A new framework for researcher assessment

A report from Australia's Chief Scientist, Dr Cathy Foley
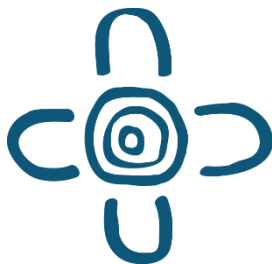
Acknowledgement of Country

The Office of the Chief Scientist acknowledges the traditional owners of the country throughout Australia and their continuing connection to land, sea and community. We pay our respect to them and their cultures and to their elders past and present.

Artwork: Connection to Country, 2021 by Shaenice Allan

Meeting Place icon by DISR employee Amy Huggins

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A new skills and experience framework for researcher assessment

This paper was written by Dr Cathy Foley in 2024 during her tenure as Australia's Chief Scientist. It responds to challenges identified in the *Research Assessment in Australia: Evidence for Modernisation* report (ACOLA 2023) by proposing a framework for researcher assessment and a series of next steps to support the intersectoral mobility of a diverse cohort of researchers across Australia's science and research system. It has been submitted to the Australian Government's strategic examination of research and development.

Introduction

Australia delivers high quality research and makes an outsized contribution to research outputs compared to our population size.[1] However, like many other countries, Australia's approach to assessing research and researchers is still largely driven by publication metrics, rather than assessing quality and impact of the research. The negative consequences of this approach result in research that it less innovative than it could be, delivered by a researcher workforce that is less diverse than it should be.

Recent research by the Australian Council of Learned Academies (ACOLA) found research assessment practices in Australia impact the effectiveness of our research.[2]

It is clear that we must do more to ensure our research inputs (research funding expenditure) are leading to effective outputs, outcomes and impact.[3]

Research landscape

Australia faces a range of challenges as we seek to support a strong, innovative, impactful research system. Some challenges, such as the precarity of research careers, the competition for global talent and the rising need for access to trusted evidence amid mis and disinformation, are faced the world over.

Other challenges, including a low proportion of business engagement with research and development, funding pressures for universities and low engagement between sectors, are more pronounced in Australia than in some comparator countries.

Each of these challenges impacts researchers, their careers and research outputs produced. For example, universities under funding pressure may be more likely to hire a senior researcher based on their ability to secure funding than on demonstrated leadership qualities, impacting team culture and opportunities for junior researchers.

Background to the researcher assessment project

In 2023, the Office of the Chief Scientist (OCS) commissioned ACOLA to examine how researcher assessments were being conducted in Australia and the impact on research output and researchers' careers. The report *Research Assessment in Australia: Evidence for Modernisation* (ACOLA 2023, the report) found research metrics used in Australia for recruitment and promotion are evolving to rewarding impact, excellence and engagement. Australia's research funders are also taking steps towards more inclusive research funding practices (Appendix A). Some universities have broadened, or are in the process of broadening, assessment frameworks to assess a range of research outputs and measure a range of impacts, including on community, field of research and student outcomes.[4]

Despite positive steps, the report found Australia's current approach to research assessment is resulting in a range of negative outcomes for researchers and their work (Figure 1).

Figure 1: Select quotes from ACOLA report 2023

> *Australia's current research assessments have been built on widely used systems for benchmarking university citation performance against international comparators and tracking traditional performance of those generally seen as high-performing researchers who do not face inherent bias, discrimination or bullying. The use of research impact assessment processes in many government and private sector research organisations has also ensured a strong focus on applied outcomes of research.*
>
> *There are beneficiaries of the current system, however, it also creates challenges and ingrains distortions and biases that in aggregate have a greater negative than positive impact on the innovation and effectiveness of our research sector.*

Sixty-six per cent of the 1428 researchers surveyed for the report expressed dissatisfaction with current research assessment processes, reporting that processes are not adapting to changing needs and priorities in the research community.

Issues targeted in this work

In 2024, Dr Foley and her office reviewed the ACOLA report and identified:

- priority system-level issues stemming from undesirable outcomes of current research assessment in Australia, and
- priority issues impacting individual researchers.

This report proposed a new framework aimed at addressing targeted issues, shown in Figure 2.

Figure 2: Issues and consequences identified in the current system targeted in the proposed new framework for researcher assessment

Targeted system issues	Targeted researcher issues
- Limited knowledge sharing between sectors. - Limited diversity in knowledge creation. - Less innovation and reduced scope and nature of research.	- Lack of workforce mobility. - Unequal access to opportunities. - Opaque effort and reward systems, leading to issues with workforce diversity, transparency in recruitment and career progression. - Lack of recognition for new and innovative ideas.

Chief among the issues impacting researchers is low intersectoral mobility, in part driven by poor recognition of research skills between sectors. Low researcher mobility impacts individual career pathways and contributes to limited knowledge sharing and innovation at the system level. While mobility between sectors with similar research approaches (such as universities and research institutes) may be easier, the evidence is that movement of researchers from academia to industry is almost always a one-way path.[5]

The 2021 Research and Development Inquiry by the South Australian Productivity Commission found no significant regulatory or financial barriers to sector mobility and suggested that cultural factors are likely at play.

> *In the university sector, these relate to employment entry conditions, internal promotions, and securing basic research funding for ongoing positions. In the business sector, factors include the ability to implement flexible working arrangements and the highly specialised skills of researchers.*[6]

The ways in which success is measured in universities, industry and government are so disparate they are not comparable by employers. For example, the ability to commercialise research is a highly desirable attribute of a researcher in industry. Other sectors may not place as much weight on this indicator, although it is becoming a more valued attribute in universities.

Most research career paths do not follow a linear path from PhD graduate to professor in a university. Based on data from the UK, only a small portion (0.45%) of PhD graduates become university professors.[7] There are also differences in mobility based on discipline – a factor not articulated in this report.

Approaches to research assessment in Europe and the United Kingdom

Several initiatives in Europe are reshaping research assessment practices under a common framework, delivering a shared vision and common language. Focused on the university sector, they provide valuable insights for Australia on shaping culture.

In the Netherlands, universities and research funders are following an agreed roadmap to develop institutional plans based on five priorities, which are outlined in a position paper titled *Room for everyone's talent.* The priorities balance individual and collective contributions, diversify and revitalise career paths, promote open science, focus on quality, and encourage academic leadership.

The position paper *A pathway towards multidimensional academic careers* from the League of European Research Universities[8] outlines a career framework to assess researchers in three dimensions:

- a multidimensional perspective, focusing on the diversity of contribution.
- a developmental perspective, emphasising personal growth and development of leadership.
- a contextual perspective, considering the professional and personal context.

UK Research and Innovation (UKRI) use a flexible narrative CV template Resumé for Research and Innovation (R4RI)[9] for funding decisions that require track-record information. The R4RI captures a wider range of skills and experience, asking researchers to describe contributions to:

- new ideas, tools, methodologies or knowledge.
- development of others and effective working relationships.
- research and innovation community.
- broader societal benefit.

Australia's research sectors and knowledge systems

Australia's research system is broadly arranged across five sectors: universities, publicly funded research agencies (PFRAs), industry, government and research institutes. A system supporting movement of researchers between sectors is considered more likely to produce innovative research and a diverse workforce with a range of career pathways.[10]

A single set of indicators for evaluating researchers is unlikely to eventuate, as business needs and organisational objectives vary between sectors. Each sector has specific funding sources and primary goals driving differences in research culture, approach and outputs. Intersectoral mobility of researchers, particularly back into academia from all sectors, is stymied by lack of shared language,

low understanding or appreciation of transferrable skills, different sector and organisation priorities and disparate workforce cultures. One way to consider these differences is to acknowledge each sector is effectively its own knowledge system. As outlined by Fazey et al, knowledge systems include the practices, routines, structures, mindsets, values and cultures affecting what and how knowledge is produced and used, and by whom.[11]

Knowledge systems of five key sectors employing researchers in Australia are summarised in Appendix B (Table 4, Table 5, Table 6 and Table 7). Each sector places different value on capabilities sought from researchers.

The Australian Public Service (APS) has established a common language system of transferable capabilities and skills – the Integrated Leadership System (ILS). Developed by the Australian Public Service Commission and adopted by the Australian Public Service in 2004, the ILS comprises five core capability clusters, supporting movement of people from diverse disciplines into the APS, and mobility of staff within APS.[12] Similarly, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) uses a classification system to support internal movement of staff. It outlines role specifications and expected competencies for a range of role types and levels. Researchers can move vertically or horizontally by demonstrating skills and experience against competencies. More recently some universities have introduced broad frameworks to support skills assessment. In 2016, Monash University introduced the Academic Performance Framework, which asks for evidence of activities and achievements against three areas of research, education and engagement.[13]

The enduring nature of employment assessment frameworks, such as those used by the APS and the CSIRO for more than 20 years, promotes the utility of a new researcher assessment framework to support intersectoral mobility.

Researchers will be better supported to forge career paths between sectors by a shared understanding of skills, capabilities and experience.

Readers should note that there are existing bridges to support the intersectoral movement of researchers, including the APS Science Policy Fellowship program, PhD internships and university-based professors of practice.

Three spheres of researcher contribution

In response to the outlined issues and conditions, this paper proposes a novel framework for researcher assessment. At the core of the proposed skills and experience framework for assessment of researchers by current and prospective employers, are three spheres of contribution, depicted in Figure 3.

Success is attributed to demonstrated skills, alignment to organisational drivers, and developmental activity. The developmental activity includes professional development and leadership, similar to the developmental perspective in the system proposed by the League of European Research Universities (LERU 2024).

The **demonstrated skills** sphere describes workplace strengths. Responses in this sphere will be similar across sectors and may vary in complexity by job level and field.

The **organisational alignment** sphere captures work contributing to organisational priorities, or to discipline priorities where appropriate. Responses will vary by sector.

The **developmental activity** sphere showcases engagement in personal and team development. Responses will vary with position level.

Figure 3: Three spheres of researcher contributions
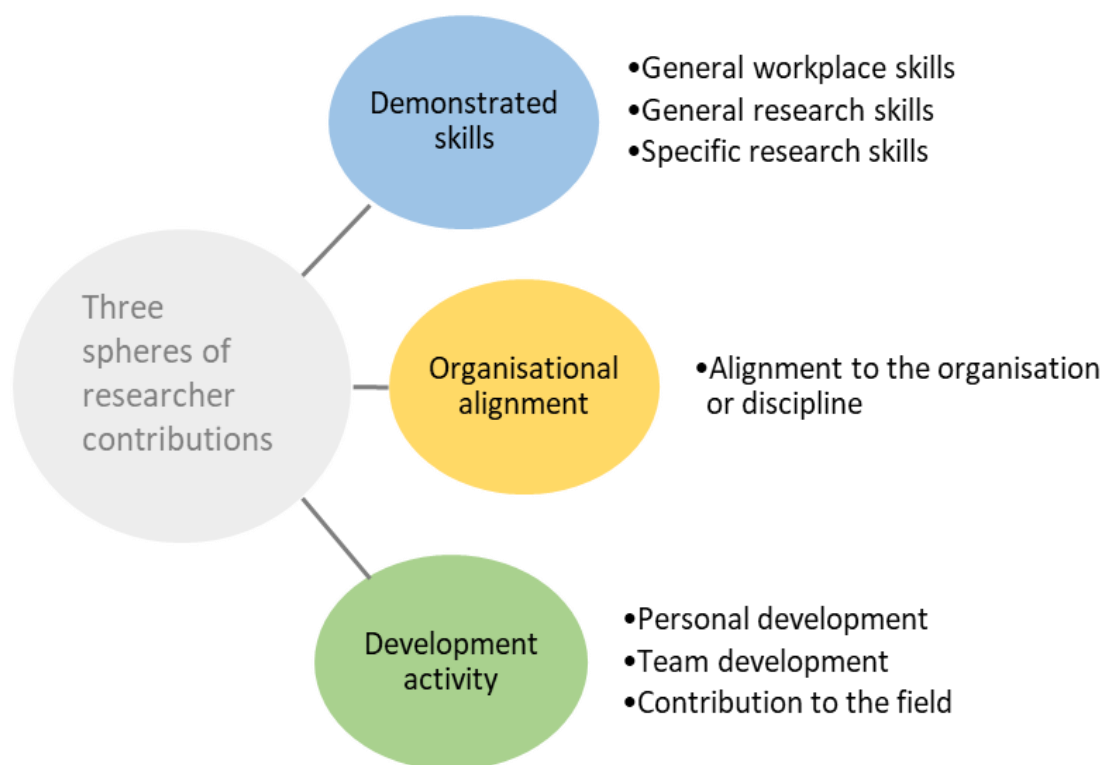
1. Demonstrated skills

Researchers can describe their demonstrated skills capability as general workplace skills, general research skills and specific research skills.

For professional roles, there are **general workplace skills** important to employers in all sectors.

Researchers at all career stages can demonstrate **general research skills** relative to their experience.

Specific research skills give researchers opportunity to display transferable skills and expertise specific to their field of research or geographical location of their work or project.

2. Organisational alignment

This sphere acknowledges the goals of an institution that influence what success looks like. Researchers in some sectors may attribute success to research publications and ability to secure funding. Employers in other sectors may be more interested in commercial translation. This sphere invites researchers to demonstrate how their work contributes to goals of the sector (for example, research commercialisation) and the organisation (for example, to bring a novel item to market by a certain date).

In most organisations, delivering impact is a key organisational goal. The ARC defines impact as 'the contribution research makes to the economy, society, environment or culture, beyond the contribution to academic research.'[14] The CSIRO furthers this definition by adding human (transfer of knowledge and skills), financial and physical (e.g. infrastructure) determinants of impact.[15]

Under this sphere, employers could customise the framework to meet needs of their organisation during internal assessment. Hiring managers could leave this sphere broad and open during recruitment to give researchers the opportunity to respond relative to their current role, regardless of sector.

3. Development activity

ACOLA surveyed 54 organisations employing researchers, primarily universities and medical research institutes. Almost half of respondents prioritised publications, followed by research impact, grant funding, research commercialisation and external engagement. Metrics related to collaboration, training, leadership, awards and service were secondary considerations.

Ultimately, research teams may not be as well run, and junior researchers will not develop as robustly, unless leadership, service and training are valued in assessment of individuals. This sphere of assessment captures these vital skills.

Responses under this section of the framework may be linked to level of employment. Senior researchers can demonstrate contributions to leadership, mentoring and team development. Early to mid-career researchers can showcase personal and professional contributions to the field, positive workplace culture and a growth mindset.

At all career stages, this sphere captures contributions to teams, the field and the workplace.

Examples of skills and behaviours against the framework

Table 1, Table 2 and Table 3 provide further detail of the framework, including examples of indicators, skills and experience against each of the capabilities. Note that these are examples only. For some roles, many of these examples will be applicable. For other roles, very few or none of these examples will apply.

Table 1: Examples of skills and experience in the demonstrated skills sphere of researcher contribution

Demonstrated skills	Indicators	Examples of skills and experience	Notes on implementation
General workplace skills	Applicants are required to demonstrate general workplace skills in professional roles.	Examples of general workplace skills include: • organise and manage time to prioritise and deliver tasks • communicate clearly and accurately • establish and nurture workplace relationships • adapt to changing conditions or business needs • use a range of tools to solve complex problems • collaborate with stakeholders and share information.	General workplace skills are important to employers across all sectors. Navigating complexity will vary with levels of seniority.

General research skills	Applicants must demonstrate general research skills. They are required to deliver reproducible, high-quality research. The question is clear, the methodology is sound, the data collection is robust, the analysis is appropriate, and the conclusions follow.[16]	Examples of general research skills include: • implement principles of project management • identify and mitigate risk • objective, controlled experiment design • handle data according to organisational guidelines • analyse and present data clearly and accurately • cite and reference the work of others • think critically in all aspects of research • write technically to communicate research within the researcher's field • communicate technical information to a non-technical audience.	General research skills are important to employers across all sectors. Navigating complexity will vary with levels of seniority.
Specific research skills	Applicants must demonstrate specific research skills and experience relevant to the field of research.	Examples of specific research skills include: • operate specific research infrastructure • run clinical trials • conduct field work • write funding applications • contribute to research translation and commercialisation activities.	Specific research skills may vary by field and will translate between research sectors. Subject matter expertise is attractive to related industry sectors. For example, skills gained in the university sector undertaking food chemistry research are translatable to multinational food manufacturing companies. University researchers are employed in industry research and regulatory roles.

Table 2: Examples of skills and experience in the organisational alignment sphere of researcher contribution

Organisational alignment	Indicators	Examples of skills and experience	Notes on implementation
Align to the organisation	Applicants must contribute to end use of research, aligned with goals of the organisation.	Examples of organisational alignment include: • establish and maintain external or international collaboration • scan environment and possess knowledge of the field • maintain relevant expert knowledge over time • assimilate pure or basic research into an applied context • demonstrate experience in work leading to the translation or commercialisation of research • secure specific types of funding • academic publications • contribute to government reports or policy documents • contribute to intellectual property • share and communicate research methodology, data and findings openly and responsibly. • demonstrate teaching experience and excellence • secure alignment to technical standards • contribute to innovation • outreach and engagement activities.	Organisational alignment skills may vary and can be transferred across sectors. For example, a researcher with experience writing academic publications could apply those skills to writing government reports. Organisational alignment skills demonstrate a researcher's willingness and ability to align effort with broader institutional goals. Individual organisations can include here criteria important to them as an institution. Customisable for organisations during internal assessment. Hiring managers should recognise a broad set of capabilities during recruitment to allow applicants to respond with reference to their current role regardless of sector.

Table 3: Examples of skills and experience in the developmental activity sphere of researcher contribution

Developmental activity	Indicators	Examples of skills and experience	Notes on implementation
Professional development	Applicants are required to undertake professional development appropriate to job level.	Examples of developmental activity include: • undertake formal training and accreditation • undertake personal and professional development • participate in mentor/mentee relationships.	Responses to professional development should be linked to level of employment.
Team development	Applicants must contribute to team development in line with job level. This may be a formal team as usually occurs in government, or an ad hoc multidisciplinary research team.	Examples of developmental activity include: • identify, train and nurture talent • develop diverse teams • drive behavioural or cultural change • facilitate team collaboration or meetings • lead teams • improving research quality standards.	Responses to team development should be linked to level of employment. Junior employees may deliver work to support the team, while senior employees are expected to develop and lead the team. In sectors with career paths to senior individual contributor roles (for example, the technology sector) team development may take the form of technical mentorship or leadership rather than management of staff.
Contribute to the field	Applicants must contribute service to the field of research and to science in general.	Examples of developmental activity include: • organise conferences • edit journals • take part in peer review • advocate for diversity and inclusion • communicate via traditional or social media • membership of government advisory boards or committees.	Responses to the 'contribute to the field' category may vary with level, field and/or sector of employment.

A new skills and experience framework for researcher assessment

The new skills and experience framework for researcher assessment proposed here comprises the three spheres of researcher contributions (Figure 3), detailed in Table 1: Examples of skills and experience in the demonstrated skills sphere of researcher contribution; Table 2: Examples of skills and experience in the organisational alignment sphere of researcher contribution; and Table 3: Examples of skills and experience in the developmental activity sphere of researcher contribution.

The framework supports intersectional mobility of researchers by grouping research skills and defining common language for the groupings.

For employers, the framework shows how skills and experience can be applied or transferred across sectors. It demonstrates the broad range of skills important to a well-functioning research team.

For researchers, the framework presents a broad picture of research roles and shows how researchers can articulate their skills and experience to employers in sectors outside their own.

The framework advocates a move away from what is easy to measure towards attributes indicating future success. It identifies researchers who support organisational and system goals and values. It recognises broader contributions that researchers make to their organisation and field, including service, engagement, leadership, research translation, teaching and supervision.

The framework advocates transparency and openness

By outlining a holistic set of research performance indicators, the proposed framework reduces emphasis on publication metrics and supports open science. It includes recognition of sharing and communicating research methodology, data and findings openly and responsibly.

Using the framework

Articulating skills and experience

The survey conducted to inform the ACOLA report asked researchers to identify one change to research assessment to improve researcher mobility. The most common responses related to valuing and measuring different kinds of knowledge, experience and skills.

Adoption of a broader framework such as that detailed in Table 1, Table 2 and Table 3 could help employers recognise and acknowledge the range of transferable skills developed across the sectors.

For example, a researcher with experience contributing to academic publications could apply these skills to other organisational priorities listed against the 'Alignment to the organisation' capability, such as contribution to government reports or policy proposals. The skills, aptitude and willingness to contribute to research aligned with broader organisational goals must be recognised by employers across sectors.

The framework serves as a scaffold on which researchers can articulate the relevance of their skills to employers in sectors outside their own.

Supporting a diverse workforce

Current research assessment practices in Australia fail to value broader research skillsets and are over reliant on traditional metrics, perpetuating structural inequalities supporting systematically privileged individuals.

The proposed new framework is designed to capture the full range of research skills and contributions. By valuing activities of leadership, personal and professional development and contribution to team and discipline, the framework supports the hiring and promotion of a more diverse research workforce.

Next steps

This paper and the framework within are the first steps towards supporting the broad mobility of researchers between sectors in Australia. To contribute to further development and cross-sectoral use of the framework, suggested next steps are:

- Develop strategies to increase mobility by supporting researchers to build skills and experience in areas identified in the framework.

- Work closely with employers in each sector to test how the skills and experience framework could integrate into their existing hiring and promotion policies.

    o Further engagement with industry is needed to determine how existing practices, including input from people other than the candidate to assessment processes, might compliment this framework.

- Consider how the framework could be implemented alongside existing assessment frameworks, including those used in the public service, government, universities and industry. Implementation of the framework would require training for researchers and employers and be best served by ongoing monitoring and evaluation.

- Develop resources to show researchers the breadth of career pathways available to them and the skills that could be transferred between sectors.

    o Include realistic depictions of careers in each sector to increase awareness of the different expectations, structures, cultures and ways of working between the sectors.

- Work with human resources professionals to review the framework from a hiring perspective.

- Consider how employers could weight capabilities against sector and organisation priorities.

Conclusion

The framework proposed in this paper captures the breadth of work undertaken by researchers and provides a scaffold on which they can demonstrate their skills and experience to employers across sectors.

It provides a common language wide enough to support assessment of researchers undertaking work in a range of fields and sectors.

The framework emphasises balanced researcher assessment by encouraging researchers to identify transferable skills used to deliver research outputs. It captures skills and experience independent of the availability of resources and assesses contributions to the team, and the development of self and others as key performance indicators. While publication metrics can be used to demonstrate contributions, they are considered alongside a range of alternative research outputs.

Finally, the framework encourages employers to consider a variety of activities and experiences in assessing researchers, to build a diverse, resilient, future-ready workforce.

Appendix A

Australia's two largest research funders, the Australian Research Council (ARC) and the National Health and Medical Research Council (NHMRC) are taking steps towards more inclusive research funding practices.

In 2011 ARC initiated the Research Opportunity and Performance Evidence (ROPE) policy. ROPE incorporates diverse experiences and career interruptions into the process of evaluating research achievements of National Competitive Grants Program applicants.

ROPE captures:
- context for performance evidence such as employment in positions with a research component, including outside of academia; and
- significant career interruptions such as unemployment, caring and parental responsibilities.

The ROPE policy is also designed to support researchers in early to mid-career, under-represented groups, women and First Nations researchers.[17]

The NHMRC is a signatory to the San Francisco Declaration on Research Assessment (DORA). Developed in 2012, DORA focuses on:
- assessing research on its own merits shifting away from journal-based metrics
- being transparent about hiring and promotion criteria, and
- measuring impact and quality of research.[18]

For funding agencies, DORA recommends explicit evaluation criteria for grant applications, valuing research quality over publication metrics, and considering a broader range of research outputs and impacts.

In 2022, based on advice from its research committee, and in alignment with other international agencies, the NHMRC made grant application process changes to prioritise quality over quantity. The agency implemented a 'top 10 in 10' policy, where applicants are asked to provide their top 10 publications from the past 10 years, rather than their complete publication track history.

Evaluation of this process change showed an increase in emphasis on quality rather than quantity of publications and reduced burden on peer reviewers. The same year, the NHMRC published a Research Impact Position Statement[19] recognising 'Knowledge' as an impact domain beyond academia, along with Health, Economy and Society.

In 2024, the NHMRC became a member of the Coalition for Advancing Research Assessment (CoARA).[20] CoARA was initiated in 2022 and builds on international progress made through the DORA, on the Leiden Manifesto[21] and the Hong Kong Principles.[22] CoARA emphasises diverse outputs and activities, qualitative judgements, responsible quantitative indicators, flexibility and institutional autonomy in evaluation practices.[23] It is too early to see the impact of this membership, but CoARA goes further than DORA by including a commitment to act.

Table 4: Primary goals – Australia's research knowledge systems

	Universities	PFRAs	Government/public service	Industry	Research institutes
Primary goals	The primary goals of universities are to: 1.. Educate people, enabling them to take leadership roles in the intellectual, cultural, economic and social development of their communities. 2. Create knowledge and develop expertise for advancement of knowledge and competitive advantage. 3. Apply knowledge and discoveries to the betterment of communities in Australia and internationally,[xiv] including via translation and commercialisation.	The primary goals of PFRAs are to orient with their mission and long-term research programs of national priority and benefit.	The primary goals of science and research in the Australian Government are to create knowledge for policy making, societal welfare and national interest and to support the regulation of Australia's industries and standards.	The primary science and research-related goals of industry are to create knowledge for competitive advantage, product development or service and profit generation.	The primary goals of research institutes are to promote and conduct research and develop in defined areas of research specialisation.

Table 5: Research focus - Australia's research knowledge systems

	Universities	PFRAs	Government/public service	Industry	Research institutes
Research focus	The research focus of universities is: 1. Theoretical and foundational knowledge, long-term research and	The research focus of PRFAs is: 1. Applied research to solve practical problems that directly affect	The research focus of the Australian Government is applied research to solve societal problems, provide evidence to support public policies	The research focus of industry is applied research, development (R&D) and innovation to create marketable products and services.	The research focus of research institutes is research, from fundamental discovery to clinical research and the translation of findings.

	exploration of fundamental questions. 2. Applied, experimental and clinical research and research translation, aimed to benefit community and industry partners.	society or national interests. 2. Long-term, foundational research to understand complex public issues and applied research to benefit society.	and ensure regulatory compliance.		

Table 6: Research approach – Australia's research knowledge systems

	Universities	PFRAs	Government/public service	Industry	Research institutes
Research approach	Traditionally, university research approaches are curiosity driven and aligned with academic freedom. However, modern Australian universities are also driven by government and public sector priorities and missions and align with the priorities of industry as they partner to deliver specific projects.	The research approach of PFRAs is directed and in line with public priorities and societal challenges. It is informed by policy needs.	The research approach of government is driven by societal challenges, national priorities and public service obligations. It is often conducted through government research agencies and national laboratories.	The research approach of industry sectors is problem solving and product driven. It involves proprietary research with emphasis on confidentiality and IP.	The research approach of research institutes is curiosity driven, conducted in well-defined research themes.

Table 7: Key research outputs – Australia's research knowledge systems

	Universities	PFRAs	Government/public service	Industry	Research institutes
Key research outputs	University outputs have historically focused on scholarly articles, conferences, books and intellectual property.	PFRA research outputs include reports, scholarly articles, databases, public guidelines, white papers, intellectual property, risk assessments, policy	Government research outputs include policy papers, regulations, legislation, and public reports such as strategies and discussion papers.	Industry sector research outputs include products, patents, trade secrets, invention disclosures and industrial processes.	Research institute research outputs include scholarly articles, conferences, books and intellectual property.

	Most universities have now established systems and expertise to assess a broad range of research outputs, including designs, technology outcomes and take up of patents and inventions by industry.	papers and legislative support.			

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