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TITLE	Government functions that support innovation in New Zealand and peer countries		
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PURPOSE	To provide an overview and comparison of government innovation functions in NZ and comparable countries, while noting distinctive features of the functions and context in each country.		

THIS PAPER SUPPORTS YOUR FOCUS ON INNOVATION, ADVANCED TECHNOLOGY, AND COMMERCIALISATION

This paper categorises typical government functions that seek to create, grow, attract, and retain research and development (**R&D**) and other innovative activity by private firms (herein simply called *innovation*). We categorise these functions, review the relevant functions in peer nations, and indicate how New Zealand compares.

This paper provides a high-level outline of functions that sit in, or closely adjacent to, a central national innovation agency or agencies and does not seek to review all government interventions that may be considered relevant to innovation. We have focused our review on the innovation functions, and, other than some high-level observations throughout, we have not in the paper analysed the institutional arrangements through which these functions are delivered. We have not consulted with experts in these countries to gather information or test how we have interpreted policies.

This paper continues the series of papers provided to the Science System Advisory Group (**SSAG**) on innovation, advanced technology, and commercialisation. We previously provided you with material on specific NZ government support mechanisms for innovation (found in paper SSAG-MBIE-009) and background on Callaghan Innovation (found in paper SSAG-MBIE-003).

INNOVATION FUNCTIONS FALL INTO NINE BROAD CATEGORIES

The following categorisation is a synthesis of innovation functions, as observed and described in policy and academic literature.

1) **Strategic policy** indicates the degree to which there is coherence around, and prioritisation of, a national approach to innovation. This encompasses fore-sighting, setting national strategies about innovation, developing and evaluating policies, having delivery agencies with clear mandates and adequate resourcing, and coordinating relevant agencies.
2) **Financial innovation support** can be provided in the form of grants, equity, loans, or tax incentives to startups, businesses, or via intermediaries like incubators and venture capital firms to incentivise innovation.
3) **Networking** is about connecting between actors in the innovation system by sharing information about the capabilities and assets of different parts of the system, facilitating navigation and introductions, convening different kinds of public and private actors around joint interests, and brokering agreements.
4) **Innovation infrastructure** can be subject to intervention via sole or joint state ownership of land, facilities, and equipment, as well as incentives or agreements that drive shared use of assets and co-location of organisations.
5) **Human capital** improvement in innovation is targeted through measures like subsidies to tertiary education, training in entrepreneurship for researchers, and, for firms, training in innovation and management capability. These measures often come packaged with financial support, eg startup incubators.
6) **International connectivity** is the inward and outward flows of investment, talent, and IP which are subject to regulation and treaties, and can be supported by state financing, advice, trade missions, and access to overseas innovation facilities. These flows are critical to internationally competitive research organisations and businesses at all stages.
7) **System optimisation** means routinely launching small, experimental policies that respond to emerging conditions. This can include: initiatives bringing together capabilities of several

organisations; targeting niches not addressed by the main suite of innovation functions; scaling or spinning out effective policies, and swiftly shutting down unsuccessful ones.

8) **Regulatory responsiveness** is designing, monitoring, and adapting regulations in ways that prioritise the enablement of innovation. This can include regulatory approaches that enable business innovation broadly, helping particular sectors where compliance is a high burden (eg medicines and banking), or specific efforts to enable a new sector to emerge.
9) **Government procurement of innovation** is the extent to which governments try to bring innovation into the public sector, and support innovative domestic firms, by procuring locally.

THERE ARE DIFFERENCES IN INNOVATION FUNCTIONS ACROSS COUNTRIES

We offer these overarching insights from our review of functions across small, advanced economies:

- The most commonly observed function is **financial innovation support**. Nearly always, complementary to that support, governments seek to lift **international connectivity**.
- Functions that affect **human capital** are treated by most governments as a key avenue to connect research and business, usually in the form of incentives for joint projects, cluster programmes, or colocation around major **innovation infrastructure** like universities.
- About half of governments we studied have an **overarching strategy** to direct their innovation functions. Often this strategy will encompass export growth, foreign investment attraction, and draw on other government levers such as immigration and tax.
- Some countries actively prioritise **attracting foreign investment and talent** as part of their efforts to drive innovation. Israel and Ireland, in particular, have policies that specifically seek to bring ashore the R&D performing departments of large multinational enterprises.
- We observe varying degrees of **coordination in delivery**. In New Zealand and Finland, delivery of innovation functions is split across multiple agencies, but Finland has a mechanism (Team Finland) to align and coordinate agencies. Ireland and Singapore deliver most innovation functions through one agency. Israel delivers all functions via one agency.
- In some countries, **networking functions** improve ecosystem connectivity by minimising friction for navigating state and non-state support and partnerships.
- Two governments, Israel and Finland, stood out as particularly experimental because they clearly designated a **system optimiser function**. In each case, an innovation agency had a clear mandate to pilot new kinds of interventions to lift R&D.
- It is rare for governments to purposefully engage in **innovation procurement** or to take a **responsive approach to regulating,** such as using regulatory sandboxes. Israel does the most, with schemes to match businesses with regulators as well as procure innovation for the government.
- While our analysis focused on the small, advanced economies, we also briefly reviewed two other countries, Australia and the United Kingdom:
    - **Australia's** innovation functions mainly sit within CSIRO, which performs and funds R&D. The main innovation functions at CSIRO seek to improve research-industry connections. For example, funding R&D support for SMEs, training programmes for researchers to create impact with industry, and financial support for commercialisation.

- The **United Kingdom's** innovation functions are mainly delivered by Innovate UK. Funding primarily goes to projects led by businesses that partner with research organisations, and to a knowledge transfer network that supports partnerships in high potential areas. It can be likened to the Irish model we have detailed.

SUMMARY OF INNOVATION FUNCTIONS ACROSS COUNTRIES

Cross-country scan of international innovation functions ◆ Present ◇ Partial, indirectly or only narrowly available	*Strategic policy*	*Financial innovation support*	*Networking*	*Innovation infrastructure*	*Human capital*	*International connectivity*	*System optimisation*	*Regulatory responsiveness*	*Government procurement of innovation*
Finland	◇	◆	◇		◇	◆	◆		◇
Ireland	◆	◆	◆	◆	◆	◆		◇	
Israel	◇	◆	◆	◆	◆	◆	◆	◆	◆
Singapore	◆	◆	◆	◆	◆	◆	◆		
Switzerland	◇	◇		◆	◇	◇			
New Zealand	◇	◆	◇	◇	◆	◇		◇	

FINLAND – AN EXPERIMENTAL, COORDINATED APPROACH

Function is present? Yes/Partially/No	Distinctive functions or context
Strategic policy	The Research and Innovation Council, chaired by the Prime Minister, discusses key issues relating to research and innovation policy in Finland. The level of policy evaluation is unclear and Sitra (a system optimiser agency, discussed below) performs fore-sighting. In 2018, Finland's previous innovation and internationalisation agencies, Tekes and Finpro, were merged under the name Business Finland. This was done to clarify and simplify the business support system.
Financial innovation support	We observe a conventional approach, as described in the nine innovation function categories above. For example, Business Finland offers innovation vouchers for firms to develop new products and prepare for international growth.
Networking	Team Finland is a strategic coordination and customer sharing mechanism between central and local agencies that deliver innovation functions, as well as a shared overarching brand. Sweden and Norway have similar mechanisms.
Innovation infrastructure	Not observed.
Human capital	We observe a conventional approach as described in the nine innovation functions categories. For example, Business Finland offers funding to small and medium sized companies that have international growth aspirations, to cover costs of improving capability to manage innovation.
International connectivity	Team Finland has an office network overseas, including a footprint in some consulates, and R&D offices in key international innovation ecosystems. Business Finland offers international growth services such as capability support and funding for building readiness for entering new export markets, funding support for businesses with international market potential, and loans for piloting and developing technologies with global potential.
System optimisation	Sitra acts as a think tank, policy experimentation unit, and investment fund resourced by the central bank and directly accountable to the Finnish parliament.
Regulatory responsiveness	Not observed.
Government procurement of innovation	Business Finland offers funding to public sector organisations to encourage innovation when procuring.
Contextual observations	Since the Second World War, Finland began experimenting with innovation functions, via Sitra, with the stated goal of diversifying their economy away from primary sector commodity exports to Russia.

IRELAND - A FOCUS ON FOREIGN INVESTMENT

Function is present? Yes/Partially/No	**Distinctive functions or context**
Strategic policy	The Irish government has a national strategy for R&D and exports (*Impact 2030: Ireland's Research and Innovation Strategy*). Most innovation functions sit with one delivery agency (Enterprise Ireland) that works closely with trade and export functions in Ireland's Foreign Direct Investment Agency. Policy is developed at the Department of Business, Enterprise, and Innovation, and monitored by the Department of Foreign Affairs and Trade.
Financial innovation support	We observe a conventional approach, as described in the nine innovation functions categories above. For example, Enterprise Ireland offers grant funding to assist commercialisation, IP strategy, and talent attraction.
Networking	Knowledge Transfer Ireland is a national agency that seeks to improve research-industry connections. Enterprise Ireland has navigators to connect firms to government function and identify research with commercial potential.
Innovation infrastructure	Research-oriented centres are run by Science Foundation Ireland, in conjunction with universities. Also, Ireland's Foreign Direct Investment Agency runs a shop window for leases in Ireland's state-owned innovation parks.
Human capital	Enterprise Ireland is relatively active with innovation education for various company stages, international sales training, public communications about the benefits of innovation for the country, and R&D advocates that increase R&D awareness in innovation-inactive firms.
International connectivity	Enterprise Ireland and Ireland's Foreign Direct Investment Agency jointly run FDI policies. For example, the IDA R&D Fund supports multinational subsidiaries to expand or establish R&D facilities in Ireland. Also, the Science Foundation Ireland funds industry hubs at universities to encourage user-orientated basic research.
System optimisation	Not observed.
Regulatory responsiveness	The Central Bank of Ireland recently launched a regulatory sandbox programme for financial services.
Government procurement of innovation	Not observed.
Contextual observations	Ireland's government has maintained a focus on attracting foreign investment and the R&D centres of global firms.

ISRAEL – AMBITIOUS AND INTEGRATED FUNCTIONS

Function is present? **Yes/Partially/No**	**Distinctive functions or context**
Strategic policy	Israel lacks an overarching strategy that directs its innovation functions, and we do not observe fore-sighting. All innovation functions are delivered through a single agency – the Israel Innovation Authority. Policy evaluation is performed in-house and at the parent agency, the Ministry of Economy and Industry.
Financial innovation support	Israel's approach to financial support is conventional but emphasises the reputational benefits of state support for companies. For example, recipients of R&D grants from the Israel Innovation Authority receive an official endorsement, or quality tick. This helps firms to enter markets, attract other state support or raise private capital.
Networking	The Israel Innovation Authority has a relatively strong focus on connecting businesses and research, including funds that specifically encourage foreign firms to collaborate with domestic organisations. For example, the MAGNET Consortiums policy provides grants for R&D collaboration among a group of companies and research institutions.
Innovation infrastructure	Like Switzerland, Israel has policies in place for innovation infrastructure planning. For example, a National Infrastructure Forum for R&D has run since 1997, to establish R&D infrastructures and inter-organisational projects. Another example is the R&D Infrastructure and Equipment incentive program offered by the Israel Innovation Authority. This offers 55% or 66% state co-funding to establish and operate R&D infrastructure for a group of firms.
Human capital	The Israel Innovation Authority delivers a conventional approach to education and training. For example, via the Technological Innovation Incubators Program, entrepreneurs and researchers can receive comprehensive assistance, including business mentoring and legal guidance.
International connectivity	The Israel Innovation Authority offers relatively strong incentives to lift FDI. In particular, to attract multinational firms to locate their R&D centres in Israel. For example, one fund (R&D Collaboration with Multinational Corporations Program) involves the state matchmaking and co-investing in R&D projects alongside multinational firms and local startups.
System optimisation	The Israel Innovation Authority (and its predecessor organisations) have carried out significant policy experimentation and evaluation over several decades. Israel is generally considered to have been a first-mover in innovation policies that are now considered globally typical.
Regulatory responsiveness	The Israel Innovation Authority runs the Joint Government Support for Pilot Programs. This involves calls for proposals in areas of government interest, such as space and digital health. Companies are matched with relevant regulators to

	jointly pilot new technologies in a sandbox environment. Companies receive funding and access to state-owned testing locations and facilities.
Government procurement of innovation	The Israel Innovation Authority offers its expertise to other parts of government. For example, facilitating the design and implementation of innovative projects within and between Israeli government agencies and regional authorities.
Contextual observations	Israel invests more in R&D than all other OECD countries. This is due to a strong business contribution, as Israel ranks lowest in the OECD in the share of R&D funded by government.

SINGAPORE – A CENTRALISED, FOREIGN INVESTMENT APPROACH

Function is present? Yes/Partially/No	**Distinctive functions or context**
Strategic policy	The Research, Innovation and Enterprise Council (**RIE**) comprises Cabinet Ministers and distinguished local and foreign members from the business, science, and technology communities. The RIE publishes strategic policy such as Singapore's *Research, Innovation and Enterprise 2025 Plan*. The Ministry of Trade and Industry (**MTI**) monitors relevant agencies such as Enterprise Singapore and A*STAR.
Financial innovation support	We observe a conventional approach as described in the nine innovation functions categories. For example, grants and loans are provided by Enterprise Singapore and A*STAR to encourage R&D and industry-research connections.
Networking	A*STAR has a mandate to facilitate collaborations between research and enterprise. Enterprise Singapore also plays a networking role by educating businesses about where to go for different kinds of support. Enterprise Singapore (**EnterpriseSG**) and the Infocomm Media Development Authority (**IMDA**) operate the Open Innovation Network which conducts National Innovation Challenges (**NIC**). The NICs are a directory of industry-wide issues proposed by government agencies or companies seeking solutions from business or research.
Innovation infrastructure	Jurong Town Corporation (**JTC**) is a statutory board under MTI which develops infrastructure to support the growth of new industries in Singapore. One-north is one example of this infrastructure, which provides access to a range of benefits including R&D services and factory space, including the presence of Biopolis - a biomedical R&D hub housing public research institutes and private research organisations.
Human capital	There is a comprehensive suite of talent initiatives, predominantly administered by Enterprise Singapore. For example, the Global Ready Talent programme helps Singapore businesses gain exposure to offshore markets.
International connectivity	Enterprise Singapore provides the main functions that help business expand overseas. Responsibility for foreign investment attraction sits with the Singapore Economic Development Board. They aim to anchor FDI through schemes that encourage global business to expand in Singapore, such as the Singapore Investment Clinic.
System optimisation	System optimisation appears to be a generalised activity across government, aimed at specific societal challenges, rather than the mandate of one agency. The Alliances for Action (**AfA**) are a key example of this. The AfAs are industry-led coalitions, working in partnership with government, to prototype solutions in areas of great opportunity or challenge. AfAs are allowed to fail if they are considered non-viable after a six-month sprint process.
Regulatory responsiveness	The Singapore government does not appear to play a strong system-wide role here. However, it recognises the importance of regulatory support for innovative companies. For example, offices of relevant regulators tend to co-locate in innovation infrastructure.

Government procurement of innovation	Not observed.
Contextual observations	Singapore's foreign investment, regulatory and tax settings have been designed to capture as much high value investment as possible, and Singapore is well known for its consistent FDI promotion and attraction efforts. This has seen the attraction of international R&D investment and talent to grow its domestic innovation system.

SWITZERLAND – HANDS OFF AND LEVERAGING CLUSTERS

Function is present? **Yes/Partially/No**	**Distinctive functions or context**
Strategic policy	The Federal Council sets strategic objectives for Switzerland's policies across education, research, and innovation every four years. The level of policy evaluation or fore-sighting is unclear.
Financial innovation support	The Swiss government appears relatively uninvolved in financial support for innovation. Most support is provided by Innosuisse (considered Switzerland's innovation agency), primarily providing funding for projects between industry and researchers.
Networking	Not observed.
Innovation infrastructure	The Federal Government plans infrastructure as part of four-yearly strategic objective setting via the Swiss Roadmap for Research Infrastructures. The Swiss Innovation Park – a public-private partnership – spans six regional sites, and provides laboratories, offices, conference rooms, and co-working spaces for firms at large research institutions. The parks provide a network for researchers, domestic and overseas corporates, and startups to work together on joint projects.
Human capital	Conventional approaches to developing human capital are not observed at Innosuisse. However, the ETH Domain (made up of Switzerland's two federal institutes of technology and four research institutes) are highly regarded in terms of federally-supported study programmes that prepare researchers for business and industry.
International connectivity	There is internationalisation support for firms via Innosuisse. This is mainly funding for innovation projects that involve partners in the EU and strategic partner countries. These projects can involve businesses at all stages of growth as well as research organisations.
System optimisation	Not observed.
Regulatory responsiveness	Not observed.
Government procurement of innovation	Not observed.
Contextual observations	Notably, Switzerland has a relatively attractive environment for innovation (through tax and regulatory settings, strong universities etc) without an extensive range of support functions as seen in the other countries.

NEW ZEALAND

Function is present? **Yes/Partially/No**	**Distinctive functions or context (***Note: Further detail on New Zealand's innovation support mechanisms was provided to you in paper SSAG-MBIE-009)*
Strategic policy	MBIE is the main policy and monitoring agency for innovation functions. Functions are mainly delivered by Callaghan Innovation, and, for international activities, New Zealand Trade and Enterprise (**NZTE**). New Zealand has government strategies that overlap with some innovation functions (such as export growth) or innovative sectors (such as aerospace) but there is not an overarching innovation strategy of the kind observed in many other small, advanced economies. New Zealand agencies appear to carry out relatively less fore-sighting and policy evaluation of innovation functions.
Financial innovation support	NZ takes a conventional approach, as described in the nine innovation functions categories above. Through Callaghan Innovation, government funds and incentivises private-sector R&D and technology incubation. Another government agency, New Zealand Growth Capital Partners, provides venture capital in early-stage markets to support start-ups.
Networking	The New Zealand Product Accelerator is a small-scale, government funded service to broker connections between businesses and researchers.
Innovation infrastructure	The state owns a portfolio of innovation facilities via universities, Callaghan Innovation and Crown Research Institutes but there is no overarching mechanism for national SI&T infrastructure planning or incentives around hubs and clusters. Callaghan Innovation provides fee-for-service R&D capability and access to advanced equipment. This is an unusual, perhaps globally unique function for an agency that also administers other functions like financial innovation support.
Human capital	Callaghan Innovation administers a conventional approach to skills development, offering a broad suite of services to lift R&D capability in firms, and to lift business capability in start-ups. Callaghan Innovation also funds student placements in R&D performing firms and has recently piloted a programme to lift management capability.
International connectivity	NZTE covers export promotion and foreign investment attraction. These customers tend to be later-stage companies rather than innovative, high potential firms or pre-revenue startups. Callaghan Innovation does not have an overseas footprint, which seems uncommon for an agency involved with delivering innovation functions.
System optimisation	Not observed.
Regulatory responsiveness	A responsive approach to regulatory change has enabled space and aerospace sector development. Government provides a regulatory sandbox in this area and access to launch facilities jointly owned by government and local iwi (the Tāwhaki site). However, there is no system-wide function.
Government procurement of innovation	New Zealand does not have specific programmes to encourage agencies to incentivise innovation through procurement.

Contextual observations	Inland Revenue has observed that New Zealand's tax system presents relatively high barriers to business investment, including foreign investment. The OECD and the New Zealand Treasury have stated that New Zealand's overseas investment screening regime is restrictive compared to other countries.