How the NZ government funds research to support policy and government operations

The tension between centralised and departmental funding for research

July 2023

A discussion paper by[*]:

Dr George Slim (Consultant to Prime Minister's Chief Science Advisor)
Prof Gary Evans (Previous CSA, MBIE)
Dr Gill Jolly (CSA, MBIE)

With input from the Forum of Chief Science Advisors/He Rauhinga Tohu Putaiao

[*] The authors particularly thank Tim Ng for his insightful comments

Executive Summary

This paper discusses the funding of research to meet the policy and operational needs of government departments in Aotearoa New Zealand, which has been identified as a gap in in the country's research science and innovation system. The paper aims to inform MBIE's Future Pathways, Te Ara Paerangi project, so that improving this very important area of research funding is not overlooked.

Government-funded research plays a crucial role in providing the necessary evidence base for policy development and implementation, and the operational and regulatory functions of government agencies. It includes funding for long-term databases, environmental and health data, social and justice sector data, and climate and geological hazard forecasts.

Different funding models exist globally, ranging from central agencies funding all government research to individual departments funding all their own needs. Historically, Aotearoa New Zealand has experienced transitions between these two models. Currently, there is a mix of central and department-centric funding, but there is a need for greater cross-agency oversight and a comprehensive approach to accessing the research needed by the government. The changes in the system have historically been made on an ad hoc basis rather than with deliberative oversight. Te Ara Paerangi presents an opportunity to change this.

Advantages of central research agency funding include coordination, scale, long-term view, expertise in commissioning, and independence. However, it may not meet individual department needs effectively. On the other hand, funding by individual departments ensures direct connection, agility, and building relationships, but it can lead to duplication, fragmentation, lack of scale, and short-termism, particularly when agencies come under budget pressure.

To develop a functional system, a well-designed mixed model seems optimal. A mixed model would include a central funding agency that funds mission-led and long-term research projects and addresses research strategies developed by other agencies. Individual agencies would fund their own research needs but collaborate with others and access centralised systems for commissioning and oversight. This is particularly important for areas, such as hazard monitoring, that provide benefits (and support better outcomes) for more than one agency.

A well-designed funding system should strike a balance between central coordination and departmental needs, ensuring effective research to meet central regional and local government requirements. It should consider national priorities, research strategies, cross-agency collaboration, and consistent commissioning and oversight policies, as well as meeting Te Tiriti obligations.

Introduction

One of the roles of departmental Chief Science Advisors (CSAs) is to ensure their departments have access to the research, and the underlying data collection and analysis, that the department needs to provide an evidence base for developing and monitoring the impact of their policies, and support their operational and regulatory functions. MBIE's[†] Future Pathways, Te Ara Paerangi project,[‡] which is currently looking at how Aotearoa's research and innovation system can be improved to make it fit for the future, has identified funding of research to meet the needs of government departments as a gap in the current system. The gap was also highlighted in a report from the Parliamentary Commissioner for the Environment in 2020[§] reviewing funding for environmental research, and on-going issues in funding basic government infrastructure such as the National Seismic Hazard Model.[**]

The gap in funding for research to meet government needs has developed over a number of years, and during the evolution of the Aotearoa New Zealand research and innovation system, a number of different approaches have been taken to fill it, each with a different set of advantages and disadvantages, barriers and enablers. This paper is aimed at informing the Future Pathways, Te Ara Paerangi process so that improving this very important area of research funding considered as a critical component of an optimised science system.

Scope of the paper

In his 2015 paper, 'Why do governments support research?', Professor Sir Peter Gluckman[††] identified four broad and overlapping reasons for governments to fund research; cultural (broadly defined) and reputational, to meet society's needs for knowledge, for the state's own needs as a major end-user of knowledge, and to promote science-based innovation for social, environmental and economic benefit (See *Figure 1*). Governments also fund research aimed at building the capacity and workforce to undertake further research.

The Future Pathways, Te Ara Paerangi process is an opportunity to look at the system as a whole but this paper only focusses on funding of the third item identified by Professor Gluckman: research to meet the State's own needs, i.e. the *research to meet the policy needs of government*. It does not look at models for funding the other main categories of research funded by governments and only touches lightly on the balance between applied/commercial and basic/pure research. This is not to say these issues are unimportant. Gathering, storing, and analysing the data needed to undertake the research needed by government for its own use is included in the broad heading of research.

[†] Ministry for Business, Innovation and Employment

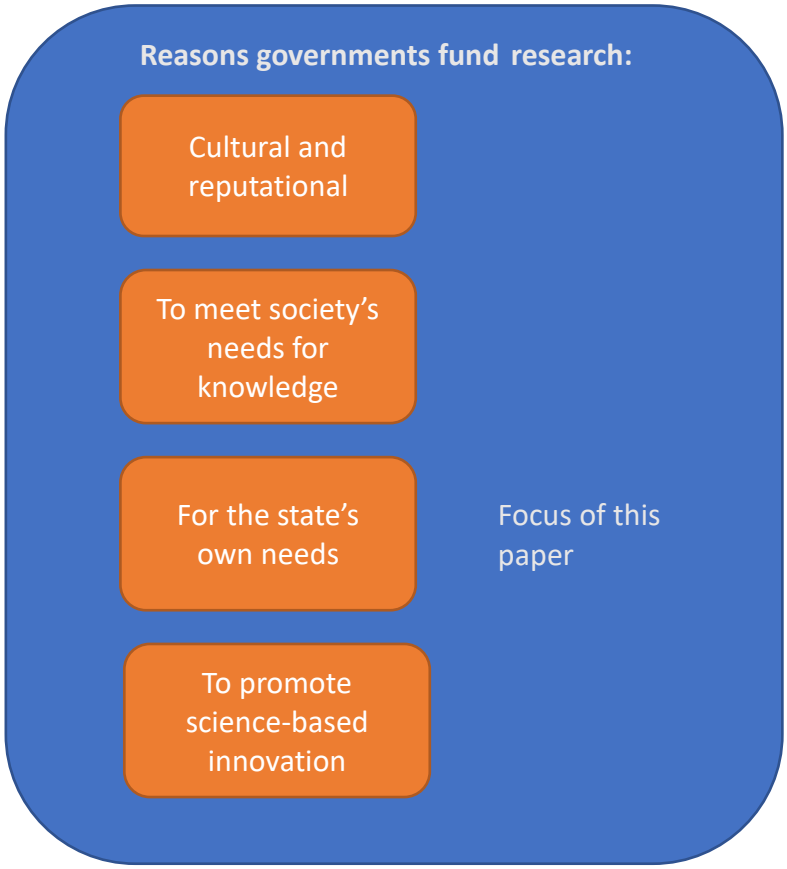
[‡] https://www.mbie.govt.nz/science-and-technology/science-and-innovation/research-and-data/te-ara-paerangi-future-pathways/

[§] https://pce.parliament.nz/publications/environmental-research-funding-review/

[**] https://www.nzgs.org/libraries/review-of-national-seismic-hazard-model/

[††] https://informedfutures.org/why-do-governments-support-research-2/#:~:text=To%20promote%20science%2Dbased%20innovation,that%20informs%20the%20private%20sector

***Figure 1**: Types of research funded by governments (from Gluckman,2015).*



Research needed by government departments

A core function of government funded research is to provide the underpinning research and data[‡‡] that government agencies need to formulate, implement, and (less commonly in Aotearoa New Zealand) evaluate policy in the long term and perform their regulatory functions. Research to support policy includes such things as collection and maintenance of long-term databases of environmental and health data, data on resources such as minerals and fish stocks and the research on how to regulate them, research into social and justice issues, forecasts of how environmental systems may change in response to climate, and so on. This research should not be dependent on short term contestable funding processes because of the inefficiencies of constant bidding impact on the ability to undertake the research. Clear examples are the development of the National Seismic Hazard Model which is a critical input to the building regulatory system and GeoNet which supports NEMAs operational role. There will never be a time when Aotearoa New Zealand does not need to manage the risks from earthquakes and volcanoes and yet funding for these research services stumbles from temporary fix to temporary fix.

There is also a need for directed research to answer particular policy questions or undertake trials or evaluations that may be suited to direct commissioning, or competitive funding processes over

[‡‡] Noting that the evidence used to support policy can come from many sources. This paper is about the research required to produce new, usually Aotearoa New Zealand specific, knowledge not available from other sources.

shorter (occasionally very short) timeframes. Examples include trials of methods to reduce the spread of COVID-19 during the pandemic and cyclone recovery research to inform managed retreat.

Governments also fund research that supports economic activity in the private sector that meets departmental aims. This typically has one of two intended outcomes; economic - to increase economic activity by funding research that is too high risk for a firm or industry to undertake alone or where the firm or industry lacks the scale to support the necessary research, or policy - where the government seeks a change in industry policy that may not directly benefit the industry, for example to make livestock farming less methane intensive. Examples of such funds are Callaghan Innovation to boost economic activity in general, the Sustainable Food and Fibre Futures Fund from MPI[§§] to support the primary sector and MfE's[***] Waste Minimisation Fund.

As well as the direct benefits from research, governments get value from spill-over benefits relating to the "positive externalities" from knowledge. Governments may fund research where the wider economic or social benefits from the expected knowledge gain are greater than would accrue to a researching industry or firm alone. There is evidence from the economic literature that these wider benefits can be quite large. They typically are associated with knowledge that is hard to keep secret once it is gained, hence limiting the incentives for firms to do that sort of research, with the rationale for government support therefore tending towards the basic/pure end rather than the applied/commercial end. Maximising these benefits, while meeting the need to directly support the policy process within agencies or drive benefits for their sectors, is important.

Governance and evaluation arrangements are important to achieving the benefits of research. For example, if a piece of research such as funded by Aotearoa's Strategic Science Investment Fund, is meant to be mission-led and deliver benefit to particular end-users or sectors, do those organisations have a meaningful role in oversight of the research, its direction, its progress, and an ability to hold the research team to account if the research isn't living up to its promises? Who performs these roles and how close they are to the research and its intended impacts are important considerations in the funding, commissioning, and management of the research.

Another issue facing research funded by governments is who has responsibility for the resources to plan the research, build, and maintain the relationships, in Aotearoa, particularly with Māori, to ensure that the research is well targeted and relevant to end users. Regardless of who funds the research, agencies need an internal science capability to understand, evaluate, and incorporate the research into their policy and operations effectively.

Funding models for government research

Globally, there are many different funding models for government research. Research to meet departmental needs can be funded at one extreme by a central funding agency responsible for funding all sectors of government research for both policy and economic outcomes. The other end of the funding continuum is each individual department funding the research applicable to their own needs and that of the sectors they oversee.

Historically, Aotearoa New Zealand has wavered between the two ends of the spectrum. We now find ourselves in transition from the centralised policymaking and funding for most government funded research, envisaged in the formation of MoRST[†††], to an increasingly individual department-

[§§] Ministry for Primary Industries.
[***] Ministry for the Environment.
[†††] Ministry of Research, Science and Technology.

centric approach. We have one large central research funding agency (MBIE) funding research for economic development (MBIE's core institutional role). MBIE also funds for government policy outcomes, through their support for the Strategic Science Investment Fund which covers infrastructure such as nationally significant databases and collections as well as the research itself. However, MBIE's largest contestable project fund, now called Endeavour, has not been aligned with department strategies since it moved away from subject-aligned funding pools. This is a significant shift from the Public Good Research Fund of the 1990s which had closely targeted 'portfolios' of research and panels including department officials who set research questions to guide applications. This shift was not explicitly announced to agencies (or Ministers) which has left demands being made on the fund from outside which it is no longer designed to meet.

In the meantime, a number of other agencies are funding research for their own policy needs. Two agencies, MfE and significantly MPI, are funding substantial amounts of research that will benefit the private sector in their areas, and also research that will (hopefully) drive policy change in them.

To date the transition has been managed, or has evolved, with very little cross portfolio ministerial oversight but there is potential for the Future Pathways, Te Ara Paerangi process to look at the issue of how the Government accesses the research it needs. For instance, the development an Environment & Climate Research Strategy, that was recommended by the Parliamentary Commissioner for the Environment (PCE) and endorsed by joint Ministers last year, is being proposed as a pathfinder for how national research priorities might be scoped and implemented. MfE is leading this with input from MBIE, MPI and DOC[‡‡‡].

Advantages and disadvantages of different funding modes for departmental research

The breadth of experience from the historical development of the Aotearoa New Zealand science system has shown up both the benefits and risks of the two ends of the spectrum of funding research to meet government needs.

Funding from a central research agency allows for more consistency, scale and coordination of research. It also allows dynamic reprioritisation of funding across different areas of research according to changing research and policy needs. However, it may not meet individual department needs so well unless the departments are very closely involved in the commissioning/bidding process.

Conversely, funding by individual departments makes it much more likely that the research will meet their needs and have the impact they want, but more limited budgets give issues of scale. Viewing each department's research in isolation gives problems in coordination, the potential for duplication, and overall efficiency. Setting up funding processes in isolation leads to a lack of experience and scale, and departments may fall back on their procurement processes for other services which can inhibit collaboration.

The most significant issue for individual departments is that if a department's operational budget comes under pressure, research is very often the first thing that gets cut or reprioritised to address operational shortfalls.

Table 1 outlines the advantages, and policies that can enhance them, and the disadvantages, and policies that can ameliorate them, of the two opposite ends of the spectrum – noting that any system will inevitably be some sort of mixture of the two.

[‡‡‡] Department of Conservation.

***Table 1**: The advantages and disadvantages of central research agency and individual department funding of research*

Funded through a pan-government central research funding agency[§§§]	
Advantages	***Policy Enablers***
Coordination: The central research agency has an overview of research being conducted and can avoid duplication and fund large projects that meet the needs of groups of agencies.	Whole of system oversight and connections function within the central funding agency. This is a significant gap in the current structure.
Scale: Able to fund large projects independent of a single agencies' operational needs. (Noting that the National Science Challenges are likely to have lessons for us in this regard).	Large flexible budget allocations.
Long term view: Able to fund projects for the long term – potentially indefinitely for infrastructure, data bases and collections, and programmes that collect longitudinal datasets to maximise outcomes.	Large flexible budget allocation not subject to a detailed annual review of research results. Willingness to build cost inflation into long term projects. Specific decision-making processes around long-term underpinning research. This is not straightforward and is a gap in the current system.
Expertise in commissioning, funding, and monitoring research: Distributes substantial amounts of money on regular basis so builds up number and experience of personnel in a broad range of areas and understand process design.	
Independence: Able to fund and prioritise across all government need, not to drive its own policy agenda.	Strong connections with other agencies across government.
Disadvantages	**Potential policy solutions**
Capture of funding by central funding agency.	Independent central funding agency without ties to outcomes needing research. Clear mandate from Cabinet that the central funding agency needs to meet all of government's research requirements.
Failure to meet individual department needs.	Strong connections with agencies. Internal function to oversee and connect across departments within central funding agency. Inclusion of individual agencies in bidding process, including developing commissioning criteria, monitoring and review.

[§§§] Such as MoRST, or its immediate successor, the Ministry of Science and Innovation

Funded by Individual Agencies	
Advantages	**Policy enablers**
Impact: Direct connection with department needs.	Implementing a departmental or sectoral research strategy.
Connection: Builds department relationships with researchers.	Facilitate meetings/conference attendance and interviews as part of tendering process.
Agility: Able to rapidly address department changing needs.	
Disadvantages	**Potential policy solutions**
Duplication of research across system.	Convene cross-department research panels including research organisations/researchers.
Fragmentation of research across system.	Convene cross-department research panels including research organisations/ researchers Commission research as syndicates of agencies.
Lack of scale.	Commission research as syndicates of agencies.
Short termism. Annual department budgets may inhibit long term research.	Annual department budget cycles would need to be lengthened for the research function.
Reduced expertise in commissioning, funding, and monitoring research.	Develop robust tendering and monitoring processes that can be used across agencies.
Capture. Direct tendering and overly strong relationships between agencies and researchers can skew research outputs to support department agendas.	Robust and transparent peer reviewed tendering and oversight processes.
Loss of spill-over benefits by excessive targeting of research outputs to the commissioning department's relatively narrow needs.	Consultation with other agencies.
Diversion of funding to department operational needs, especially when projects are shared across departments.	Tagging Budget appropriations specifically to research. Having the research budget sit with separate research department.

Designing a highly functional system

Given the inherent conflicts between maintaining close connections to impact coupled with appropriate oversight of the research system, and matching departmental demand and research timelines and scale, neither end of the spectrum seems optimal. And, as we have seen with the development of the research system in Aotearoa New Zealand over time, any attempt to impose a single system will be subverted by the vagaries of the Budget process valuing novelty over consistency, organisational culture and attitudes of executives to research, and the responses of individual Ministers to daily exigencies and pressures.

In terms of government funding of research, science, and innovation, Aotearoa New Zealand has always had some sort of mixed model. Until relatively recently the country had a system with two large government research funders in MBIE and the Ministry of Education. MfE and MPI have since secured funding for a range of programmes based on research and therefore have become large purchasers of research, science, and innovation by default. However, if we believe that greater devolution of funding is desirable then this arrangement needs to be done deliberatively. This means that decision-making in funding needs to have a systemic view and clear boundaries as to who funds what so that there is clear accountability and visibility of who is responsible for funding the research that is needed by New Zealand, including research needed by government agencies. An overly devolved approach risks losing having an overall strategy for the research science and innovation sector and the loss of synergies between the government funded research, and the wider science and innovation ecosystem, including industry, with the consequent weakening of the links to economic development and productivity gains.

It is likely that a future optimum system should include different components such as:

A Central Funding Agency that funds mission led research directed to national strategic priorities, investigator led research to develop new and unanticipated areas, and funding for large-scale, long-term research projects that support government policy making, especially those that have more than one departmental beneficiary, that:

- Has a Cabinet mandate and a culture directed at meeting other department needs.
- Is required to address the research strategies developed by other agencies, particularly as regards long term underpinning requirements such as infrastructure and databases and collections.
- Is not strongly tied to funding one policy area (for example, economic development).
- Has genuine research system oversight, including over the research workforce, and strong connections to other research-using agencies.
- Ensures agencies that fund their own research have consistent commissioning, contracting and oversight policies.
- Takes into account research being conducted by other agencies in its decision-making processes.

Agencies with funding to meet their own direct research needs that:

- Work in collaboration with agencies who have similar or overlapping research needs, such as the natural resource agencies currently developing the Environment and Conservation Research Strategy.
- Are strongly connected to research funded by the Central Funding Agency.
- Have research and development funding separated from operational funding.
- Ensures that science to enable/support regulatory and operational functions is integral to decision-making on regulatory system improvement.

- Collaborate with other agencies on joint projects.
- Access centralised systems for commissioning contracting and overseeing research.

The ability to develop cross-agency funding schemes that:

- Develop close collaboration across agencies where they have mutual requirements.
- May be co-funded by the Central Funding Agency if there are broader public good beneficiaries of the research as well as agency specific requirements.