high-level coordination from its early stages to avoid duplication and divergent approaches. It will maximise investment outcomes, which is essential if FAIR for research software investments shadow the increasing FAIR data investments, such as the European Commission's €10 million, 3-year FAIRsFAIR initiative.</i></p> <p><i><u>Proposed activity:</u> (Infrastructure theme) Resourcing is needed for Phase 2 of the Roadmap, which will focus on implementation of the plan outlined in</i></p>

	<p><i>Phase 1. Initiatives emerging from Phase 1 that could benefit from support include:</i></p> <ul style="list-style-type: none"> ● FAIR for Research Software Roadmap Metrics Working Group - formed in February 2021 in partnership with Community Health Analytics Open Source Software (CHAOSS). ● FAIR for Research Software Life Sciences Working Group - formed in April 2021 in partnership with ELIXIR. <p><i>Proposed activity: (People theme) supporting research software product managers (who are distinct from Research Software Engineers, although there is some overlap) in their roles. People in these positions are often skilled in software development and project management, but not necessarily in areas such as inclusive practices, grant writing, impact assessment, sustainability/business models, community management, influencing local decision-makers, etc. Resourcing is sought to create a skills framework that facilitates increased support and recognition for these personnel.</i></p>
Year 2	Support ongoing task forces and establishment of task forces resulting from Year 1 community consultations.
Outcomes	Partners collaboratively develop new approaches to advance the initiative.
3. Establish shared measurement practices	Goal: Partners increasingly collect and use data to adapt and refine their strategies.
Year 1	Set up task forces to identify both available and needed data on research software issues, in consultation with the community.
Year 2	Facilitate task forces to facilitate research to collect and analyse data to answer the questions identified in Year 1. ReSA member organisations may collaborate to undertake or fund some of this research, and/or publicise these questions with the research community, so that individual researchers might choose to investigate them.
Outcomes	Partners increasingly use data to adapt and refine their strategies.
4. Build public will	Goal: More research software community members (both organisational and individual members) feel empowered to take action on the issue/s.
Year 1	Improve community communications and networks so that research software organisations and communities can access best practices, community news, networks, opportunities for collaboration, and share their initiatives.

	<p>Identify and promote people, policy and infrastructure resources, such as best practice guides, international recommendations or examples or national strategies.</p> <p>Promote and collaborate on development of events with other organisations (where appropriate).</p> <p><i>Proposed activity: Investigate co-convening an international research software conference with Netherlands eScience Center. The symposium would act as a catalyst to advance international collaboration on research software issues, enhance visibility of activities, and provide networking and knowledge sharing opportunities.</i></p>
Year 2	<p>Establish regular events where the community can formally come together. Run events/projects/discussions that improve linkages between existing research software initiatives.</p> <p>Provide more sophisticated analysis of what is happening in the sector, including new resources. Utilise this to write relevant white papers, RFI responses, articles, blogs, etc.</p> <p>Reach out to related communities to create relationships that help develop synergies with the research software community, such as data science, data stewards, open infrastructure.</p> <p>Consider establishing other infrastructure to enable this, such as journal special issues or a new journal if needed.</p>
Outcome	More community members feel empowered to take action on the issue(s).
5. Advance policy	Goal: Research and research infrastructure policy changes increasingly occur in line with the research software community's goals.
Year 1	<p>Provide a meeting place and contact point for community work on policy changes. Recommend relevant organisations or represent the community and their priorities in international and strategic forums, e.g., UNESCO, OECD. In Year 1 focus on building relationships and visibility to achieve this.</p> <p><i>Proposed activity: (Policy theme) Develop a research software advocacy toolkit to support policy interactions, that helps people looking to raise the profile of software within their local context, whether it be at team or national level, and with employers or international policy makers. Resourcing is needed to conduct this project.</i></p>
Year 2	Ensure that the research software community is a known entity at this level to ensure a seat at the table in relevant discussions, an evidence base to refer to, and resources to put forward our arguments.
Outcome	Policy changes increasingly occur in line with initiative goals.

6. Mobilise funding	Philanthropic and government investments are increasingly aligned with the research software community's goals.
Year 1	<i>Proposed activity: (Policy theme) Facilitation of a research software funders forum, possibly including representatives of national governments with research software strategies. Resourcing is needed to establish this forum, which may then be hosted by one of the funders.</i>
Year 2	Evolution of the research software funders forum, utilising information from the community consultations and task forces.
Outcome	Philanthropic and public funds are increasingly aligned with initiative goals.

4.2 Operations

ReSA's operational goals focus on sustainability, diversity, equity and inclusion, and governance.

To support achievement of its strategic goals, ReSA aims to establish a sustainable operational base that supports three staff in 2022; a Director, a Community Manager, and a Policy and Campaigns Manager. In the future this could expand to additional roles such as a Policy and Campaigns Officer, and a Membership Manager.

To provide ongoing financial sustainability, the [ReSA community engagement plan](#) for July-December 2021 identifies a priority area to be the establishment of a [community of fee-paying organisational members](#), to complement existing individual members. ReSA aims to be an online community composed of **key influencers** who share ReSA's vision and collaborate to achieve it through two tiers:

1. Organisational members - organisations and programs that address the varied challenges in increasing recognition of the importance of research software. These members are the core of ReSA. They potentially include the 50+ organisations identified in the ReSA [community landscape](#) (2020), and a wider group of initiatives supporting open science and/or open source software. The key influencers within these organisations who champion involvement within ReSA are usually senior staff. Their motivation for membership of ReSA is to access best practice, sector news, networks, opportunities for collaboration, share their initiatives, and influence ReSA's development.
2. Individual members - individuals who are interested in ReSA's work through task forces as it aligns with their own projects. They may be part of an organisation that is also a member, but equally may not. They seek to support other community members to achieve joint goals, receive feedback and collaborate with other organisation representatives.

Additional funding is also being sought to support the transition to this organisational membership model, and specific activities as listed in the previous section.

ReSA will also focus on internal projects related to governance, and diversity, equity and inclusion. The primary aim of the governance focus is the establishment of by-laws for the ReSA [Steering Committee](#), including a transparent process for membership elections that aligns with the two-tier membership structure. ReSA is a fiscally sponsored project of [Code for Science & Society](#).

ReSA also aims to increase the inclusivity of its work. Engaging with a diverse range of stakeholders who influence or engage with research software development and use is crucial to ReSA's mission; however, only 2% of participants in ReSA activities such as the [FAIR for Research Software Working Group](#) are from low-to-middle income countries. A brief audit of ReSA event practices showed that approaches to addressing diversity, equity and inclusion challenges are very limited at best ad hoc, and need to be embedded in ReSA culture and practices from beginning to end.

Significant cultural change is needed in the research software community to increase the diversity and inclusion that can facilitate the rewarding and enabling research environment required for higher-quality research. ReSA is an international leader in the research software community and has the ability to encourage development of a shared vision for change in our sector. Centering diversity and inclusion practices within ReSA and the collaborations it facilitates across the sector has the potential for broad influence. Consequently, ReSA aims to both embed diversity and inclusion approaches throughout ReSA's own culture and practices; and to exemplify and disseminate best practice more broadly, providing case study materials about ReSA's journey, and resources used, to inspire others to undertake similar work, and be able to quantitatively and qualitatively measure usage of ReSA resources.

5. Evaluation

The success of ReSA activities will be measured based on the [Commonwealth Scientific and Industrial Research Organisation \(CSIRO\) impact model](#):

Inputs E.g., resources, staff	Activities E.g., methodology, work	Outputs E.g., reports, events	Outcomes E.g., change in practices, technology licences	Impact E.g., social, environmental, economic
Resources to support staff to coordinate	Opportunities for members to access best	Outputs of community consultations,	Boost co-creation and	Better software to support better research

activities	practice, sector news, networks, opportunities for collaboration, share initiatives, and influence ReSA's development	task forces, advisory activities etc, Members sharing information and extending networks	collaboration within organisations in the community	
Metrics: Resourcing (staff hours and budget)	Metrics: Range of activities undertaken and amount of organisational involvement enabled	Metrics: Community consultations, task forces engagement activities completed. Member sharing of information.	Metrics: Growth in organisational members collaboration, continued participation by existing members, feedback on value of ReSA's work	Metrics: Increased research software visibility and representation internationally

6. Risk management

ReSA's risk management matrix identifies, assesses and strategises ways to address possible risks.

Risk	Likelihood	Impact	Mitigation strategy
Challenges in gaining resourcing	High	High	Advance planning, involvement of Steering Committee
Challenges in recruiting organisational members	Medium	Medium	Develop materials that demonstrate value. Utilise Steering Committee networks
Limited resources to manage existing and planned projects	High	High	Stage development to match resourcing
Staff retention	Medium	Medium	Be transparent on funding situation, improve

			documentation to capture ReSA plans and processes
Ability of Steering Committee to contribute to ReSA development	Low	Medium	Set realistic expectations
Difficulty in demonstrating ReSA's value	Medium	High	Utilise strategic and engagement plans to focus activities