

Policy directions to increase business investment in innovation

Office of Innovation and Science Australia

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1 Executive Summary

Australia lags other countries in investment in innovation. This reflects the structure of our economy, with a low share of manufacturing, which tends to be more innovation-intensive, or at least R&D intensive, than other industries.

It also reflects the lack of diversity in our exports, which are dominated by primary industries with low value added. Global headwinds and digital technologies pose considerable risks to the Australian economy due to falling terms of trade. Policies that have delivered strong income growth are no longer delivering the productivity growth needed to improve our standard of living.

In this environment, businesses must invest more in innovation. This study approached this challenge from the perspective of businesses. Businesses can make it worth their while to invest in innovation. Government can contribute through proactive industry policy.

Australia needs more businesses to have the characteristics of successful innovators uncovered through this study. These businesses:

- make considered and deliberative decisions about investing in innovation
- have highly engaged staff and investors supported by their organisational structures and leadership
- know and meet the needs of customers and potential customers
- engage extensively with their industry ecosystem of suppliers and potential collaborators.

Businesses need all these characteristics to successfully innovate. These characteristics are useful to diagnose why investment in innovation is low in particular types of businesses.

Startups are focused on the investment decision and have highly engaged staff. Businesses established to solve problems tend to focus on clients but may need to learn how to expand beyond their initial customers. Technology startups are more likely to have strong research collaborations but may lack a clear customer focus.

Ambitious small and medium enterprises (SMEs) are most likely to have all these characteristics, but may struggle to export and link with collaborators along the value chain. At this point Australia risks these businesses moving offshore.

Other SMEs lack these characteristics because they are comfortable in their niche. Some want to be more ambitious but are not deliberative in their approach to investment. There is considerable scope to improve productivity in this group through incremental innovation – adopting technologies that are new to the firm, but not to the world, and improving processes.

The last group of businesses is mature corporates. Many of these businesses appeared to be complacent. Many assign innovation to a unit in the business, with the rest of the business being averse to risk. Some mature corporates engaged as part of this study reported that boards are not forcing management to present a sound case for investment in innovation, in part because tax and other policies damp incentives for risky investments with longer term returns. Some larger businesses spend R&D dollars on competing for market share at home, which can be a zero-sum strategy from a national perspective.

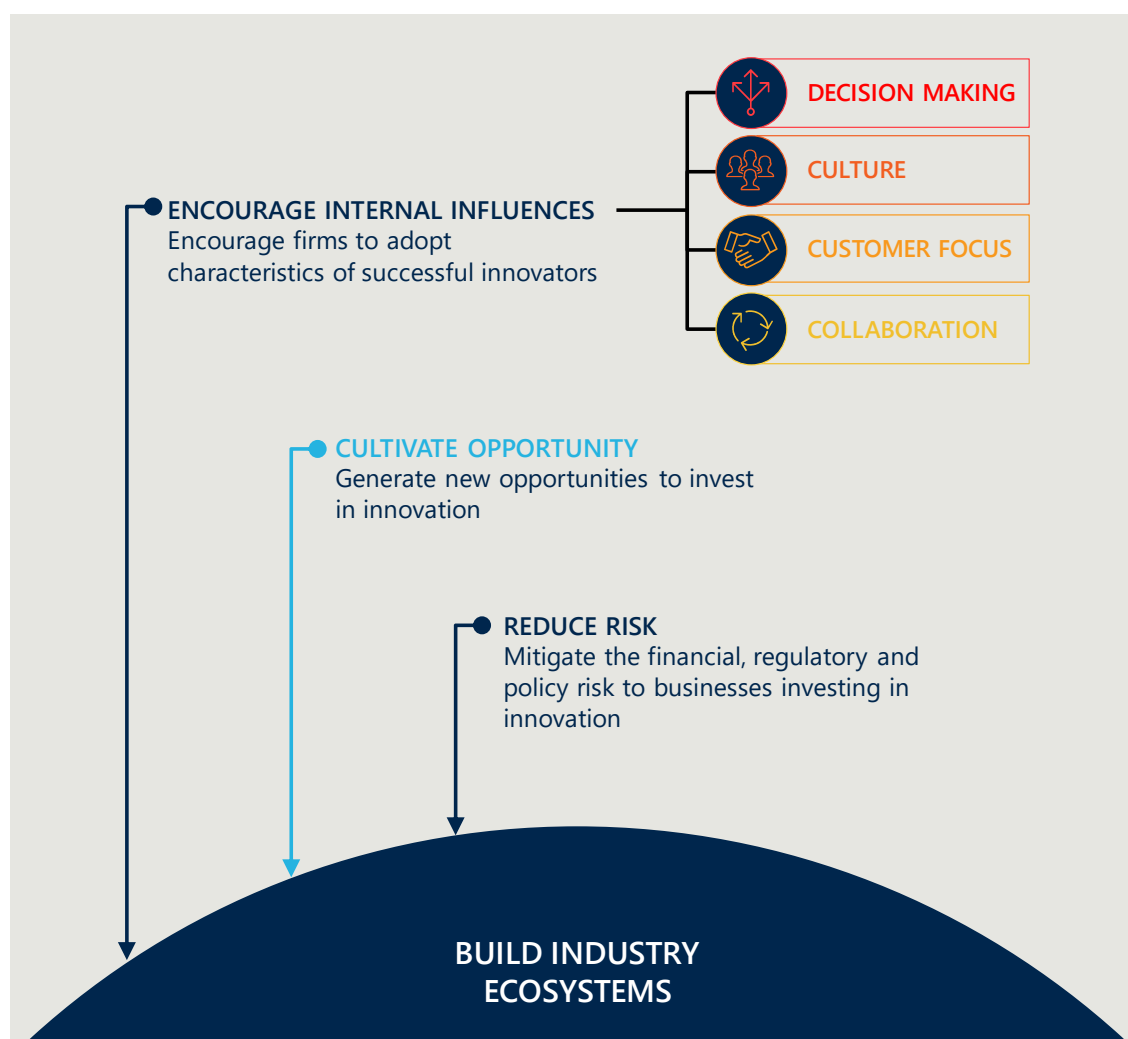
Governments cannot directly change these business characteristics, but they can foster the industry ecosystem in which the businesses operate. Governments can do more to improve the opportunities for business innovation and reduce the risks of investing in innovation. Governments can also achieve critical mass in industry ecosystems where Australia may have a comparative advantage. The 'valley of death' concept applies to industries as well as to startups.

This report sets out directions for change and opportunities that should increase business investment in innovation. These directions are not new; rather, they represent a change in emphasis and the active engagement needed to make a difference. The wide engagement with businesses through this study led to the conclusion that governments can help businesses invest more effectively in innovation through:

- constructing an inclusive and compelling narrative on innovation
- consolidating, redesigning and coordinating grants programs
- concentrating support to build thriving industry ecosystems
- fostering collaborations, including between business and government
- using procurement to drive innovation
- improving the foundations for businesses
- working more effectively with business to build skills.

The policy directions outlined in this report were developed through a co-design process involving businesses and government staff engaged in industry policy. These directions aim to improve the four elements that work together to increase businesses' capacity and inclination to invest in innovation – desirable internal characteristics, more opportunities, reduced risk and a thriving industry ecosystem (Figure 1).

Figure 1 | Opportunities for government to support business investment in innovation



2 Australia needs to change to be an innovation nation

Australia is lagging behind peer OECD countries in many aspects of investment in innovation.¹ Productivity growth has slowed since the early 2000s and our economy has become more concentrated and reliant on a handful of export industries. To take full advantage of the digital 'revolution' of robotics, artificial intelligence (AI) and the internet of things, Australia will need a critical mass of businesses using these technologies drawing on skilled labour, supporting regulations and infrastructure. Australian businesses need to access these opportunities. This report explains how governments can help them to do this, while recognising that it is up to businesses to develop thriving industry ecosystems.

2.1 This study looks at innovation policy through the eyes of businesses

To inject new thinking into the policy discussion, the Office of Innovation and Science Australia (OISA) engaged Nous Group to identify a new approach to boosting business investment in innovation. Nous adopted a human-centred design (HCD) approach, which involves end users (in this case, businesses) early and often, and examines behaviours and perceptions as well as systems and processes.² This approach sought to understand how Australian businesses in 2019 make decisions about investment in innovation.

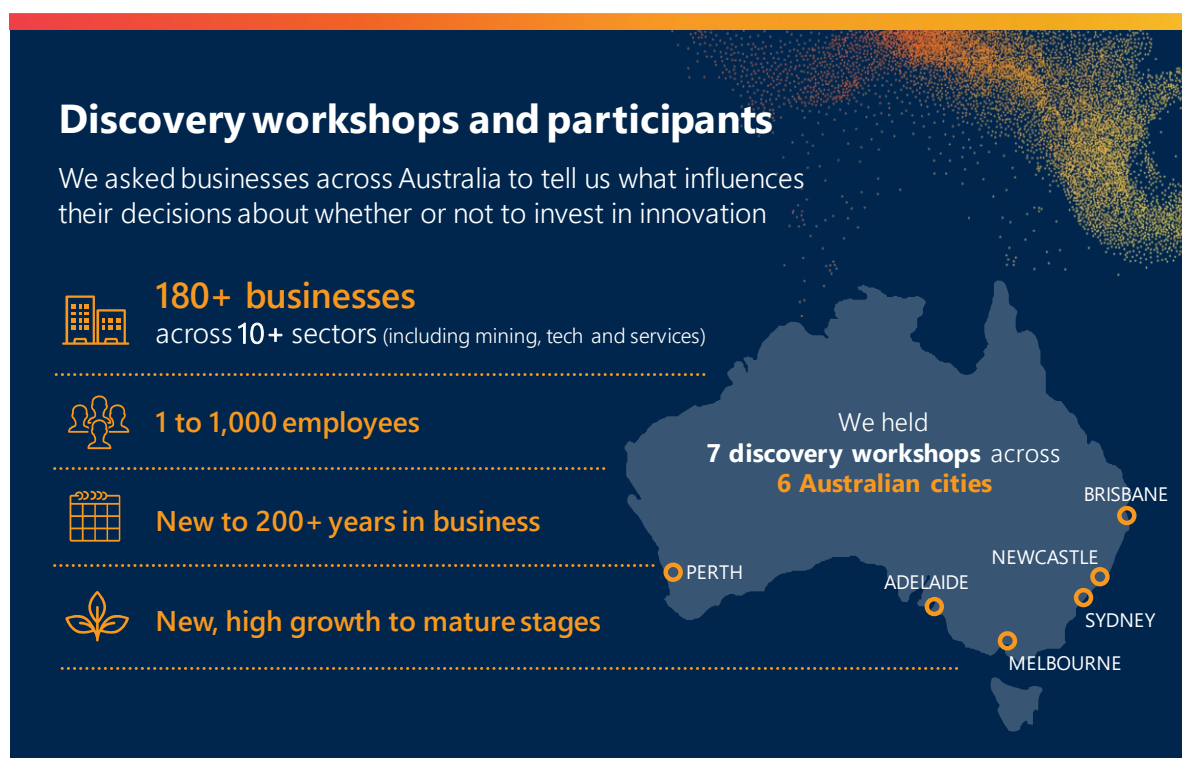
The seven discovery workshops (Figure 2) and three co-design workshops with businesses highlighted some ambivalence in businesses about the role of government. Many businesses were unaware of the array of programs that governments provide to assist businesses to invest in innovation. Some were critical of government efforts, while others found them valuable. Overall, businesses tended to focus on what government can do for them, which was sometimes to get out of the way, but mostly to mitigate their financial risk. Businesses saw little sense in contributing to building ecosystems to support their industry's endeavours and there were clear differences between businesses that innovate and those that do not.

To improve productivity growth and take advantage of digital technologies, Australia needs more businesses with the characteristics of the innovators. It needs businesses to be more active in collaborating to build their industry ecosystems. And it needs more concentration of effort to build critical mass in areas where Australia can have a comparative advantage.

¹ AlphaBeta, 2019, Australian Business Investment in Innovation: levels, trends, and drivers

² Further information on methodology is in supplementary reports.

Figure 2 | Overview of discovery workshop participants



This study asked businesses how governments can enable them to thrive. There was consensus that reliable and efficient economic infrastructure and a skilled and healthy labour force contribute to business success. Most agree that sound regulation (to govern the conduct of firms and protect the interests of consumers, workers and the environment) is important. The more contentious policy question was whether governments can stimulate economic growth through proactive industry support.

Many countries have policies that actively promote their businesses and support them to innovate, including through government procurement, co-investment and direct investment in businesses. This section looks at some of the approaches taken in other countries and the challenges for boosting investment in innovation in Australia. Section 3 reports on how businesses invest in innovation. Section 4 summarises the views from business on how governments can enable them to invest more in innovation. Section 5 sets out how governments could encourage businesses to invest, not just in innovation for themselves, but in creating thriving ecosystems to support future innovation.

2.2 Governments overseas more actively drive investment in innovation

With governments in other countries being increasingly proactive in supporting businesses to innovate, it is imperative that Australian governments deliver effective policies to help level the playing field. In doing so, policies must induce additional investment to enable businesses to respond to market opportunities and avoid encouraging rent-seeking or crowding out investment that would otherwise have occurred. Without more active, well-targeted engagement to foster innovation investment, Australian businesses risk falling further behind their international competitors.

Around a quarter of current Australian Government investment in R&D programs and activities is through the R&D Tax Incentive.³ This is a passive mechanism that helps to reduce the cost to business of investment in R&D. While it is highly valued by many businesses, there are concerns about the extent to which the incentive encourages additional business investment in R&D.⁴ Other industry programs range from seed and project funding for Industry Growth Centres to grant programs for commercialisation.

Generally, there are three broad mechanisms beyond tax concessions and grants through which other governments are helping to drive investment in innovation:

1. co-investment in R&D with industry
2. major government procurement
3. direct investment in innovation.

Detail on each strategy is below.

Co-investment in research and development with industry

Germany has a long history of driving and investing in research partnerships. For example, the Fraunhofer Institutes research a specific area of applied science. The annual research budget is €2.6 billion (A\$4.2 billion); of this €2.2 billion is from contracts and €400 million is provided by government for preparatory research. In this way, Germany supports commercialisation where it would not otherwise be available, and fosters collaboration between research, government and industry.⁵

Other countries are following this approach, facilitating connections between public sector research institutions and businesses. For example, the C\$950 million (A\$1.05 billion) Canadian Innovation Superclusters Initiative is developing five industry-led superclusters.⁶ Switzerland Innovation, with federal backing of 350 million Swiss francs (A\$510 million) in supporting private equity investment, aims to foster R&D collaborations between private companies, Swiss universities and other research partners.⁷

Expertise is also provided in many countries through business coaches or seconding public sector experts. For example, Singapore second research scientists and engineers from national research institutions to provide technical expertise and strategic guidance to SMEs.

A critical mass of growth-oriented firms and strong collaborations between private, academic and public organisations through national funds helps drive investment in innovation. Nevertheless, it remains to be seen whether a programmatic approach (a fixed investment over a fixed period) will develop the same outcomes as the long-term commitment to working together on R&D that Germany has achieved.

Major government procurement

Major government procurement has long been recognised as an effective mechanism to support the development of an innovation ecosystem. This is particularly prevalent in the health, higher education and defence sectors, which often face complex and technical challenges and attract significant public expenditure. The United States' 'space race' expenditure in the 1960s demonstrated how major

³ Department of Industry, Innovation and Science, 2018-19 Science, Research and Innovation Budget Tables, October 2018

⁴ Ferris, B., Finkel, A., and Fraser, J., 2016, Review of the R&D Tax Incentive. See also The Centre for International Economics, R&D Tax Incentive Programme Review, March 2016.

⁵ Fraunhofer-Gesellschaft, 2019, Annual Report 2018.

⁶ Innovation, Science and Economic Development Canada, Innovation Superclusters Initiative, viewed 12 September 2019, <https://www.ic.gc.ca/eic/site/093.nsf/eng/home>

⁷ Switzerland Innovation, viewed 12 September 2019, <https://www.switzerland-innovation.com/about-us>

government procurement can also foster innovation in other sectors. Indeed, this expenditure was a driving force keeping the United States at the forefront of innovation.⁸

Governments have adopted challenge-based approaches to procurement to drive productivity growth through innovation. For example, the United States' Small Business Innovation Research program,⁹ the United Kingdom's Small Business Research Initiative¹⁰ and Innovative Solutions Canada¹¹ are all procurement programs where governments release challenges to the public and procure from innovative SMEs to deliver the solution. The Australian Government's Business Research and Innovation Initiative (BRII) is a similar approach. "Advancing Space: Australian Civil Space Strategy 2019-2028" has elements of this idea, but it does not have a major procurement element. And while it does have a vision, it involves flagging opportunities rather than solving a clear challenge.

In considering the benefits of these SME challenge programs, it is important to consider their relative size and whether they have the scale to make any difference to the size of the ecosystem supporting innovation. Additionally, their focus is often limited to directing the efforts of the businesses in these programs to the specific challenge they have been set. Whether this can generate positive spill-over effects is yet to be seen.

Direct investment in innovation

Countries that invest heavily in innovation commonly have mechanisms for governments to fund private-sector entities, either through direct co-investment or risk guarantees for private investors.

Funding is typically provided through co-investment programs. Examples include the Finnish Innovation Fund¹² and the Startup SG equity fund in Singapore.¹³ A key feature of these programs is the targeting of innovative enterprises that operate in a designated sector or meet the strategic needs of the nation. This mechanism is similar to government procurement.

Governments may drive investment for innovation by providing risk guarantees to private investors. For example, Yozma, an Israeli Government venture capital fund, attracts private investment into Israeli SMEs by fronting money in a joint fund, reducing private investors' risk.¹⁴

Although successive Australian governments have adopted some of these approaches, fewer resources tend to be allocated and the programs are rarely focussed on particular sectors or industries. Australian policies tend to have a wide apparent eligibility, in part because of an understandable reluctance to pick winners. But with a small economy, the lack of scale can condemn efforts to a marginal benefit at best and can render them ineffectual at worst. These issues are discussed in Section 5.

⁸ Mariana Mazucato has popularised the term moonshot in her book *The Entrepreneurial State, Debunking public vs private sector myths*, Anthem Press, 2013, ISBN 978-0-857282-52-1.

⁹ Small Business Innovation Research, viewed 12 September 2019, <https://www.sbir.gov/>

¹⁰ Government of the United Kingdom, SBRI: the Small Business Research Initiative, viewed 12 September 2019, <https://www.gov.uk/government/collections/sbri-the-small-business-research-initiative>

¹¹ Innovation, Science, and Economic Development Canada, Innovative Solutions Canada, viewed 12 September 2019, <https://www.ic.gc.ca/eic/site/101.nsf/eng/home>

¹² The Finnish Innovation Fund Sitra, viewed 12 September 2019, <https://www.sitra.fi/en/>

¹³ Enterprise Singapore, Startup SG, viewed 12 September 2019, <https://www.startupsg.net/>

¹⁴ The Yozma Group, viewed 12 September 2019, <http://yozma.com/home/>

2.3 Australian businesses are not well placed to embrace the opportunities presented by the changing global environment and new technology

The external challenges are considerable...

Australia's terms of trade are vulnerable to tensions in the world trading system and slowing global growth. Without trade as a source of income growth, Australian businesses need to look to their own resources to drive productivity and profits.

The trade-related risks from the global economy are not the only disruptive factor. There is major change underway as cloud storage, digital communications and artificial intelligence (AI) increase the value of data and reduce the tyranny of distance. Machine learning, robotics and sensors are automating more cognitive-based work. The rapid evolution of digital technologies offers both opportunities and threats for Australia – opportunities as distance and scale are less of a barrier, and threats as failure to keep up will see our businesses' markets eroded.

...as are the internal challenges for businesses to scale up

Australian businesses face the challenge of scaling up, and governments face the challenge of helping these businesses grow and stay in Australia. The reasons Australian businesses struggle to grow vary by industry. Challenges include growing businesses that by their nature are 'boutique' in a small market, keeping innovative businesses onshore as they grow; and growing mature businesses where they enjoy easier conditions as oligopolies in the Australian market.

Economies of scale are a major source of productivity growth. However, technology is changing this source of advantage with 3D printing, more tailoring of product to specific tastes, and the bundling of goods and services. This means that knowing customer tastes and responding to changing preferences is increasingly critical to businesses.

There is a trend in Australian manufacturing toward niche products. This could explain both the slightly falling R&D intensity and the flatlining productivity growth in manufacturing. Both are consistent with the growth of artisan products that, while profitable, have higher inputs per unit of output.¹⁵ More tailored products require marketing and design input, which are more likely to be treated as expenditure (intangible investment) than R&D. This explanation is consistent with the data but may only be a small part of the overall picture.

It is clear that scaling up businesses in artisan products is difficult, because they lose their appeal once scaled. The efficiencies of franchises come from standardisation and central buying power, which undermine the local focus of many artisan products. Extracting more value out of the artisan model requires applying a common platform to more markets – deriving efficiencies from replicating the business model, based on their foundational knowledge, rather than the product.

To achieve jobs and growth through local innovation requires keeping startups in Australia as they move from high growth into their mature phase. Many great Australian ideas end up offshore, whether taken there by the entrepreneur inventor, or sold at early stages when the going gets tough or the offer is too good to turn down. This pattern is pronounced even before the proof-of-concept stage of

¹⁵ Productivity Commission 2013, Productivity in Manufacturing: Measurement and Interpretation, Staff Working Paper.

commercialisation, with Australian public investment in research yielding remarkably low commercial returns relative to the scientific returns.¹⁶

The challenges in scaling up might determine the pattern of R&D investment – businesses do not invest because they do not think they can scale up to make the investment worthwhile. This is consistent with innovation activity being positively correlated with firm size in Australia and relatively concentrated. Notably, 30 per cent of Australia's total business expenditure on R&D (BERD) (\$4.8 billion) is generated by only 14 firms. In contrast, more than 90 per cent of innovation-active Australian businesses spend less than \$100,000 per year on innovation.¹⁷

Mature Australian businesses have a modest record when it comes to offshore expansion. This is despite the relatively high share of BERD in some sectors where mature businesses dominate, notably the financial sector (our financial sector is largely inwardly focused and dominated by the four big banks and big superannuation funds).

Generally, more concentrated sectors tend to invest more in R&D. This higher investment should imply that these businesses are more innovative and looking to expand abroad to grow. But this does not seem to be the pattern; rather, investment in R&D seems to be oriented toward competing for market share rather than using the domestic base as a platform to grow business overseas.

In recent years, investment in BERD has been only weakly correlated with multifactor productivity (MFP) growth, and broader innovation investment has not been not correlated with MFP growth. Given this, it is surprising that broader innovation activity (self-reported) has proved to be highly correlated with MFP growth. This suggests there are problems in measuring investment in innovation, including that there are tax incentives for businesses to frame expenditure as R&D. But it also suggests that businesses that are conscious of their investment in innovation do see returns.

2.4 Shifting the dial on innovation is not just about helping startups with new-to-the-world products

Businesses that invest in innovation do better than those that do not. This holds for large and small businesses – firms that invest in intangible assets and R&D typically perform better than ASX200 firms that prioritise dividends. They are also more likely to survive than firms that do not report intangible assets or R&D spending.¹⁸

In designing policy, it is important to understand the nature of the challenge. Australian innovation (as distinct from industry) policy has tended to focus on assisting new businesses to get through the 'valley of death' in commercialising their new-to-the-world idea. Startups are often characterised as new firms with potential for high growth, with an export focus. Yet many new firms are less ambitious, with owners more focused on making a living and controlling their own destiny than making millions as exporters.

Australia, like many OECD countries, has a very small share of high-productivity growth firms at any point. While there is some churn in this group, there is growing concentration of productivity growth, higher wages and profits in a shrinking share of firms.¹⁹ This means there is a big pool of SMEs that never reach high growth and many mature corporates that underperform. Failure to lift productivity in these businesses is a major factor behind the poor performance at the level of the economy.

¹⁶ Department of Industry, Innovation and Science 2019, National Survey of Research Commercialisation Snapshot.

¹⁷ AlphaBeta, 2019, Australian Business Investment in Innovation: levels, trends, and drivers.

¹⁸ AlphaBeta, 2019, Australian Business Investment in Innovation: levels, trends, and drivers.

¹⁹ Andrews, D., Criscuolo, C., and Gal, P., The Global Productivity Slowdown, technology divergence and public policy: A firm level perspective, Background paper Global Forum on Productivity, OECD, July 2019 https://www.oecd.org/global-forum-productivity/events/GP_Slowdown_Technology_Divergence_and_Public_Policy_Final_after_conference_26_July.pdf.

Many businesses do not appear to be driven to invest in innovation to stay ahead of the competition through product innovation, as the vast majority do not invest in R&D. A higher share invest in other intangible assets likely aimed at improving performance, which could also be about surviving in a competitive environment. This suggests the extent of competition as a driver of innovation is to encourage surviving through cutting costs than thriving by finding new ways to work and new markets.

The other way competition raises productivity is to force poor performers out of the market. This competitive dynamic process, which would lift the overall productivity levels, is at odds with the long tail of poor performers that stay in the market.

Australian businesses that compete globally through better quality and service can help diversify exports, which currently rely disproportionately on resources (coal and iron ore) and higher education. And while exports are not inherently better than domestic sales, a large and diverse exporting sector is critical to ensure the Australian economy is resilient to commodity shocks (or to a shift in sentiments in China on studying offshore). Exports enable us to buy more imports and benefit from the gains to trade.

This study looked at innovation from incremental to radical and from process to product

This study sought to understand what drives business investment in intangible assets (such as management systems and marketing), as well as the often more manufacturing oriented processes and product innovations.

Increasingly, innovative products involve goods and service in one package, so systems to support businesses, process data and manage client relationships are just as important as a mechanical device or software application.

Traditionally, BERD has been the key indicator of innovation investment. However, BERD is not highly correlated with investment in non-R&D innovation and not all innovative businesses invest in R&D.²⁰ An increasing share of investment in innovation is in intangible investment, which can include trialling and testing new systems; purchasing enabling technology, including licenses for intellectual property; testing and rolling out new marketing approaches; and the costs of business disruption associated with the introduction of new products or processes.

Throughout this project, stakeholders were encouraged to reflect on the entire spectrum of innovation, and all factors that influence or enable investment. Both radical and incremental innovation are important for increasing productivity, raising wages and employment, and diversifying the Australian economy.

2.5 Shifting the dial on innovation requires a new way of thinking about the nexus between business and government

The timing is right for a new approach to innovation policy as governments around the world are moving away from the Washington Consensus to a more proactive approach to promoting innovation.

A focus on competition to drive innovation served Australia well as it moved from having a highly protected economy to one where markets were allowed to operate relatively free from government interference. Reforms from the 1980s through to the early 2000s transformed the economy and delivered unprecedented growth in productivity and household income. Governments floated the Australian dollar, slashed tariffs and removed quotas, abolished single markets for agricultural products, freed the labour

²⁰ AlphaBeta, 2019, Australian Business Investment in Innovation: levels, trends, and drivers.

market, opened up the capital market, withdrew from many areas of production, and removed many constraints on competition.

Some slowing of productivity growth was expected as Australia moved closer to the productivity frontier as less productive industries shrank, and competition forced businesses to reduce their unit costs of production. But this cannot fully explain the stall in MFP growth since the mid-2000s.

Competitive pressures on Australian businesses might have eased as income grew because of the strong growth in the terms of trade. (This was due, in part, to external factors as China joined the World Trade Organisation and falling transport and communication costs created a network of global value chains that stimulated demand for Australian resource exports.) It has allowed Australian businesses to survive and has dampened the impetus that international (and domestic) competition normally bring for businesses to invest in innovation.

Businesses must do the heavy lifting on investment in innovation. Government efforts will always seek to create a conducive environment rather than fund individual businesses to increase investment in innovation. But government can do more to enable businesses.

Working out what works is a challenge for governments. Determining the effectiveness of government efforts to drive private sector innovation is not easy. It is often difficult to establish whether innovation investment would have occurred even without a tax incentive. Evaluations of grant programs have had mixed results, and the impact of promoting collaboration between industry players and research agencies is similarly hard to pin down empirically. Evaluation must be part of the policy mix to ensure that governments have confidence that their efforts are making a difference.

Figure 3 interpretation

Figure 3 provides an investment framework. It shows that investments in developmental, financial and commercial activities that are intended to produce an innovation can be tangible or intangible. Tangible investments are included in traditional measures of innovation and include for example plant and equipment (including robotics). Intangible investments which are included in traditional measures of innovation are R&D and procurement software. Intangible investments which are not included in traditional measures of innovation are:

- data curation and collection,
- in-house software,
- design processes,
- organisational design and leadership, and
- employee training.

These investments lead to the innovation of a new or enhanced product or process being introduced to the firm, to Australia or to the world. These innovations fall into four categories:

- Product innovation – a good or service that is new or significantly improved
- Process innovation - A new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software.
- Marketing innovation - A new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing.
- Organisational innovation - A new organisational method in business practices, workplace organisation or external relations.

There are microeconomic and macroeconomic outcomes of these innovations. The measurable changes attributed to the innovation on a macroeconomic level include domestic and export sales/revenue, labour productivity and profits. On a macroeconomic level, the outcomes include GDP/GVA, exports, employment and tax revenue. It is important to note that the realisation of macroeconomic outcomes from innovation will depend on the extent of overcrowding and spillovers.

Figure 3 | Investment Framework



Source: derived from the Oslo Manual (2005): Guidelines for Collecting, Reporting and Using Data on Innovation, 3rd Edition

3 We asked businesses what makes them invest in innovation

When businesses are asked about industry policy directly, they instinctively call on governments to both increase support and reduce interference. By inviting them to map their innovation journeys and reflect on why some ideas did not attract investment, we were able to dig deeper into what drives investment in innovation, and what stops it. As a result, we could identify policies outside the usual approach of investing in (or importing) skills, improving access to and lowering the cost of finance and removing regulatory hurdles – while recognising that these areas remain relevant areas for action.

3.1 Businesses saw drivers of investment in innovation as internal and barriers as external

The drivers of investment in innovation identified by businesses were mainly firm level characteristics

A desire to grow the business (**growth**) was the most frequently cited driver of innovation investment. Businesses also commonly cited leadership that encourages innovation and a clear vision of the business as being innovative (**leadership and vision**).

Leaders operationalise an appetite for growth by developing and executing a growth strategy, and by cultivating an environment that supports innovation (including with respect to the assumption of risk). **Organisational structure** was seen as an enabling driver that supports the growth mindset and the leadership and vision drivers of innovation. A good organisational structure facilitates the deliberative and well-informed decision-making that underpins successful innovation.

When nominating **collaboration** and **capability** as drivers of innovation, businesses referred to both an inward and outward focus. *Collaboration* refers to collaboration within and between teams (as enabled by *organisational structure*), and also collaboration with other stakeholders (suppliers, universities, etc.). Both can be enabled by the organisational structure. The structure can do this by assigning responsibilities and providing clear guidance on the resources that can be allocated to these activities.

Capability encompasses the ability to access, retain and use talent. The ability to effectively use talent is primarily internal; the ability to attract and retain talent depends on the external talent market and the attractiveness of a firm. A good organisational structure can help in retaining and building talent, but buy-in to the organisational vision and/or the prospects of sharing growth are more likely to attract and retain talent.

The final commonly identified driver was the **anticipation of future disruption**. The businesses identifying future disruption as a driver of investment in innovation cited both the threat and the opportunity of new technologies.

Threats tended to be from other businesses moving faster with new products or accessing cheaper inputs. Opportunities tended to come from new technologies or falling prices and greater access to inputs, allowing new combinations of technologies to offer a new product. The rise of social media, cloud storage and other technologies was seen by a few businesses as creating opportunities for process innovation in

marketing and in managing their own business. But most responding to this driver were focused on getting a new product to market.

Other drivers mentioned included the inherent satisfaction of innovation, competition to reduce costs, identified social needs, a cohesive team, 'leftover' (surplus) capital, responsiveness to regulatory changes and new scientific discoveries.

Examining the drivers raised by businesses broken and down by sector, by business lifecycle stage and by number of employees suggests some interesting patterns:

- The ambition or desire to grow was a more significant driver for high-growth firms and SMEs. Other categories of businesses are motivated by a wider mix of drivers.
- Collaboration was a more significant driver for larger firms and a less significant driver for new firms. This suggests there may be latent benefits from collaboration that new firms are not capitalising on.
- Mature firms were less likely to cite leadership as a driver of innovation, which could suggest that as businesses mature, leadership shifts its focus from innovation and risk-taking to compliance and risk-aversion.
- In the 'other' category, new firms and SMEs were more likely to cite the inherent satisfaction of innovation as a driver, which suggests that for some new firms and SMEs the ambition to innovate is part of their culture.
- Growth was less likely to be identified as a driver of innovation investment in the mining sector. This is at odds with the higher R&D intensity in mining during the investment phase.²¹ This might reflect the dominance of the mining business cycle in driving industry growth, which raises a concern that individual businesses see their growth as determined by industry growth rather than by their capacity to grow their market share or expand into other markets.
- Surprisingly, manufacturing and technology businesses reported that their investment in innovation was less driven by future disruption. This could reflect that these businesses identify as the disruptors.

The barriers to investment in innovation identified by businesses were more external than internal

In contrast to the drivers of innovation, the barriers cited by businesses were mostly external. The focus on external barriers may be an artefact of the construction of the workshop, which used drivers to focus on what enabled businesses to invest in innovation. But it might also reflect the general tendency for people to look for barriers outside of their own responsibilities. The identified barriers broadly reflect the 'usual suspects': access to capital, regulatory barriers, difficulties finding skills, and a risk-averse culture in both suppliers and customers.

Resources/capital and **cash flow** are strongly related but have different dynamics. *Resources/capital* as a barrier suggests that firms fundamentally lack the capital to invest in innovation, or that they do not perceive the return on investment to be worth the investment of capital. *Cash flow* as a barrier suggests that firms struggle to invest in the here and now. The difference between lacking capital and difficulty managing daily operational expenses demands different policy responses. The cash flow barrier reflects the availability of a cash surplus as a driver of investment in innovation – 'we do it when we have the cash' was a common assertion. It links into the finding that many businesses do not take a deliberative approach to investing in innovation.

²¹ AlphaBeta, 2019, Australian Business Investment in Innovation: levels, trends, and drivers

Regulation and **capability** were generally seen as external barriers, things that businesses live with rather than things they can change. *Regulation* is a commonly cited but often ephemeral barrier – while some businesses highlighted specific regulations as onerous, most firms were not specific. Capability was mostly cited as the difficulty in accessing talent from an external labour marketplace or losing talent to competitors.

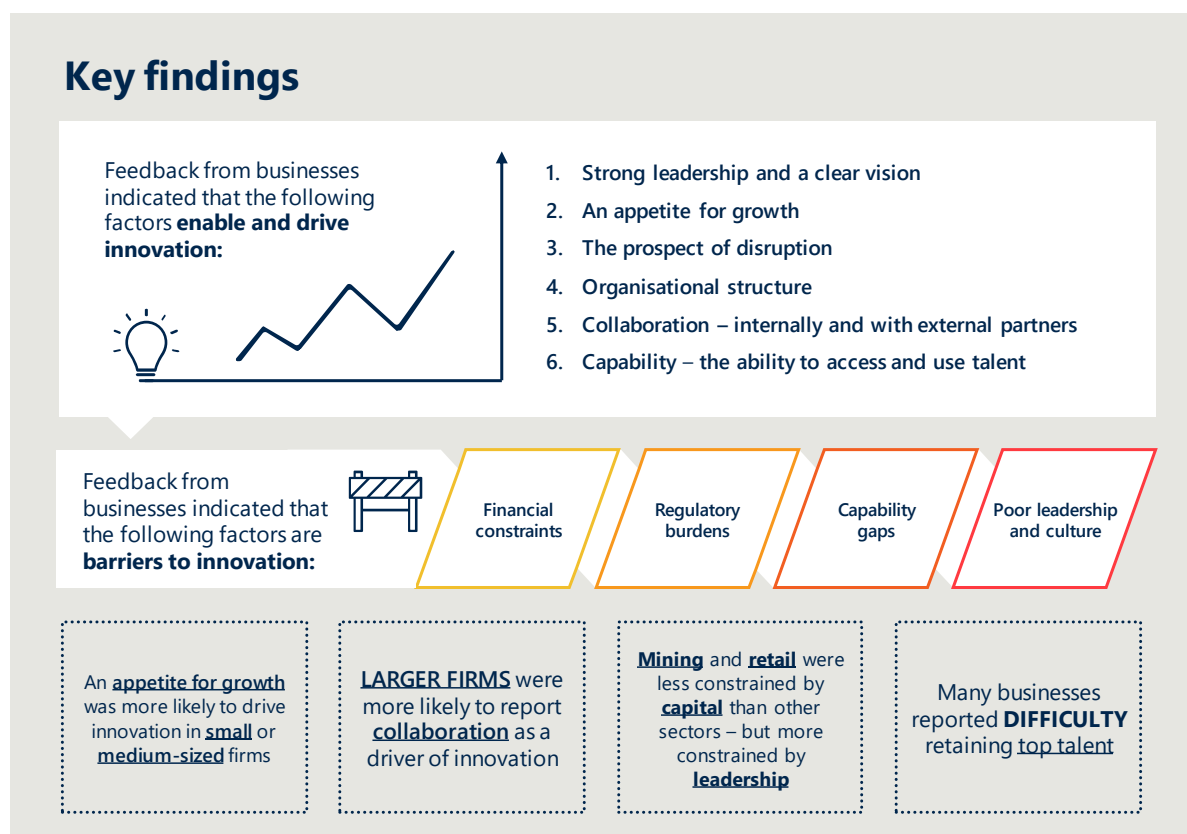
Culture and **leadership** are both internal barriers. *Culture* as a barrier stemmed from risk-averse attitudes and risk-avoiding actions of employees at all levels. Where *leadership* was a barrier, it was described as a top-down aversion to investment in innovation.

Breaking down these reported barriers by sector, by business lifecycle stage and by number of employees suggests some interesting trends, though there was less variation than observed in the drivers:

- Access to and retention of capability was more commonly cited as a barrier for firms that consider themselves high-growth and firms with 50-1000 employees. This could reflect the fact that smaller, newer firms might start the journey with a core of talented innovators, and very large firms have the brand to attract and retain the capability they need.
- Smaller firms were more likely to cite culture as a barrier and less likely to cite leadership. The higher proportion of small firms citing culture as a barrier relative to large firms could reflect a subset of SMEs with an unambitious culture.
- Mature firms were more likely to cite leadership as a barrier – which could imply that as firms move into 'business as usual', leadership becomes more focused on preserving the status quo than on continuing to innovate and develop.
- Mining and retail were less constrained by capital than are other sectors – but more constrained by leadership. This could reflect a culture of risk aversion among leaders of more strongly established businesses in more traditional sectors.
- Technology firms were highly constrained by a lack of access to capital, mirroring their emphasis on a desire to grow as a driver of innovation.
- High-growth firms were less concerned by access to resources/capital, which might reflect the fact that resources/capital are necessary to self-assess as 'high-growth'.

The main messages are summarised in Figure 4.

Figure 4 | Summary of the main barriers and drivers from the discovery workshops



3.2 Businesses that invested in innovation had four characteristics in common

When asked about policy to promote investment in innovation, businesses cited external factors as barriers and saw the role of government as boosting the capital and skills available to businesses.

To get beyond this starting point, we asked firms to map their innovation journeys and to reflect deeply on why some ideas attracted investment and others did not. This pointed to a set of firm-level characteristics that were mostly present in the businesses that successfully invested in innovation and were absent in those that did not invest or did so poorly.

The four characteristics that define businesses that successfully invest in innovation are: a deliberative investment decision-making process; widespread engagement from staff and investors in this process; strong client relationships; and extensive engagement with the ecosystem of suppliers and potential collaborators on innovation (Figure 5).

These characteristics give the business an advantage over other businesses in investing in innovation. They point to the importance of businesses having the financial space to invest, not just in R&D, but in their internal processes (to ensure decisions are well informed) and in relationships with staff, clients and others in the ecosystem.

Figure 5 | Four characteristics of successful innovators



Characteristic 1: Robust deliberative decision-making processes

The decision to invest in innovation can be more difficult than routine investment decisions. Novelty entails risk. Clear and considered decision-making processes are necessary for businesses to accurately assess and prioritise potential investments in innovation. An effective decision-making process requires:

- **Data:** Businesses need to harness data and information to understand the costs of the investment (including the cost of implementation and transition) and to assess the potential benefit.
- **Capability:** Businesses need the skills to analyse data and information and to prepare the business case for the investment, as well as the skills to undertake the investment.
- **Consistency and clarity:** Decision points must be scheduled, and clear authority assigned; big investments need 'go/no go' decision points. Processes need to be proportional to the investment and the associated risk.

Businesses need some 'fat' in the margin to invest in innovation – too many innovate only under pressure.

Characteristic 2: Investors and staff are engaged and encouraged to innovate

Investors with an appetite for innovation can drive firm behaviour. Similarly, leaders that value innovation and encourage innovative behaviour inspire their staff to innovate. Conversely, an attitude of 'if it ain't broke, don't fix it' means that resources are only diverted from business-as-usual activities in a crisis. The following factors contribute to an innovation culture:

The decision not to progress an investment is rarely seen as an opportunity for learning and is too often seen as a failure.

- **Leadership:** Businesses need leaders who appreciate the potential value of innovation.
- **Engagement:** Staff who benefit when the business does well are far more likely to generate ideas and commit to driving innovation. Staff also need to feel rewarded for putting forward ideas, including when the investment proves unsuccessful.
- **Internal collaboration:** A willingness to share ideas and insight within a business allows ideas to be tested and those found useful to gain support.
- **Organisational structure:** The willingness and ability to innovate can be frustrated by a siloed structure. A siloed structure compromises knowledge transfer and limits opportunities for staff to be exposed to new ideas and practices. A siloed structure sometimes manifests where a specific business unit is made responsible for innovation. This is more common in large organisations. While this can be beneficial, it can also mean that employees in other business units do not see innovation as their responsibility.
- **Investor mindset:** Some businesses said that investors see innovation as an indulgence, rather than an avenue for value creation. Some reported masking investment in innovation through other forms of expenditure. Investors' negative views of innovation investment may be attributed to an emphasis on dividends or insufficient information to assess the value of investments and the associated risks.

Characteristic 3: Decision-makers know and respond to customers

Businesses that build effective relationships with customers are more likely to innovate. Many businesses respond to a perception of customer needs instead of proactively engaging customers to identify new opportunities. Effective engagement requires three things:

- **The ability to use customer data:** Using customer data to inform investment decisions requires an understanding of what data is important, efficient collection mechanisms and sound decision-making processes (as specified in Characteristic 1) for the use of data. These capabilities span technical and business skillsets. Some smaller businesses said it was beneficial for decision-makers to be directly involved in responding to customer questions and complaints.
- **The ability and interest to engage in different markets:** Potential customers may be found outside of existing geographical or product markets. Investors, business leaders and staff need the right mindset and openness to engage in new markets. Board members, in particular, can derail interest in new markets if these markets sit outside their area of knowledge.
- **Trust:** Businesses need to build trusting relationships with their clients, who were sometimes viewed with suspicion. The perceived risks of greater customer engagement included losing bargaining power in negotiations or the loss of skilled staff to customers.

Characteristic 4: Active engagement with external partners (including suppliers)

Businesses that engage with their ecosystem are more likely to innovate. The ecosystem comprises research bodies, suppliers and other businesses, as well as regulators. By engaging with these actors, businesses can access new ideas, a broader skillset, and opportunities for mutually beneficial collaboration.

Concerns about competition can discourage constructive engagement that would build the industry ecosystem.

- **Business-to-business engagement:** Businesses often avoid collaboration for competitive reasons. The perceptions of anticompetitive practice or collusion can also deter some businesses. Additionally, as with customer engagement (Characteristic 3), many businesses fear losing their staff to competitors.
- **Business and research organisation engagement:** Businesses and research bodies have a poor record of collaboration in Australia. This is partly because universities seek out larger opportunities for collaboration, while much interest in collaboration resides with smaller businesses. It is also due to a lack of flow of staff between research organisations and business (or between government and these entities). Various structural barriers impede these flows, but the main one is attitudes and lack of understanding of the opportunities on offer.
- **Business and regulator engagement:** There is scope for businesses to engage more effectively with regulators. Regulation can create opportunities for innovation (for example, the renewable energy target) but care is needed to be technology-neutral. More often, businesses perceive regulation to be a barrier to innovation. Engagement on what is permissible can reduce uncertainty for the regulator about the risk posed by a new product, and for the business on its ability to test and then scale the product. Many businesses reported difficulty engaging regulators and those setting the policy to report outdated and harmful regulations.

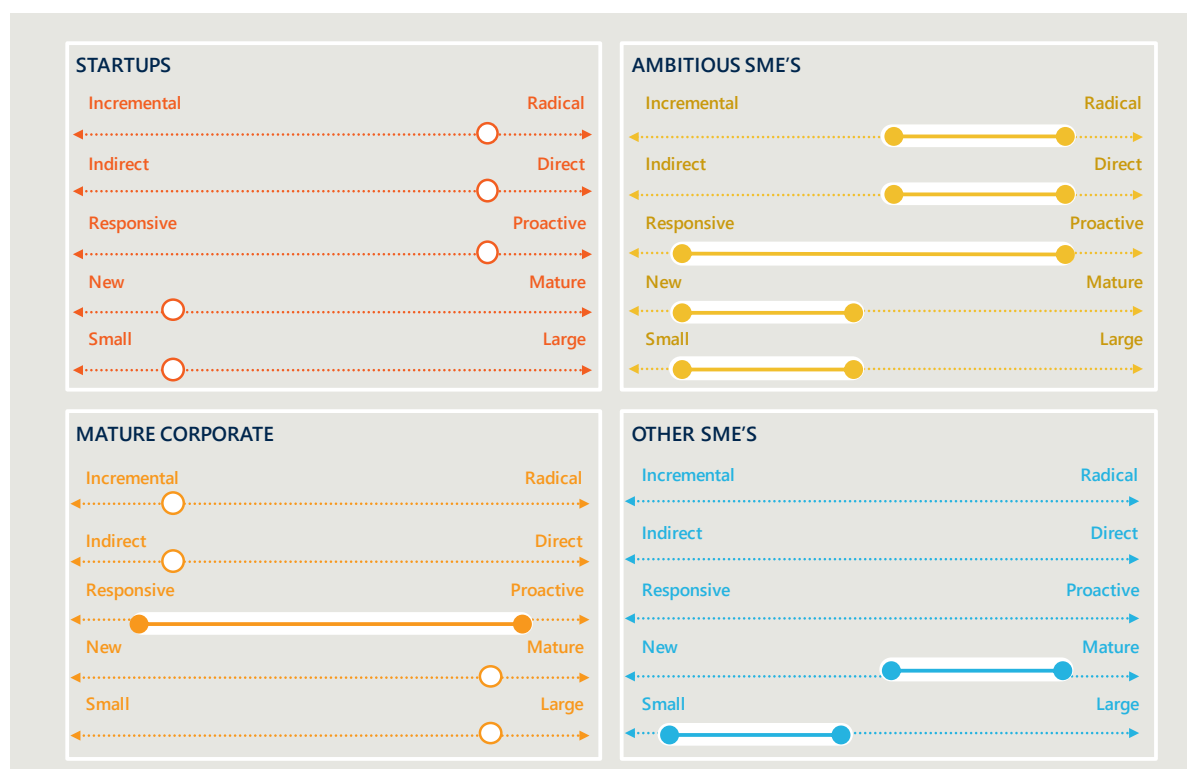
3.3 There are patterns in how businesses approach innovation

Each firm is different in its characteristics and the innovation challenges it faces. In this section, we define four firm archetypes (Figure 6) and describe their innovation profile using five spectrums:

- **Incremental – radical:** the typical scale of innovation firms undertake, from adoption of known technologies or ways of working, to new-to-the-world innovation in business models and products.
- **Indirect – direct:** the type of innovation firms undertake. These range from organisational and marketing innovation, to process and product innovation, which are more likely to require R&D expenditures that are better estimated as an investment expenditure.
- **Responsive – proactive:** whether firms innovate in response to threats or opportunities, or proactively create opportunities and address threats.
- **New – mature:** the age of a business.
- **Small – large:** the size of a business, in number of employees.

The archetypes based on these five characteristics, set out below, were developed as it was clear from the workshops that the incentives and capabilities to invest in innovation fundamentally differed across different businesses. The four archetypes reflect broad groups, so not all reflections will apply to all businesses. The groupings help to direct what policies might be relevant to what types of businesses.

Figure 6 | Four firm archetypes that have different attitudes and ability to invest in innovation



Startups

Startups are relatively new, small and either in the process of getting a product to market (commercialisation) or in the early stages of market growth. Innovation is their whole agenda. They tend to be driven either by supply or demand factors. Those driven by supply can be developing IP from basic research, or by entrepreneurs with great ideas. At the very early stage, the startup is focused on finding venture capital to turn its idea into proof of concept through developing a prototype. If the startup has passed the first 'valley of death' of developing a prototype, the challenge is to find and cultivate its first customers. On the demand side are businesses established by people who see an opportunity to solve a problem. These businesses tend to have a strong customer focus but can struggle to grow the customer base for their initial product or diversify to attract new customers.

Ambitious SMEs

Ambitious SMEs have made it through the second 'valley of death' of early stages of commercialisation to become profitable. Some have sustained high growth, while others have either experienced high growth and then stalled or failed to achieve high growth at all. They may still be highly innovative in terms of their product offer but can lack attention to other types of innovation that would better support growth.

A major issue for Australia is the tendency for these businesses to move overseas to maintain high growth as they seek additional investors and bigger markets.

Other SMEs

Other SMEs are small, often mature, businesses that do not seek growth. These SMEs have similarly traversed the 'valley of death' and some may have experienced a high-growth phase. They are defined by

a lack of innovation in any category. Some do quite well financially and are in a comfort zone afforded by lack of competition. Others are under financial pressure and lack the finances and headspace to make considered investments in innovation; rather they do what it takes to stay afloat. Lifting the productivity of these SMEs would have a substantial impact on the overall growth rate of the economy.

Mature corporates

Mature corporates are large and mostly publicly listed. Except in business services, Australian mature corporates tend to underinvest in R&D.²² Investment is highest in areas with high market concentration. Here efforts appear to be more targeted at competing for market share than growing the market. Product innovation is often undertaken by designated teams and not integrated across the organisation. Other types of innovation tend to be associated with cutting labour costs and can be viewed negatively by staff who are concerned about the impact on their jobs.

Getting more businesses in each archetype to adopt all four characteristics for successful investment in innovation should see higher investment across the board.

For startups, this is more investment in marketing to improve customer focus as well as their organisational processes to ensure they have the capacity in decision making. For ambitious SMEs, more investment (other than in product innovation) might ensure they have systems to support developing the markets for their product while managing growing pains. For other SMEs, investment can improve decision-making to allow time to think about investing in business improvements that will raise their productivity. And mature corporates can look to their organisational structure and culture to better harvest ideas to improve performance and think about expanding their markets— geographic or product.

3.4 Businesses did not see themselves as part of an industry ecosystem

In the workshops most businesses saw others in their industry as competitors. Businesses tended to see markets as a zero-sum game, with a focus on competition for market share. Many businesses feared that training staff or engaging with customers (or others in the supply chain) would expose them to having their staff poached or their ideas stolen. These businesses did not recognise that creating and sustaining the industry ecosystem would provide their business with an environment to thrive.

The businesses with a focus on innovation were less likely to operate with this mindset. Businesses willing to invest in radical innovation appreciated that the rewards made the risks worthwhile. But even radical innovators did not consider their potential contribution to their industry ecosystem. There are strong incentives for businesses to not act alone or first, and industries seemed to lack the capacity to promote collaboration to grow industry ecosystems, especially when they are not along traditional industry lines.

From a public policy perspective, the aim is not to help individual businesses, but to grow the ecosystem to a critical mass so the rewards from investing in innovation more clearly outweigh the risks for most businesses. Governments have long recognised that collaboration can mean much greater value is delivered from the existing knowledge base, but they have struggled to induce collaboration.

Overseas governments have long 'picked winners' in the sectors where they focus their R&D support and use procurement to ensure scale. Given the size of our economy, Australia must concentrate its resources into areas where there is comparative advantage. Given the global market and rapidly changing technology, areas of comparative advantage are most likely in research capabilities and skills, supported

²² AlphaBeta, 2019, Australian Business Investment in Innovation: levels, trends, and drivers

by communication and advanced engineering, than in natural resources and surplus labour. Natural resources can confer advantage, but technology is changing which ones matter, with sunlight, wind and sparsely populated spaces providing a source of advantage that Australia is only just starting to realise.

4 We asked businesses how governments could enable them to invest in innovation

The deeper understanding from the discovery workshops of what makes businesses invest in innovation was used to frame co-design with businesses and policymakers. This co-design involved three workshops:

- **Workshop 1: Blue sky desirability** – this involved building on the themes and opportunities identified from the discovery workshops through idea generation, development and prioritisation with businesses.
- **Workshop 2: Viability and feasibility** – this involved Australian Government officials assessing the viability and feasibility of the prioritised ideas generated in Workshop 1.
- **Workshop 3: Refine options** – this was informed by the design limitations and involved testing the desirability of the iterated designs and refining them with businesses.

This section is based on the findings from these co-design workshops. It begins by setting out a framework for how government actions can influence business behaviour. It goes on to describe the main areas where businesses identified a need for government action. This provided a starting point for outlining the gaps and deficiencies in governments' efforts to promote investment in innovation, as reported in the co-design process.

4.1 A framework for thinking about how governments can influence business investment in innovation

Having the right characteristics in decision-making, culture, customer focus and collaboration means that businesses are much more likely to invest in innovation. But investment behaviour also depends on the availability of investment opportunities and the associated risk.

The bigger the industry ecosystem, the better the opportunities and scope to mitigate risk, and the more resources available to the business to innovate. In turn, the more businesses that are investing in innovation to improve their processes or produce new products, the more they can contribute to the industry ecosystem. Governments can influence (directly or indirectly) investment in innovation on four fronts:

- **Improving business characteristics.** This is challenging for governments to affect directly. Education and training is one avenue, but it is a fairly blunt tool. Changes in corporate governance rules to focus attention on these internal characteristics is another avenue. Modelling the behaviour that governments want from businesses is very indirect, but could have a big impact, as could benchmarking – letting businesses know how their performance compares to others in their industry.
- **Creating opportunities.** Opportunities can come from new knowledge, customer demands, collaboration, market access and better or lower-cost inputs. Government procurement is a major opportunity. Regulatory change can also create opportunities, for example, by motivating businesses to develop products and services that comply with the new regulations.
- **Reducing risk.** Reduced risk for business investment can come through financial support (grants, tax concessions, subsidised credit and co-investment) that reduces the cost of the investment and hence the financial risk to the business. Governments can also reduce risk related to procurement and regulation.

- **Building the industry ecosystem.** Government can assist in building the industry ecosystem by signalling a medium-term commitment. This commitment should be multifaceted and involve all levels of government. Governments could cultivate ecosystems through procurement, engagement from regulators and other officials, international standard setting, and investment in infrastructure.

An ecosystem is much more than the businesses in an industry. Industries, far more loosely defined than they once were, could be formed around enabling technology, data sources, customer groupings or other unifying factors.

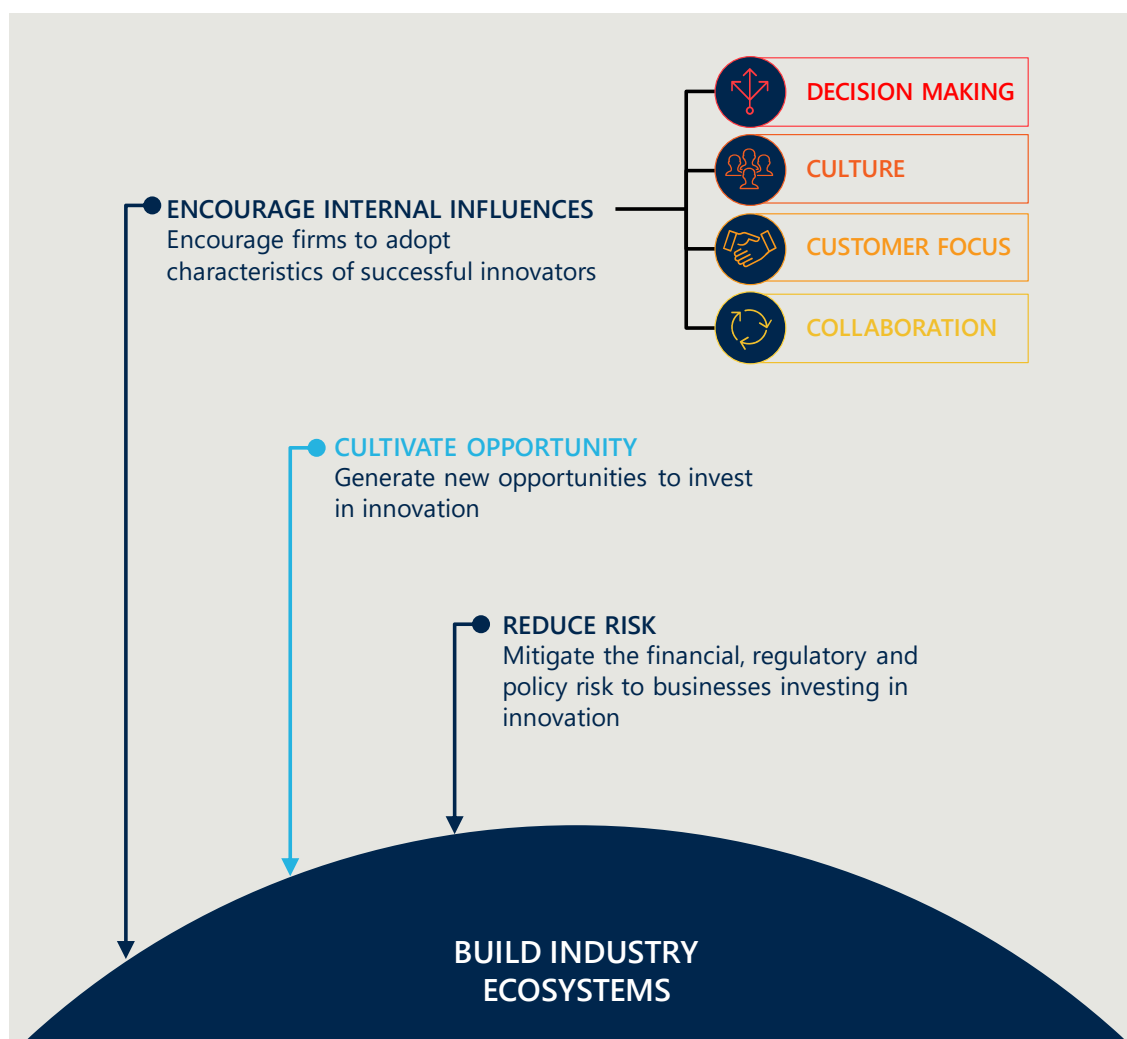
These factors can be thought of as the business equivalent to the bonding and bridging capital of communities. Bonding capital for businesses is their relationships that allows them to share data and information, cooperate on market rules, agree on standards and discipline businesses that fail to comply with these rules. Bonding capital can also increase the risk of collusion – so regulatory vigilance is needed.

Bridging capital is the relationships between businesses in this group with those in other groups. These are relationships between groups, rather than between individual businesses. These intergroup relationships are seen in agreements between countries and between industries to accept common standards. They are seen in standardised accounting and reporting conventions, and in packaging and reporting.

Both bonding and bridging capital reduce the costs to businesses in the industry ecosystem. A thriving ecosystem attracts investors. And ecosystems share a much larger talent pool and infrastructure, reducing unit costs of production.

There is a virtuous cycle reinforcing these four policy fronts. As an industry ecosystem matures, businesses can access more opportunities and market mechanisms to mitigate risk. There are also more intermediaries offering services businesses can afford to improve their characteristics. Government may still be an important customer for, and regulator of, the industry, but it can move from a proactive to a passive role as the ecosystem becomes self-sustaining and more able to self-regulate.

Figure 7 | Opportunities for government to support business investment in innovation



Different types of businesses have different needs

The different strengths and weaknesses of businesses in each of the four archetypes (introduced in Section 3.3) illustrate the need to target policies and programs to specific types of businesses. While some needs are common, others vary across the four areas of potential government engagement in the framework. The discussion below is highly generalised and each business will have unique strengths and weaknesses, but it is a useful guide to thinking about the target businesses for any policy.

The need to improve **business characteristics** is most important for other SMEs, because the lack of these characteristics makes it difficult for them to invest in innovation to lift productivity. As discussed in Section 3.3, startups tend to either lack a customer focus or, where they are customer-driven, lack the supporting decision-making processes or collaborations needed for high growth. Ambitious SMEs are more likely to have all these characteristics to some degree. Mature corporates are less likely to have an innovative culture.

All businesses can benefit from **opportunities created** by government. Opportunities are particularly important for ambitious SMEs that are seeking to expand their scope and volume as a platform for further growth. For startups, the opportunity to showcase their prototype could be the make point for the business. Other SMEs could be encouraged to invest in innovation to access new opportunities. They could also learn to engage more effectively with customers by participating in government

procurement. Mature corporates are the main beneficiaries of government procurement, so could be challenged to be more innovative in their solutions.

Reducing investment risk also matters for all businesses. For mature corporates, the main risks will be from policy uncertainty, which also affects ambitious SMEs more than other SMEs and startups. Startups and other SMEs are more exposed to the financial risk associated with their investment in innovation, so programs to reduce the financial risk may be best targeted at these types of businesses.

A thriving **industry ecosystem** is important to all types of businesses. For startups, a thriving system makes it easier to find the right collaborators and investors, as well as staff. For ambitious SMEs, the ecosystem helps them link to ecosystems outside Australia. Even other SMEs and mature corporates benefit from a thriving industry ecosystem as it enables the development of intermediaries that can tailor services to the specific needs of businesses. For example, other SMEs may lack the scale and skills to do the business planning and analysis that underpins deliberative decision-making. These types of specialised services expand with the ecosystem, whether delivered through collective action by industry associations, or by private providers.

Different government activities can influence each area

The first co-design workshop generated many ideas for how government could assist businesses to invest in innovation. Ideas put forward by workshop participants are summarised in Table 1.

Table 1 | Ideas generated by business

Problem area and nature of the solution	Examples of policy ideas	Areas of influence
<p>Low ambition for many businesses means many do not innovate</p> <p>Set the tone and articulate expectations for industry</p>	<ul style="list-style-type: none"> • Articulate where government will support industry development over the medium term (and where it will not) to focus effort • Introduce regulation that compels businesses to cooperate (for example, with respect to standards) • Require industry strategies as a condition of government support 	<ul style="list-style-type: none"> • Industry ecosystem • Internal influences – culture, collaboration • Reduce risk
<p>Many businesses do not have the characteristics of successful innovators</p> <p>Change behaviour to be conducive to innovation</p>	<ul style="list-style-type: none"> • Cultivate a culture of innovation in the public sector • Embrace innovation through procurement, including dedicated SME tranches for innovative products • Collaborate across portfolios and governments to reduce duplication and overlap • Engage on regulatory issues in a more cooperative way 	<ul style="list-style-type: none"> • Industry ecosystem • Internal influences – culture, customer focus, collaboration • Cultivate opportunities • Reduce risk

Problem area and nature of the solution	Examples of policy ideas	Areas of influence
Businesses innovate only as a last resort Provide information to promote aspiration and stimulate competition and collaboration	<ul style="list-style-type: none"> • Provide data that enables businesses to benchmark their performance against similar businesses • Support industry activity to develop market knowledge and build the reputation of Australian businesses • Pursue trade agreements to promote competition as well as enable greater market access • Improve access to consumer and administrative data 	<ul style="list-style-type: none"> • Industry ecosystem • Internal influences – decision-making, collaboration • Cultivate opportunities
innovation Improve capabilities (general skills development, plus specific interventions to improve managerial capability and decision-making)	<ul style="list-style-type: none"> • Subsidise targeted education and training • Provide programs to facilitate peer learning • Structure engagement with government (including in the context of procurement) to improve decision-making capability 	<ul style="list-style-type: none"> • Industry ecosystem • Internal influences – decision-making, customer focus
Businesses are risk-averse and see innovation as risky Intervene directly to change the cost-benefit calculus	<ul style="list-style-type: none"> • Provide grants and other financial assistance to reduce the cost of innovation • Reduce risk by providing greater stability in policy settings and program provision 	<ul style="list-style-type: none"> • Reduce risk

4.2 Governments already have initiatives to address many policy areas identified by business

Industry programs make up most public funding for innovation. At around \$2.9 billion in 2017-18, the R&D Tax Initiative represents the bulk of government support.²³ Other grants programs support early-stage commercialisation for businesses that might not be eligible for the R&D Tax Incentive.

There are a few subsidised credit programs for innovative investments or for trade financing. Grant and other programs are sometimes paired with advisory services (such as with funding through accelerators and incubators). There has also been a push to encourage collaboration with researchers (such as through Collaborative Research Centre (CRC) programs) and to build networks around a common interest (as with the Industry Growth Centres).

A high share of businesses at the discovery workshops were not aware of many industry programs. The businesses at the co-design workshops knew more about the programs available and provided feedback on which ones they found most useful and where they thought improvements were possible.

Comparing the list of policy ideas to address the problems that came out of the discovery workshops helped to expose gaps. The discussion below is based on workshop participants' feedback, so does not

²³ Calculated by Treasury, Program 1.10 Research and Development Tax Incentive, https://treasury.gov.au/sites/default/files/2019-04/pbs_2019-20_08_ato.doc

necessarily reflect the views of other businesses. It does, however, provide insight into how businesses view industry programs.

Programs that aim to build the industry ecosystem

The main Australian Government initiative under this objective is the Industry Growth Centres. Feedback on these was mixed. Some businesses found them useful, while others felt they duplicate existing industry efforts. Clearly it is important that programs in this area do not crowd out the industry efforts they are trying to encourage.

Participants did not mention government investments in accelerators, incubators, maker spaces and similar place-based approaches.

Programs that aim to improve opportunities

The only Australian Government industry program identified in the workshops under this objective is the Business Research and Innovation Initiative (BRII). BRII, which is still a pilot program, supports SMEs to develop innovative solutions to government challenges. The funding at the individual project level is sufficient to make a difference to SMEs seeking to commercialise a product and participating businesses report high levels of satisfaction. However, citing the high cost of applying, many startups and smaller ambitious SMEs engaged as part of this study reported that they did not apply.

Other government programs identified include defence and space industry programs. Businesses expressed disappointment that the Digital Marketplace channelled only \$300 million of IT procurement from a \$9 billion budget to SMEs.

Programs that reduce risk

Most programs labelled as innovation policy aim to reduce the financial risk to business of investing in a new product. Grants, targeted tax concessions and subsidised credit all reduce the cost to the business of making an investment, and so change the cost-benefit calculus for that investment.

The R&D Tax Incentive, by contrast, is not tied to a particular investment, and so has a smaller impact on any particular R&D investment decision. Startups, which by definition involve a particular investment in innovation, reported that the early stage cash-back for investors under the R&D Tax Incentive was very beneficial in reducing the risk of the business going under as it seeks to get through the valleys of death of developing the prototype and commercialisation.

Most workshop participants were not familiar with the Business Evaluation program. Programs managed by the Clean Energy Finance Corporation and the Australian Renewable Energy Agency were more visible to businesses interested in the area. Apart from the R&D Tax Incentive, the effort involved in getting the application right (as one participant put it, 'getting the arrow down a very narrow funnel') was a major disincentive to applying. Low success rates was another.

Some businesses reported that uncertainty about where government support would be focussed and uncertainty about the prospect and magnitude of support added to the perceived risk of investment. One participant mentioned they had no idea whether they would get a discount of \$4 million or \$8 million under the R&D Tax Incentive.

Programs that build business characteristics that support innovation

Very few programs addressed the characteristics of decision-making and culture. Some businesses reflected on very good experiences with AusIndustry staff acting as mentors and assisting them to navigate and access programs, but the extent to which this improved the internal capabilities of the businesses is unclear. There was mixed feedback on the Entrepreneurs' program, so future evaluations to see if it is building decision-making skills and shifting culture would be useful.

Businesses were unaware of governments providing data and tools. For example, officials pointed out that businesses' proposal for a standardised collaboration tool was similar to the existing IP Toolkit for Collaboration maintained by IP Australia.

A few programs assist businesses to engage with customers – particularly overseas. This includes Austrade services, such as the relatively new Landing Pads.

Most programs in this category focus on improving collaboration. Long-standing programs (such as the CRC and CRC-P programs) are mainly concerned with collaboration between businesses and research organisations. Ambitious SMEs reported that they struggled to find the matching cash to participate in CRCs, but some found the CRC-P more accessible. The Industry Growth Centres have a strong collaboration focus, but it is not clear whether they are improving businesses' skills and attitudes in relation to engaging with their industry ecosystem.

4.3 The reach of many industry programs is very limited

A key finding of the workshops was that many businesses did not access industry programs. Even the R&D Tax Incentive was used by a much smaller share of businesses than were investing in R&D. A subset of businesses was highly engaged with numerous programs. The limited reach of many programs was clear, sometimes due to tight eligibility, but other times due to uncertainty about the value relative to the cost or businesses being unaware the program existed. Several potential explanations for these findings are set out below.

The volume and complexity of government programs increases the cost of engagement

Governments across Australia offer policies, programs and grants to support business investment in innovation. These can align nicely to fill gaps, or duplicate efforts.

Although some initiatives (including the R&D Tax Incentive) are highly valued, businesses reported that the proliferation of initiatives has made the system difficult to navigate. This was said to be particularly acute where multiple jurisdictions offer policies and programs with similar aims.

Except for the R&D Tax Incentive, there was a clear misalignment between the policies and programs salient among policymakers and those that resonated with businesses. As outlined above, many ideas generated by business in Workshop 1 duplicated policies and programs *already in place*.

The high cost of engaging with government means support is susceptible to capture by a subset of firms

Some businesses were deterred from seeking government support by the cost of applying and the uncertainty of any pay-off. The risk associated with seeking government support is exacerbated by the

winner-takes-all approach to distributing funds. This concern was most prominent among startups and ambitious SMEs.

There was a perception that a subset of businesses develop (or procure) the expertise required to engage with government, enabling them to capture a disproportionate amount of support. This advantage is entrenched, as the marginal costs of applying for support declines as the volume of successful applications increases. Some larger programs have attracted an industry of advisors, who assist businesses to write grant applications, and businesses also reported that accountants often help structure their accounts to meet R&D Tax Incentive eligibility requirements. However, many SMEs felt the cost of these services was beyond their reach or not worth it for the expected return.

Some businesses felt estranged from the innovation agenda

Businesses varied significantly in how they conceptualised innovation. Some only considered radical innovation relevant; others regarded anything new to the firm to be innovation. Most businesses focused on product and process innovation, although some recognised that these innovations are often accompanied by changes to process, organisational structure and marketing. Only a few businesses viewed innovation as encompassing all these areas.

Some businesses reported that the type of innovation typically celebrated by governments did not apply to them. They felt that government tended to focus on innovation as something done by high-tech, cutting-edge industries, which are typically concentrated in major cities. The flipside of this view was that governments were less interested in more modest improvements, and did not fully appreciate their contribution to productivity growth and job creation.

4.4 Some businesses reported that government policy was restricting opportunities or raising risk

Investment in innovation can be encouraged or inhibited by regulatory settings, procurement, investment in resources (such as skills, data and infrastructure) and international engagement.

Some businesses found it difficult to engage with government

Government is often reluctant to be an active partner in developing clusters, which may need a tripartite approach because the activities of government (such as regulation, data and policy settings as well as funding) can be critical inputs. The establishment of clusters is a first step to developing industry ecosystems, which are increasingly multidisciplinary and cross traditional industry definitions. For example, a high-tech medical device ecosystem involves health practitioners and services, advanced manufacturers, and medical researchers at a minimum.

Similarly, in procurement, a co-investment approach to innovation or even just service delivery is rare. The arm's-length approach to tendering and contracting, while delivering probity, leaves little scope for co-design that can provide a better-quality service and mitigate risk for the business. This risk comes from not having full information about the client base, the policy and program context, and other moving parts that will affect the cost of service delivery. A more fulsome engagement can reduce these risks, although governments need to strike a careful balance to preserve value for money and integrity while pursuing a more collaboration.

Uncertainty about policy and regulation can hinder investment decisions

A lack of clarity about the policy and regulatory implications of prospective innovations introduces additional risk into the process of investing in innovation. This concern was particularly acute for ambitious SMEs. New firms tended to be less concerned – owing to ignorance about regulatory requirements or a sense of being ‘under the [regulatory] radar’ – while large firms typically have the resources to understand and manage regulatory requirements.

There is scope for businesses to engage more effectively with regulators. Engagement on what is permissible can reduce uncertainty for the regulator about the risk posed by a new product, and for the business on its ability to test and then scale the product. Many businesses reported difficulty engaging regulators and those setting the policy to report outdated and harmful regulations.

A focus on anti-competitive behaviour could unduly restrict collaboration

Businesses that engage with their ecosystem are more likely to innovate. The challenge for governments is to preserve competition while permitting the type of collaboration that leads to innovation.

Some mature corporates engage well with their ecosystem, but there is a view that many engage only periodically, and that they look to minimise costs from suppliers rather than to develop their suppliers’ capabilities to deliver a higher-value service. Some ambitious SMEs engage actively with their ecosystem, viewing it as a source of talent and ideas. Some ambitious SMEs play a valued role as mentors and models for startups. The propensity for SMEs to engage with research organisations and programs appears to depend on their scale and provenance.

Businesses’ criticisms of the design of government support often reflected their particular interests

Businesses raised several concerns about how government support is distributed across innovation activity and dispensed at different stages of the business lifecycle.

- Businesses generally felt there was an **undue focus on radical innovation**, with limited support available for businesses that could improve their productivity through changes to processes, organisational structure or marketing.
- Startups specifically argued that **support is only available once most of the risk has been mitigated** (after proof of concept/prototyping), at which point private finance is more likely to be available.
- Ambitious SMEs complained about a **lack of support to scale-up** and reflected that they had outgrown the support available to startups.
- Larger businesses reported that most programs are **too small or too narrow** to accommodate their innovation objectives.
- Businesses across all archetypes suggested that the **‘hard start and hard stop’ approach to dispensing support** should be replaced by ongoing (possibly staged) support.
- Businesses advocated sharing support among more beneficiaries – either through segmenting the total pool into smaller prizes or by mandating that the main recipient of support partner with others.

5 Businesses and policymakers co-designed policy directions to boost innovation investment

The final co-design workshop sought to develop policy directions. The focus was on changing the expectation around investment in innovation to make it the norm (not the exception) for businesses. Section 5.1 sets out seven policy directions. Next steps and further considerations for implementation are outlined in Section 5.2.

5.1 Policy directions: priorities from the co-design phase

Shifting the dial on investment in innovation will require changing this investment from something businesses do under pressure, or when they have spare cash, to something they do regularly. This means they cultivate a culture of innovation and source ideas from their staff, their customers and through collaboration. It means they seek information that will help them to understand the nature of the opportunities and risks so they can make well-informed decisions.

Governments can assist by providing more opportunities for businesses to offer an innovative response. They can also assist by providing policy certainty. And in some circumstances, where a good case can be made, governments can invest to build business skills, or to support investments in innovation that will have benefits well beyond the businesses directly assisted.

Seven policy directions were identified in the co-design stage that would work toward these objectives.²⁴ These are presented in Table 2 and discussed in more detail below.

Table 2 | Summary of policy directions

Policy direction	Target entities	Target for change
Build a compelling and inclusive innovation narrative	<ul style="list-style-type: none">• Other SMEs• Mature corporates	<ul style="list-style-type: none">• Culture
Consolidate, redesign and coordinate grants programs	<ul style="list-style-type: none">• Startups• Ambitious SMEs	<ul style="list-style-type: none">• Decision making• Reduce risk
Concentrate support to build thriving industry ecosystems	<ul style="list-style-type: none">• Startups• Ambitious SMEs	<ul style="list-style-type: none">• Industry ecosystem• Create opportunities
Foster collaboration, including between business and government	<ul style="list-style-type: none">• Startups• Ambitious SMEs• Mature corporates	<ul style="list-style-type: none">• Industry ecosystem• Collaboration
Use procurement to drive innovation	<ul style="list-style-type: none">• All	<ul style="list-style-type: none">• Create opportunities• Customer focus

²⁴ These align with the points made by Mark Burgess (Helping Tall Poppies Grow, InnovationAus.com, September 9, 2019). Quotations from this article appear below.

Look for opportunities to improve the foundations for businesses, such as regulatory frameworks and access to data/information	<ul style="list-style-type: none"> • Startups • Ambitious SMEs • Other SMEs 	<ul style="list-style-type: none"> • Decision making • Create opportunities
Work more effectively with business to build the skills to support innovation	<ul style="list-style-type: none"> • Ambitious SMEs • Other SMEs • Mature corporates 	<ul style="list-style-type: none"> • Industry ecosystem • Decision making

Build a compelling and inclusive innovation narrative

Despite attempts to create a buzz around innovation, this is not how Australia is viewed externally or internally. The external view will only change when Australian businesses can offer new or better services to the world on a sufficient scale to be noticed. This is the long-term objective – it needs to start with changing the internal view.

The innovation narrative needs to be more inclusive

A recurring theme in the discovery workshops was that the innovation narrative did not apply to all businesses. The current innovation narrative tends to highlight innovative technology firms, startups or firms aiming for high-growth (i.e. Silicon Valley). The innovations celebrated are radical rather than incremental: Wi-Fi rather than improved wind turbine modelling.

This narrative can alienate SMEs that do not identify with the typical innovation success stories and the mature corporates that do not see potential for high growth. The challenge is to raise businesses' expectations. This can start with getting them to see incremental innovation as important to their success, building a basis for moving along the innovation spectrum. While not all businesses will make this transition, raising incremental innovation will improve productivity.

Government has a unique role in articulating the innovation agenda and can materially influence businesses' perception of innovation. Government should ensure that its innovation agenda is inclusive. More activity should be highlighted as innovative, and more sectors and industries should be considered innovative.

Drawing a clear and explicit link between incremental innovation (and particularly process, marketing and organisational innovation) and improved profitability would encourage more businesses to consider more types of innovation. Expanding the domain of innovation to include social or local problems could embed innovation mindsets into communities that otherwise do not have much exposure to innovation.

The innovation narrative needs to be backed by government action

The generally risk-adverse culture of Australian businesses was highlighted as a barrier to shifting this view that innovation is for others. The design and implementation of some government policies and programs can promote more productive approaches to managing risk.

“Australia’s Nation brand reputation is not one of industry or innovation. This affects how others see us, but also affects how we see ourselves. I too often see a deficit of self-belief.”

Mark Burgess
9 September 2019

As set out below, procurement can promote a more innovation-oriented response. This would reinforce a narrative that innovation (incremental through to radical) is the norm, and that government policies provide a safety net for SMEs that take risks.

There was a view that the rewards for taking risks are too low for Australian entrepreneurs. Yet there was a failure to appreciate the support provided, which reduces the risks to businesses when they invest. Governments can assist businesses to better manage major risks for the survival of their business. One way is to help them become more aware of risks through, for example, good regulatory practice. Another is to share the downside risk of an innovation investment through grants and subsidised loans. Government could share in the upside where the business’ success increases employment and profits and hence tax revenue, and where the business delivers more valued services to consumers.

A more difficult policy challenge is that the rewards to innovative businesses are often perceived to be greater elsewhere, so it is hard to keep successful entrepreneurs onshore. While income should be treated similarly regardless of source, highly mobile businesses and entrepreneurs can seek lower-taxing environments. Co-investment might raise the recognition of the often-considerable support provided by governments to startups.

In addition to more traditional policy responses, the development of a thriving industry ecosystem that gives SMEs the base to compete in international markets could increase the prospect of these businesses remaining onshore. Tax concessions are unlikely to be cost effective. Further, many Australian entrepreneurs return to Australia, bringing skills and contacts valuable to later rounds of startups and ambitious SMEs.

Consolidate, redesign and better coordinate grants programs

Government programs should work together to encourage businesses to innovate

Developing a new narrative around innovation provides Australian governments with an opportunity to better coordinate their innovation-boosting programs. Businesses do not care where the support comes from, but they do care about the costs of accessing programs. Greater clarity from jurisdictions on where they are targeting and why is a good start. Competition between jurisdictions to attract businesses can undermine the development of critical mass in any one location.

While virtual ecosystems are important, the advantages of co-location are remarkably robust. More coordination could improve the quality of their responses and the effectiveness of their strategies. There is no reason states and territories should not offer similar programs to the businesses in their jurisdictions, but they should learn from each other about what works in the design of these programs.

While competitive federalism can be useful in experimenting to see what programs work, it can create circumstances that can distort businesses’ behaviour. To the extent that a jurisdiction has a comparative advantage in one industry, others should not seek to attract major players away, but develop a complementary approach. The Australian Government has an economy-wide approach, but coordination with the States and Territories to ensure the programs are complementary and of a scale to be useful would improve the value delivered.

There is considerable scope to improve the 'reach' of innovation and business programs

Businesses repeatedly raised the problem that applying for grants and programs was a skill to develop. As with procurement, applying for grants and programs requires a high upfront cost. Many businesses lack the resources to determine whether it is worth investing in an application, let alone the resources to write an application that is well considered and jumps through the hoops. There are some clear 'do now' opportunities:

- Governments should review existing programs to verify whether funds mostly accrue to a subset of firms and assess whether this is delivering on the overarching objectives of industry programs and not just each program's objectives.
- Where there are overlapping objectives, governments should consolidate grants programs. They could consider introducing stage-gates (i.e. provide some funding early, with a view to providing additional support).
- Grants processes should be simplified and made easier for businesses to quickly assess whether they would be eligible. Two stage application processes should be considered to reduce the costs, so only those with a good prospect of success put in a full application.
- Programs should be designed to avoid the 'win/loss' binary in the provision of support where possible. As some meritorious ideas might not tick all of the boxes at the outset, they can be value in integrating funding and support (information or advice) and reserving some grants/funding for proof of concept.

These programs are of particular benefit to startups but could hold more value for other SMEs if they could be reached through better program design. Ambitious SMEs also felt they were forgotten once they reached a certain size, and that support could be graduated more slowly to encourage growth.

Concentrate support to build thriving industry ecosystems

Australia lacks the scale to support a large number of industries. To date export-focused industries have been resource-based – mining, agriculture and tourism. The exception is higher education, where a successful export industry was built on the platform of the large domestic (and largely publicly funded) universities. Exports enable businesses to develop scale – applying their knowledge and technology to a larger customer base than would be possible in Australia. They also diversify the sources of income needed to purchase imports, a vulnerability for Australia.

Businesses can most easily grow where they have a thriving industry ecosystem. The industry need not be defined along traditional product lines, but could form around technologies, such as nanotechnologies, or the production of complex inputs, such as advanced materials. The industry needs to be defined by the talent/skills they need, the supporting infrastructure, which could be high-tech services, and the common interests of investors. The bigger this industry ecosystem, the lower the costs for businesses in accessing resources (including specialist support services) and the lower the risk for businesses in investing in innovation as they can make more informed decisions and should be able to attract risky tier capital.

Governments can require businesses cooperate to build a core for industry ecosystems

For sectors of the Australian economy to compete in global markets and benefit from a business ecosystem conducive to innovation, critical mass is necessary. An emphasis on competition in the allocation of resources to support innovation means benefits are dispersed and isolated: a single business might benefit, but there is no realistic prospect of a sector achieving critical mass as the result.

A thriving ecosystem is characterised by businesses that recognise the value of the collective and working collaboratively. Governments can assist in developing the ecosystem core by requiring businesses with

common interests to cooperate in developing standards and regulations, and providing a pathway to engage collaboratively in international standards negotiations.

Governments need to concentrate their investments in areas of comparative advantage

Government should commit to and concentrate its support on specific sectors that have comparative advantage. Comparative advantage might be conferred by current research excellence, publicly funded services that have achieved a high quality (as was the case in higher education), or by natural resources (such as having large sparsely populated areas for space launch and data collection). Sectors with the potential to diversify the Australian economy, or sectors where Australians will benefit directly from cutting-edge goods and services, should be first in line for development.

Strategic choice of sectors to concentrate support should have regard to comparative advantage. The chosen sectors should be capable of thriving when they achieve critical mass, without further government resources.

This is an infant ecosystem policy. Having learned from the failure of infant industry policy, ensuring that the ecosystem 'grows up' is critical. Governments must commit to a medium-term strategy but have clear milestones that could trigger withdrawal of support if the milestones are not met and are considered by independent advisors as unlikely to be achieved.

Foster collaboration, including between business and government

Collaboration with suppliers, between businesses and with government is one of the four characteristics of successful innovators. Collaboration is easy where there is a thriving industry ecosystem, but it is also a mechanism for building this ecosystem.

Industry associations need to be more proactive in developing thriving industry ecosystems

The returns from collaboration can be undervalued by individual businesses. The 'tragedy of the commons' is generally viewed as the overuse of common property resources. But there is a different type of tragedy of the market, which is the failure to develop common property resources of value to all in the industry ecosystem. Individual businesses will tend to underinvest in the common property that defines the industry ecosystem – such as standards, market reputation, pool of skilled and specialised labour, supporting data and physical infrastructure.

Industry associations should be the market response to this underinvestment, but they can be dominated by the few large players that can internalise some of these externalities. In small and medium markets, competition might not solve these problems and other approaches are needed. Governments should assist new industries to develop effective industry associations, while exercising care not to crowd out existing associations. They should look for opportunities to ensure cooperation among competing associations where the competition is destroying rather than enhancing value for the development of the industry ecosystem. Government should also look for opportunities to engage with businesses and industry associations as partners.

Procurement and grant practices can be designed to encourage collaboration. For example, governments could apply a collaboration premium to existing grants and programs. Direct financial resources are a powerful lever to drive business behaviour and including criteria relating to collaboration will encourage businesses to collaborate where they might not have otherwise considered doing so. This needs to be balanced against competing policy objectives.

Government needs to signal that collaboration between businesses need not be anti-competitive

Policies that exclusively focus on competition can undervalue collaboration. Collaboration is essential to building an industry ecosystem that supports businesses in it to invest more in innovation.

The need for regulators to avoid capture and be effective in their enforcement of regulations need not be threatened by engagement on matters relating to the ecosystem and not to individual business behaviour. There needs to be a rebalancing – starting with the areas where governments want to focus their efforts.

Businesses identified two areas where government could reform regulations that discourage collaboration:

- **Revisit IP protections.** As the economy moves towards intangible assets, the significance and impact of IP regulation will increase. The incentives to innovate and develop IP, which are increased with stronger IP protection, must be balanced against the cost to collaboration and uptake of innovation across the Australian economy. SMEs saw reforms that reduce relatively fixed costs of complying with IP regulations as important for improving collaboration, as these businesses need to demonstrate compliance to access IP licences. Some support exists, but SMEs tend to be unaware of what is available (as mentioned, businesses consulted in this project were unaware of the IP toolkit).
- **Revisit competition policy and regulation.** Regulations that discourage collaboration should be revisited to ensure that the benefits are worth the cost, and that the regulation is clearly communicated. Businesses tended to be unclear about the limits of competition policy and were concerned about the line between collaboration and collusion. Better guidance, particularly for SMEs, would be beneficial.

Governments' arms-length approaches to regulation and procurement can impose a cost on the development of more cooperation to build the industry ecosystem. Government can model more cooperative approaches that are focused on sharing risk where there is common purpose that will contribute to improving the industry or broader ecosystem.

Use procurement to drive innovation

The Australian Government procured goods and services worth \$71.1 billion in 2017-18.²⁵ This is a sizable lever that can drive desired behaviours in businesses, and can encourage innovation that has spillover and flow-on effects, particularly in social and environmental policy. In addition to directly funding innovation, procurement is an opportunity for governments to encourage businesses to adopt the characteristics associated with successful investment in innovation (for example, by mandating some form of collaboration). As pre-eminent customers in the Australian market, governments are well positioned to establish norms and trends in customer engagement and procurement.

Government business can be an important baseload for developing an industry ecosystem. The higher education export industry illustrates the role of government procurement in providing critical mass for an industry, and how businesses (even if they are not-for-profit) can respond where there is regulatory permission and incentives.

"A lack of vertical and horizontal collaboration is an ongoing challenge, with suspicion often more likely than partnership. Elsewhere in the world, your biggest competitor is often, simultaneously, your most important partner."

Mark Burgess

9 September 2019

²⁵ Australian Government Department of Finance, Australian Government Procurement, www.finance.gov.au/procurement/.

Government procurement is important for all businesses, but perhaps more so for ambitious SMEs as they grow. The scale of government procurement means that ambitious SMEs in a position to pursue government contracts could be transformed, which puts the government at a critical juncture in their success pathway. A subset of mature corporates caters primarily to government, and so government can have a strong influence on these firms by changing the way it makes purchasing decisions.

There are four ways procurement could encourage greater investment in innovation. It should be:

- **less prescriptive.** In its desire to provide a level playing field and facilitate fair evaluation, tenders are often very prescriptive of the product or service desired. This can deter businesses from investing in new solutions.
- **less complex and costly.** Responding to tenders can be costly; particularly for smaller businesses that do not have a well-established process. Streamlining this process would allow smaller businesses to put forward innovative responses.
- **less risk-averse.** Government procurement often biases towards established solutions over new and innovative solutions. A more risk-tolerant procurement process would create a market for new and innovative solutions, which would drive investment in developing these innovations.
- **less focused on short-term value.** Government procurement is required to consider value for money, but this consideration is often at the point of a single procurement. By biasing towards businesses that have reduced their costs and hence their margin, government makes longer-term re-investment of profits into innovation more difficult.

Any changes to procurement practice need to be carefully considered and will require cross-departmental buy-in. Relative price often acts as a proxy for value in procurement because it is easy to measure. Expanding the notion of value for money would increase the complexity of fairly assessing proposals, and government would need to be prepared for an increase in procurement decision-making complexity and upskill staff to meet this need.

Look for opportunities to improve businesses' access to resources

Shared infrastructure can lower the cost for businesses to develop and test products

Greater cooperation on access to key infrastructure can greatly assist businesses. Access to testing facilities at universities and other public research organisations can greatly reduce the costs of testing prototypes. Public facilities with high-tech equipment can make it available in downtimes to SMEs. Some sharing is being facilitated through the Growth Centres, but more can be done in this space.

Improving access to data removes one barrier to investment in innovation

Access to data is necessary to develop and improve many intangible assets. Government has a role to play in facilitating access to data and encouraging a view of data as a valuable resource. There are at least three strands to governments improving access to data, which is increasingly the natural resource for businesses. Australian governments have made progress on data access, but open data is still mainly place-based and more needs to be done to create the environment for the safe use of business and consumer data:

- **Access to consumer data.** Recent legislation has made it easier to share consumer data in some industries with the permission of the consumer. Government should communicate the improved access to consumer data. This includes business education about what is accessible and demonstrations of the benefits of industry-wide data-sharing collaborations.

- **Access to government data.** The Australian Government is working to improve access and use of administrative data for business purposes where this will deliver public benefits. Government should permit access to and use of administrative data by default. The uses of data may be difficult to predict and prescribe in advance, so data should be made available in a suitable form and method to maintain privacy unless there are good reasons to restrict access.
- **Access to cloud storage and other data infrastructure.** This is a growing area of interest for many businesses as the internet of things generates enormous volumes of data. Civil space applications also largely involve data (including geopositioning). Consumer data is of growing value as businesses seek to tailor products to market tastes and needs. The infrastructure to support this data collection, curation and storage is huge and will need to be regulated, as will the applications of the data to protect privacy and to protect consumers and workers. Government investment in technologies, as well as regulatory approaches, will be important in shaping the opportunities for Australian businesses to be part of this growing and diverse industry of data makers, analysts and users.

Government should take a proactive approach to regulating data infrastructure and applications. There are many competing sentiments and concerns so government should consult widely to develop and communicate its investment and regulatory strategy on the use of sensors, spectrum, data transmission and storage. These strategies will need to balance ethical considerations (including protections for privacy, consumer and worker protections) with the benefits to industry, consumers and the community.

Work more effectively with businesses to build the skills to support innovation

Skills to support innovation are not restricted to STEM skills, although these are important. Surveys of management skills suggest that Australian businesses could substantially lift the quality of management.²⁶ The problem of many SMEs being reluctant to train workers also needs to be addressed.

Business management skills are underdeveloped and undervalued

Skills in business management are undervalued and the skills developed by myriad business studies programs are not tailored to help SMEs take more deliberative decisions around investment in innovation. In SMEs, financial planning skills are often lacking, as is the ability to provide a cogent business case for investment in innovation.

Governments should continue to assist businesses to build their organisational capabilities by:

- Reviewing the quality of the management training offered by Australian educational institutions and developing strategies for microcredentials in emerging areas of management tools and skills.
- Raising the quality of governance in relation to accountability for investment decisions in public companies. This should include working with organisations like the Australian Institute of Company Directors to develop board governance and skills.

Businesses need to be encouraged to train more workers

Businesses reported an unwillingness to invest in training and developing workers, owing to the risk that they would move to another firm. As discussed, this is a collective action problem: all firms would benefit from a pool of highly skilled workers; however, there is no incentive for individual firms to invest in skill development. The attitude that government or workers should invest in training to ensure a good supply of workers with the prerequisite skills, creates an impasse given many of these skills can only be acquired

²⁶ The Australian Management Capability Index 2017 Report, <https://test.managersandleaders.com.au/blog/australian-management-capability-index-2017-report/>.

in the workplace. This impasse is only broken by importing skilled workers. This can be a solution for some difficult-to-develop skills but should not be the routine response.

While several ideas were proposed, any kind of lock-in contract is not feasible (nor desirable) in today's labour market. Building an industry ecosystem to change attitudes to training seems the best way forward.

5.2 Further work is needed to develop and test specific reforms

Policies to promote investment in innovation need to build on current efforts

As discussed in Section 4, governments have many programs that address some barriers to innovation identified by businesses. A few, such as BRII, look to be effective and could be expanded. Others should be consolidated and redesigned to improve their reach. This study has drawn on the views of businesses to develop the policy ideas presented above. They provide a clear direction for governments but there is much work between a direction and a clear policy, and only some ideas have a 'can do now' clarity.

Governments have much to consider in developing these policy directions:

- Governments should recognise the limits on how much they can (and should) influence the internal culture and operations of businesses. It is one thing to recognise that many businesses lack characteristics of successful investors in innovation, but it is quite another to change this.
- Government resources are limited. Governments must choose wisely where to invest to create greater opportunities for investing in innovation. In doing so they need to consider the flow-on value beyond the businesses that receive support, and spillover effects.
- Policy stability enhances the value of effective policies and can be key to effectiveness. But a desire for stability must not prevent closing ineffective programs or diverting resources to more effective approaches.
- Policy coordination can enhance the effectiveness of policies, improving reach by lowering the cost of engagement, and efficiency by reducing duplication and overlap. The incentives offered by programs need to align.
- Too many innovation strategies have failed to shift the culture and opportunities of Australian businesses. Plans/narratives need to be grounded in real action for strategies to get traction.

Further work is needed to test and refine the policy directions proposed in this report. In particular, feedback provided by businesses during the co-design process should be verified (where possible), and further scrutiny should be given to the implementation challenges associated with each initiative. It may be necessary to reengage with the business community during this process.

A proactive approach does not mean good policy processes should not be followed

Determining the merits of government initiatives to drive private sector innovation is challenging. It is often difficult to establish whether subsidies support activity that would have occurred even without the incentive. Evaluations of grant programs have had mixed results, although most conclude that additionality is generally low, particularly for better established businesses that do have greater access to financing and face less risk if the investment fails to deliver.

The impact of promoting collaboration between industry players and research agencies is even harder to pin down empirically. Much more thought needs to go into designing monitoring systems that look for indicators of good things happening, rather than relying on ex-post, before-and-after or other comparisons where attribution of change to the government's actions is usually impossible. It could be a catalyst that makes the change possible, it could be the marginal effort that tips the balance into a virtuous cycle or it may be a marginal effort that had little effect because the evolution was well underway or because it was too little to effect systemic change.

When developing the policy directions further, policy makers should have regard to efficiency and effectiveness.

Efficiency:

- What is the cost to governments?
- What will be the cost to businesses of accessing the program?
- How high is the risk of crowding out private activity?

Effectiveness:

- Will the program induce behaviour change in the target population?
- Will the program build the industry ecosystem?
- Will there be spillover effects outside the industry?
- Will it raise productivity (including through facilitating the exit of less productive firms)?
- Does it make the economy more resilient (for example, through diversification)?

New policy directions may require a different approach to government administration

Quarantining responsibility for innovation policy in specific administrative units could undermine efforts to expand the reach of the innovation agenda and leverage public procurement to drive innovation. It may also increase the risk that the streamlining of programs could be reversed over time. Where responsibility for driving investment in innovation is confined to an administrative unit that lacks the major policy and funding levers, the temptation to rely on grants programs is understandable.

The policy directions envisaged in this report would require a whole-of-government effort. Departments and agencies beyond the Industry portfolio would need to embrace and promote innovation and more actively collaborate with businesses. The challenge for those administrative units charged with driving innovation is to articulate a clear strategy and drive this behaviour across government. In some cases, cooperation between different levels of government will also be required.



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A dark blue world map graphic with white dots representing cities, located in the bottom left corner of the page.

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engaging

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PEOPLE

50

PRINCIPALS

9

LOCATIONS

2

COUNTRIES

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