

The Australian Industry Group

Joining Forces: Innovation Success Through Partnerships

September 2016



AiGROUP

About Ai Group

The Australian Industry Group (Ai Group) is Australia's peak industry association. Acting on behalf of business for more than 140 years, we are the country's only truly national employers' organisation.

Ai Group represents the interests of more than 60,000 businesses employing more than 1 million staff. Our longstanding involvement with diverse industry sectors including manufacturing, construction, transport, labour hire, mining services, defence, airlines and ICT means we are genuinely representative of Australian industry.

With more than 250 staff in offices across NSW, QLD, SA, VIC and WA, we have the resources and the expertise to meet the changing needs of our members. We provide the practical information, advice and assistance you need to run your business more effectively.

Ai Group also offers members a voice at all levels of government through our policy leadership and influence. Our deep experience of industrial relations and workplace law positions Ai Group as the leading advocate on behalf of enterprises large and small across Australia.

We intrinsically appreciate the challenges facing industry and remain at the cutting edge of policy debate and legislative change – and strategic business management.

Acknowledgement

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Executive Summary



Innovation is firmly on the economic policy agenda, with all sides of politics converging on the importance of boosting and sustaining innovation and maximising the benefits that Australia derives from it. And innovation has never been so important for Australian businesses, as they confront fierce global competition and rapidly changing markets and consumer preferences. But innovation is not something businesses need to do alone.

Collaborating with other businesses and with research organisations enables more novel and commercially beneficial innovation. Unfortunately, ABS data show Australia at the back of the OECD pack in collaboration. Doing better should substantially boost our future prosperity.

Business performance is much more closely linked to collaboration on innovation than to spending on innovation. Despite this, there is an absence of practical and easily-accessible information on collaboration's benefits, how businesses should go about building partnerships with others, or how to manage these relationships to achieve greater commercial success from their investments in innovation.

These are issues of critical interest to Ai Group and our members. To fill the gap, we have undertaken a survey of Australian CEOs as well as in-depth interviews with leading Australian innovators. This report confirms that we lag in collaboration, though there may be more activity than the ABS data capture. More importantly, it sets out findings from industry to assist our members as they improve their own performance, as well as providing insights to help universities and policymakers lift Australia's game.

Leadership is needed at every level to turn Australia's innovation collaboration situation around. Business leaders can boost their organisations' partnership potential by building collaboration into their strategic plans; taking smart steps to identify and attract partners; and building a business culture of openness, cross-fertilisation and readiness for risk.

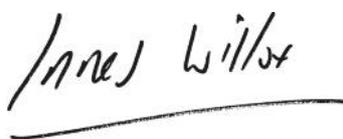
The research sector can also rethink some of its practices and priorities. For instance, an overriding emphasis on acquiring intellectual property rights from innovation partnerships is often self-defeating – dissuading business from collaborating with universities in the first place.

Government can improve the rules and incentives it provides. Public research funding decisions need to incorporate data on commercial impact, as well as the existing emphasis on academic citations. Programs to build business capability and foster industry growth sectors can further emphasise and support collaboration. But most of all, government needs to lead by holding steady: building continuity and stability in innovation policy, rather than the regular upheaval of the last two decades.

Ai Group will continue to play our part, providing services to improve the performance of our member businesses and tirelessly advocating for effective policy.

Embedding collaboration in Australia's culture is vital, but challenging: we are building up from a very low base, where collaborative innovation is rare and shallow. Despite strong interest and effort from industry, government and the public research sector, improvement is slow. We must do better. This report contains lessons from successful businesses on how we can.

Innes Willox



Chief Executive

Key Points

Filling the gap

Collaboration is not understood

Innovation is how businesses stay competitive, and collaboration can make innovation easier and more successful – but there is a lack of practical, accessible information on how to collaborate effectively. This report helps fill the gap with new survey data and in-depth interviews with leading innovators from five companies: Leica Biosystems, Planet Innovation, Pollenizer, Siemens and Signostics.

Why it matters

Collaboration makes innovation better

Benefits of collaboration on innovation include increased comfort with risk taking; exposure to new approaches; potential for specialisation; reduction in costs and time to market; and increased persistence of innovation.

We know how to do better

Learning from success

Businesses can collaborate better by working on partner identification and selection, including understanding their own partnership potential; improving relationship management, including by inviting partners to explore fundamental business problems, and not just specific technical solutions; and learning from the experience of collaboration, including through joint innovation teams who can later embed their knowledge and experience in their home organisations.

Lifting Australian innovation

Shared responsibilities

Australian businesses do not collaborate on innovation as frequently or as deeply as their overseas competitors. Turning this around will require businesses themselves to develop their collaboration skills, universities to overcome cultural differences, and governments to provide stability and to value collaboration in their programs.

CHAPTER ONE

Why innovation matters

Innovation can be important at many levels. This report will focus primarily on the contribution that collaborative approaches to innovation make to the success of individual businesses, and the flow-on to their sectors and Australia’s economy and society. Empirical evidence exists showing that innovation does contribute to a firm’s success. In innovation as elsewhere, collaboration is a tool that multiplies the scope and quality of what businesses and individuals can achieve. While the level of innovation and the use of collaboration are just two of many factors that determines the returns for business, these are areas in which Australia lags and should do better. This chapter investigates these findings to set the context for our new research and to demonstrate the high stakes.

This report defines innovation as those activities that either:

- bring new or refined goods or services into use;
- introduce new ways of producing, distributing and marketing goods and services; or
- put in place new approaches or models of doing business (including business model innovation, or innovation to accounting practices such as how the balance sheet is used).

1.1. The case for innovation

Australian businesses face formidable competition from talented individuals and organisations globally. The global business environment is now characterised by increasing complexity and rapid and unpredictable change. This is driven by many factors including:

- easy physical trade;
- hyper-connectivity of data;
- the swift introduction, dissemination and iteration of new technologies;
- new forms of automation;
- the participation of new emerging economies and the transition of economies like China towards consumption and higher value production; and
- customers who are becoming increasingly discerning in some respects and fickle in others.

In this environment, competitive advantages are often short lived so adaptation, learning and innovation become even more fundamental to

KEY POINTS

Innovation contributes to business success, but quality of innovation activity matters more than the quantity of resources allocated to innovation

Collaborative innovation is associated with higher performance.

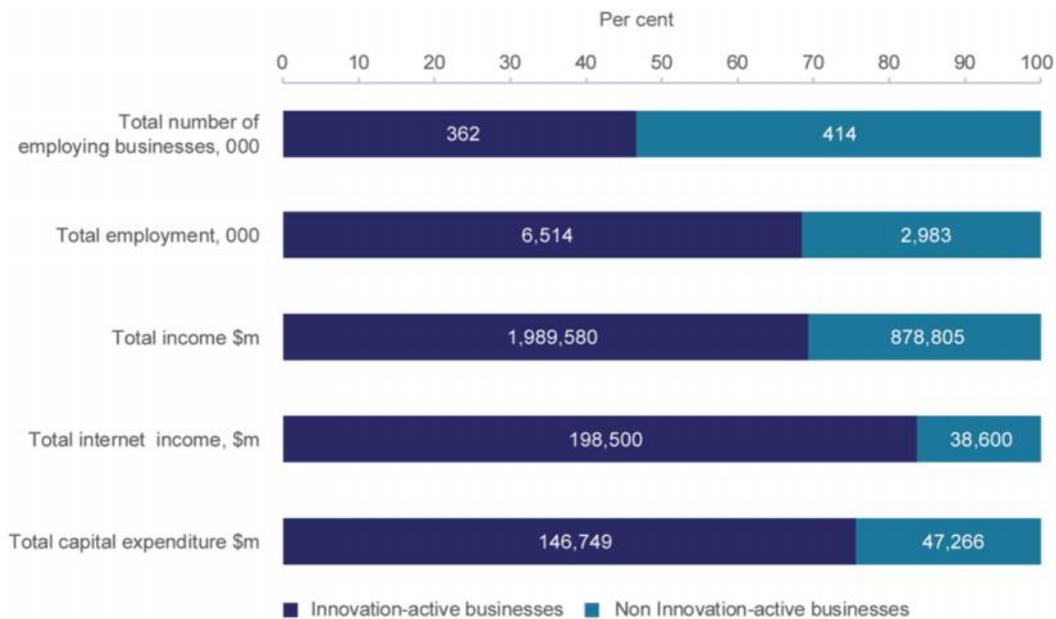
There is not enough practical and easily accessible information for business on how to build, maintain and get the most out of successful innovation partnerships.

This report aims to help fill the gap using a mixture of literature review, new survey data and, most importantly, in-depth interviews with leading innovators from five companies: Leica Biosystems, Planet Innovation, Pollenizer, Siemens and Signostics.

success. It is not enough to compete on the price or quality of existing products.

Strong evidence exists to show businesses that innovate do better. They are better able to adapt and respond to changes in their external environment, are more productive (Palangkaraya, Spurling, & Webster, 2015) and more profitable (Microsoft, 2015; Department of Industry and Science, 2014). Data from the Department of Industry and Science highlight that innovative businesses account for a disproportionately large share of Australia’s employment, capital expenditure, business income and internet income (Figure 1).

Figure 1 - Total estimated number of employing businesses that are innovation-active and their contribution to employment, income and capital investment, 2011-12



Source: (Department of Industry and Science, 2014), p38.

Innovation is also shown to benefit businesses regardless of their business size and sector. In 2012-13, research from the (Department of Industry and Science, 2014) found that compared with businesses that did not innovate, innovative Australian businesses report they are:

- 31% more likely to increase income and 46% more likely to report increased profitability;
- twice as likely to export and five times more likely to increase the number of export markets targeted;
- twice as likely to increase productivity, employment and training;
- three times more likely to increase investment in information and communications technology; and
- three times more likely to increase the range of goods and services offered.

In addition, median annual sales growth (Microsoft, 2015; Department of Industry and Science, 2014), business market share, staff and customer satisfaction and loyalty (Microsoft, 2015) were higher in small to medium-sized businesses that were consistently innovating than in those that had less or no appetite for innovation.

However, the mere existence of innovation activity at a business does not guarantee success. Not all investments in innovation result in successful commercial outcomes, and wide disparities exist in how well innovation investments actually pay off (Jaruzelski, Staack, & Goehle, 2014). These disparities exist between sectors and businesses. Microsoft (2015) research into innovation in SME businesses also suggests that there is considerable year-to-year variability in the innovation performance of individual companies.

For example, the 2014 Australian Innovation System report describes Australia’s manufacturing sector as having a high innovation capability based on a combination of research and development (R&D), patent and

trademark data. To be sure, there are clear examples of successful Australian manufacturing with strong roots in innovation: CSL, Cochlear, or Røde Microphones come immediately to mind. Yet the manufacturing sector overall has low international competitiveness in spite of its capabilities. It is unclear why this is so: investments may simply not be delivering as much innovation as expected; innovations may be successful, but commercialised overseas; innovations may be insufficiently attractive to customers; or innovation may be delivering, but simply not enough to overcome other disadvantages.

A study of innovation over the past decade by PriceWaterhouseCoopers, involving 500 innovation-active companies of all sizes, major regions and industry sectors, found innovation was not always correlated with a business's success. The authors found there was no significant statistical relationship between spending on innovation and R&D (whether total expenditure or expenditure as a percentage of revenue) and business financial performance (measured by sales growth, gross profit, market capitalisation or shareholder returns) so long as a company's spending on innovation does not fall into the bottom decile when compared to peers' spending (Jaruzelski, Staack, & Goehle, 2014). This finding should caution us against assuming that simply directing more innovation inputs will necessarily lead to more financial outputs. The quality of activity matters.

Since 2012 BRW magazine has published annual lists of Australia's most innovative companies – initially the top 30, and since 2013 the top 50. Over this period 180 rankings have been allocated among 127 companies as follows:

- 93 companies (73%) only appeared once;
- 18 companies (14%) were ranked twice;
- 13 companies (10%) appeared three times; and
- only three companies (2%) have ranked on all four lists (AbbVie, CBA and Planet Innovation).

The high level of variability in the BRW list may point to the difficulty many Australian companies face in trying to maintain a high level of innovation performance. Alternatively, it may simply reflect that companies must pay a small fee¹ and complete about 12 person-hours of application work to be considered for the BRW list; or that businesses only intermittently focus on innovation as a marketing tool. Businesses listed in one year only may have opted not to enter in other years for these reasons. Regardless, it is clear that businesses are not likely to remain in the index for long.

In summary, innovation does contribute to business success but measuring the level of innovation inputs is not enough. Indicators of the number of businesses investing in innovation and revenue spent on innovation provide a weak proxy of business innovation performance or capability. The commercial outcomes of investments in innovation are far more important as a measure of the success of innovation than these indicators. We should look to the quality of innovation practices, not just the quantity of inputs.

1.2. Why focus on collaborative innovation?

This report focuses on the role of collaboration in innovation, which evidence suggests is much more strongly linked to commercial performance than is innovation spending. Many Ai Group members have also expressed interest in finding out more about how they can use collaboration to boost their innovation performance.

Despite this, there is an absence of practical and easily-accessible information for business on how to enter successful innovation partnerships, engage external stakeholders and manage these relationships to achieve commercial success. We were motivated to do this research to fill this void. We explore how successful businesses engage with stakeholders outside of their organisation to boost their innovation performance.

The reasons for collaborating are compelling. Firstly, it is becoming increasingly difficult for single organisations to acquire and retain internally all the knowledge, skills and resources needed to maintain or improve their competitive position. While some organisations may retain a monolithic capability to 'do it all', most businesses are unable to develop competitive productivity advantages or innovation capabilities in

¹ \$2,000 to \$2,900 in 2016, depending on business size.

isolation from each other (Enright & Petty, 2013). Although true for all businesses regardless of size, the problem is amplified in smaller organisations where access to critical knowledge and expertise is more likely to be limited.

The 2014 Australian Innovation System Report (Department of Industry and Science) captures this view perfectly:

Highly networked innovation systems enable businesses to share resources, risk and ideas for innovation. International business-to-business collaboration on innovation provides a mechanism for sourcing the widest possible range of ideas and resources to build a firm's competitiveness.²

Businesses that pursue a culture of both innovation and collaboration experience compounding benefits across a range of business performance measures (Vinding, 2006).

Palangkaraya, Spurling, & Webster (2015) undertook a study of approximately 7000 Australian SMEs between 2005-06 to 2011-12 and reported that benefits of innovation were compounded when collaboration was involved. They found businesses that introduced an innovation (either new to firm or market) raised their productivity level on average (relative to their industry) by five percentage points. However, productivity increased by an additional seven percentage points when collaboration was involved in the introduction of the innovation. They also suggest that collaboration on innovation may substitute, to some degree, for inexperience or lack of skill by management, and that this could explain the compound benefit of collaborating on innovation rather than innovating alone.

Another study of SME businesses by Microsoft (2015) found that businesses that were underperforming on innovation were, among other things, less likely to be engaged in innovation orientated collaborative networks, reinforcing the idea that there is a compound benefit of collaborating on innovation.

Research (Department of Industry and Science, 2014; Microsoft, 2015) also highlights a positive correlation between collaborative innovation and:

- the novelty of introduced innovations, with new-to-market innovation being a more likely outcome if collaboration is involved;
- the consistency with which firms invest in innovation;
- the likelihood of achieving successful commercial outcomes from investments in innovation;
- business absorptive capacity – the ability to absorb and exploit external information that might improve their competitiveness;
- the extent to which firms are exporting; and
- the extent to which firms embrace new technologies.

Each of these factors could help explain the compound benefits of collaborating on innovation compared to undertaking innovation alone. Further research would be warranted to investigate whether these correlations involve causality, and if so, which way the causation runs. Businesses may export more because collaborative innovation makes them more competitive, or exporting more may make them more likely to collaborate, or exports and collaboration may both be products of a deeper underlying cause. Nevertheless, the case for the benefits of innovation collaboration is plausible.

1.3 New research to boost collaborative innovation efforts

Ai Group believes Australia must do better on collaboration for innovation, and this research report is a contribution towards that goal. Australia is currently well below the OECD average, and discussions with many stakeholders suggests that much of the collaboration that does take place is shallow. Those who have entered into collaborative arrangements often have little invested in them, financially or strategically; they can be quick to back out if projects strike challenges or don't achieve commercial success in a relatively short time-

² 2014 Australian Innovation System Report, Department of Industry and Science, p121.

frame.

Commonwealth and State Governments have made efforts to boost innovation collaboration over many years, including Co-operative Research Centres (CRCs), industry clusters, precincts, growth centres and more. These efforts have had important successes but they have also faced challenges:

- attracting participants, particularly among smaller and medium sized businesses;
- achieving sustainable collaboration that can continue without public funding, which is usually either avowedly temporary or unstable;
- utilising and listening to all the partners to the collaboration to achieve successful commercial outcomes for each;
- the tendency to focus on creating networks or partnerships for their own sake, rather than on relationships that serve a larger purpose or reflect a long term confluence of interests; and
- over-emphasis on achieving pre-determined technical outcomes (new intellectual property) rather than commercial outcomes (new or increased revenue streams).

Failure is an unavoidable part of the innovation process, and indeed a valuable one when lessons can be derived from the failure and applied to build future success. But when collaborative innovation initiatives go more fundamentally awry in these ways they may deter people from exploring opportunities associated with collaborative innovation in the future.

The level and outcomes of collaborative innovation in Australia could be greatly improved if more attention was paid to the:

- barriers to and incentives for greater collaboration on innovation and what can be done to address or leverage them; and
- factors that contribute to successful collaboration on innovation – how we should be approaching it.

Multiple initiatives are converging on this agenda. The Federal Government’s recent National Innovation and Science Agenda includes measures to boost collaboration by reweighting the funding formulae for public research. The university sector is examining itself and devising new strategies for connecting with industry effectively.

This research report contributes further by gathering and analysing business experience. It will be used to inform Ai Group’s policy work and provide businesses with practical knowledge of how to innovate successfully.

This work builds on previous work done by Ai Group, including our submissions to successive Parliamentary inquiries into innovation, stakeholder consultation to Boost Commercial Returns from Research (2014), and through our significant input to the Australian Technology Network report (2015), Collaborate, Innovate and Prosper: Ensuring Australia’s Future Competitiveness through University-Industry Collaboration.

1.4 Research methodology

This report employs several techniques:

- A review of the literature and existing data on innovation, collaboration and Australia’s performance;
- A survey of collaboration practices in Australian businesses, answered by a sample of 352 respondents from all sectors in late 2014;³
- Interviews with businesses and researchers in five collaboration case studies; and
- Insights from a roundtable of commercial and academic innovation practitioners gathered to discuss initial results and implications.

The case study interviews provided detailed experience and qualitative judgments that provide practical

³ The survey was conducted as part of Ai Group’s 2015 Business Prospects Survey. The relevant questions are reproduced at Appendix B.

insights into the success and failure of collaborative innovation. Case study participants were selected by seeking businesses that have made a conscious, strategic decision to collaborate, rather than happening into collaboration through chance connections or engaging in ad hoc, temporary collaborations.

Selection also involved a focus on more deep-seated collaboration, involving all parties having some “skin in the game”, engaging in careful planning of partner selection and relationship management to arrive at strategic solutions that benefit all those involved. This deeper collaboration frequently means that tasks will be jointly undertaken, with all participants to the collaboration contributing knowledge and expertise and having some involvement in decision making. It differs from fee-for-service type arrangements, which are generally less bi-directional in nature.

As we were interested in the principles of good collaboration – what makes relationships work – rather than the specific content of the collaboration, our selection was not limited to business collaboration with the public research sector, but also with other businesses and with customers.

The box overleaf shows the businesses we selected for case study interviews based on these criteria.

1.5 Companies interviewed

Leica Biosystems: A provider of medical diagnostic solutions with a focus on supporting cancer identification and treatment. Part of a wider set of sensor, instrument and optical businesses founded in Germany in the 19th century, Leica Biosystems today has significant operations for manufacturing or research in Australia (Melbourne), China, Germany, Singapore, the United Kingdom and the United States. In Australia, the Leica group has more than \$100 million in annual revenue and around 250 employees.

See <http://www.leicabiosystems.com/>

Planet Innovation: A commercial provider of technology innovation, product development and commercialization expertise, and a developer of their own products, with a focus on the biomedical, clean-tech and hi-tech industries. Recent innovations PI has helped develop include the Geri imaging system for IVF treatment and the Incus hearing aid control system. Founded in 2009, PI has 150 employees and is based in Melbourne, with operations in Chicago and links to clients around the world. PI topped the BRW innovation list twice and was ranked in the top ten companies in all years.

See <http://planetinnovation.com.au/>.

Pollenizer: Founded in 2008, Pollenizer helps incubate and accelerate startups; advises large established businesses on how to boost their own innovation capability; and connects startup founders with high profile companies. Active in Sydney, Melbourne, Singapore and Hong Kong, and with less than 20 employees of its own, Pollenizer helps place teams directly into startups, designs and runs incubators, and provides tools and consulting services to its clients. Its own investments have led to successful exits from two startups, group buying business Spreets and employee recognition platform WooBoard.

See <http://pollenizer.com>.

Siemens Australia and New Zealand: The local arm of a global technology, engineering and manufacturing conglomerate. Founded in Germany in 1847, Siemens has more than 350,000 employees worldwide, of whom 2,200 work in Australia and New Zealand. The ANZ subsidiary has 14 locations, with the head office in Bayswater, Melbourne. Siemens ANZ focusses on products, services and solutions for infrastructure; energy; manufacturing; defence; oil and gas; and digitalisation across many sectors including medical.

See <http://www.siemens.com.au>.

Signostics: Founded in 2005 in Adelaide, Signostics develops advanced medical imaging technologies, including handheld ultrasound devices. As well as marketing its own devices, Signostics has worked in partnership with global brands. With 15 employees of its own, Signostics contracts out some production activities to export to ten countries.

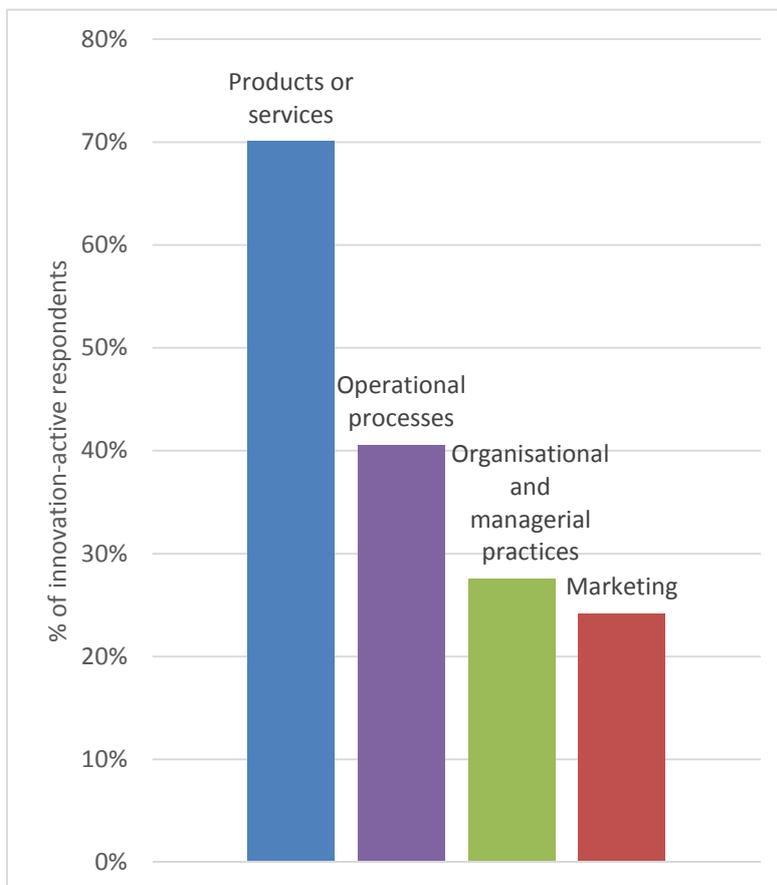
See <http://www.signostics.com.au>.

CHAPTER TWO

Australia's collaborative innovation performance

Ai Group's 2015 Business Prospects CEO Survey, which drew responses from 352 businesses across manufacturing (60%), business services, construction and mining, made several new findings about the nature of collaboration in Australian businesses. While 61% of respondents had collaborated on some form of innovation in 2014, collaboration does not appear to play a significant role in many Australian businesses' long term plans. Only 3% of businesses had plans to partner with other organisations as part of their strategy for business growth.

Figure 2 – On what activities does business innovation focus?



Source: (Australian Industry Group, 2015)

KEY POINTS

A variety of metrics show that Australian businesses do not collaborate at the same rates as international competitors, despite relatively strong overall investment in innovation.

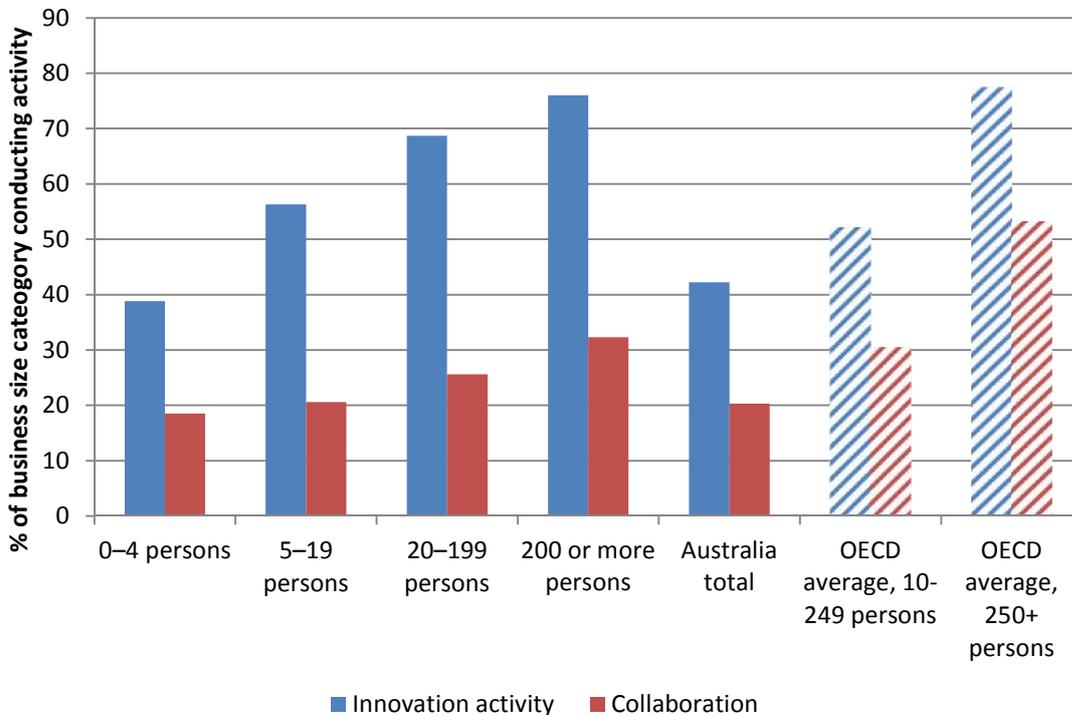
Ai Group data indicate a somewhat higher rate of collaboration and connection between universities and business than the ABS data suggest, though still low.

Collaboration with universities is hampered by a lack of skills and time among smaller businesses, and difficulties in goal alignment with all sizes of business.

Collaboration between businesses is more common, particularly with supply chain partners and equipment providers.

Of those businesses that were collaborating to innovate, most collaborative activity was focussed on new product or service offerings (70%), followed by new operational processes (41%). Only around a quarter of activity involved the pursuit of business model or marketing innovation.

Figure 3 – Rates of business innovation and collaboration - Australia and OECD average



Source: ABS cat 8158.0; (OECD, n.d.)⁴

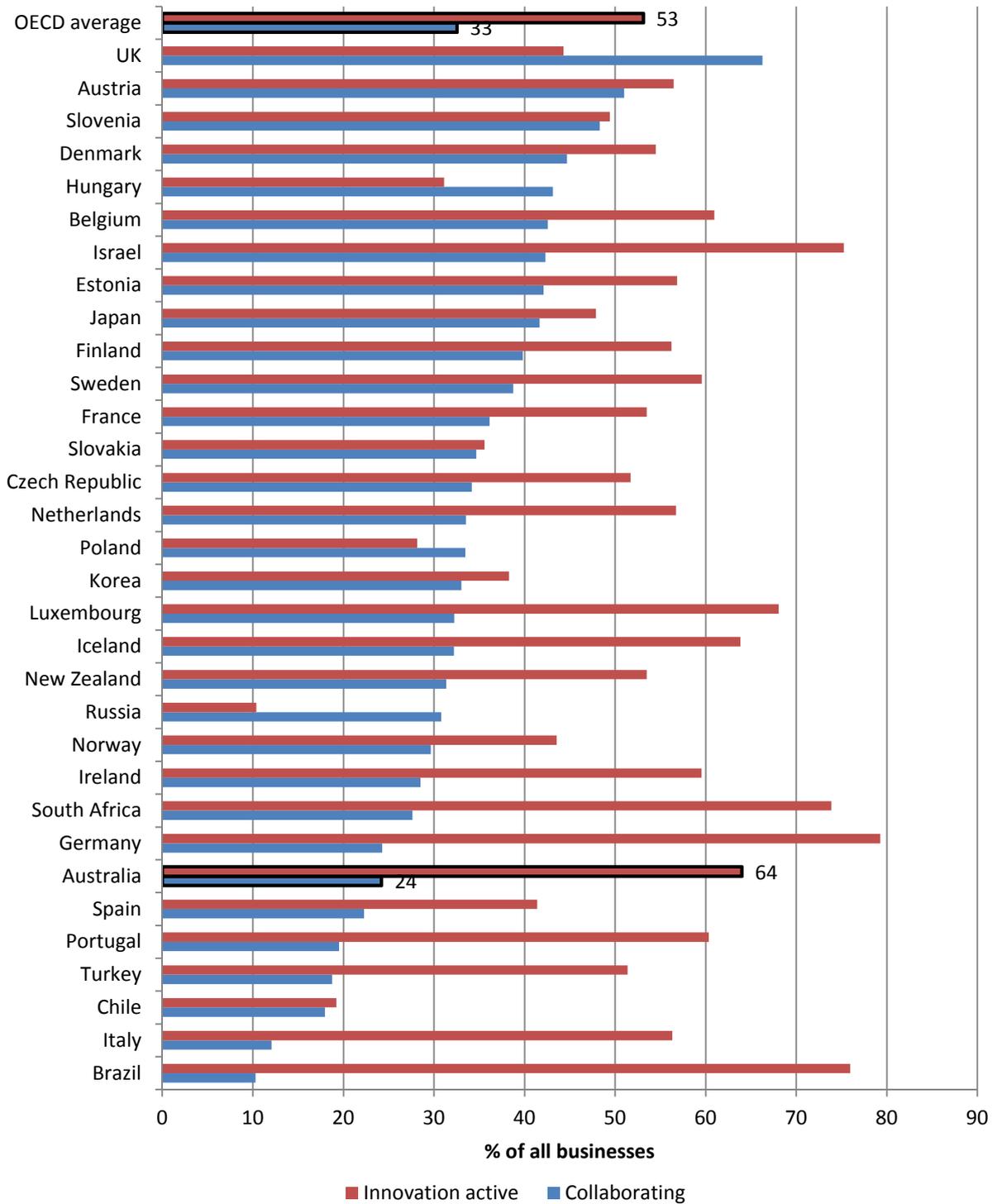
OECD and ABS figures show that overall levels of innovation activity across Australian businesses are comparable to other advanced economies and Australia ranks well against individual economies. 77% of large OECD businesses are innovation-active, compared to 76% of large Australian businesses. The Australian all-business average of 42% compares reasonably to the OECD smaller-business average of 52%, given that the former includes businesses with any number of employees, while the OECD excludes businesses with fewer than 10 employees.

However, Australian businesses are significantly less likely to collaborate for innovation purposes; just 20% of all Australian businesses and 32% of large Australian businesses did so in 2012-13, compared to 30% of OECD small businesses and 53% of OECD large businesses. Australia ranks poorly against individual OECD economies for collaboration. And as Figure 5 shows, in 2008-10, the most recent period for which comparable data are available, there was less collaboration between businesses and public sector research organisations in Australia than in any other OECD economy.

On average 24% of all firms and 34% of large firms in the OECD were collaborating with public sector research organisations on innovation. According to ABS data, in Australia the figures were 4.1% of all firms and 3.5% of large firms. This is despite both a strong, well-resourced research sector with a track record of significant innovation, and government policies over many years to encourage research-industry collaboration, including through the Cooperative Research Centres Programme.

⁴ Based on a simple average of OECD country data, excluding those with no comparable data point.

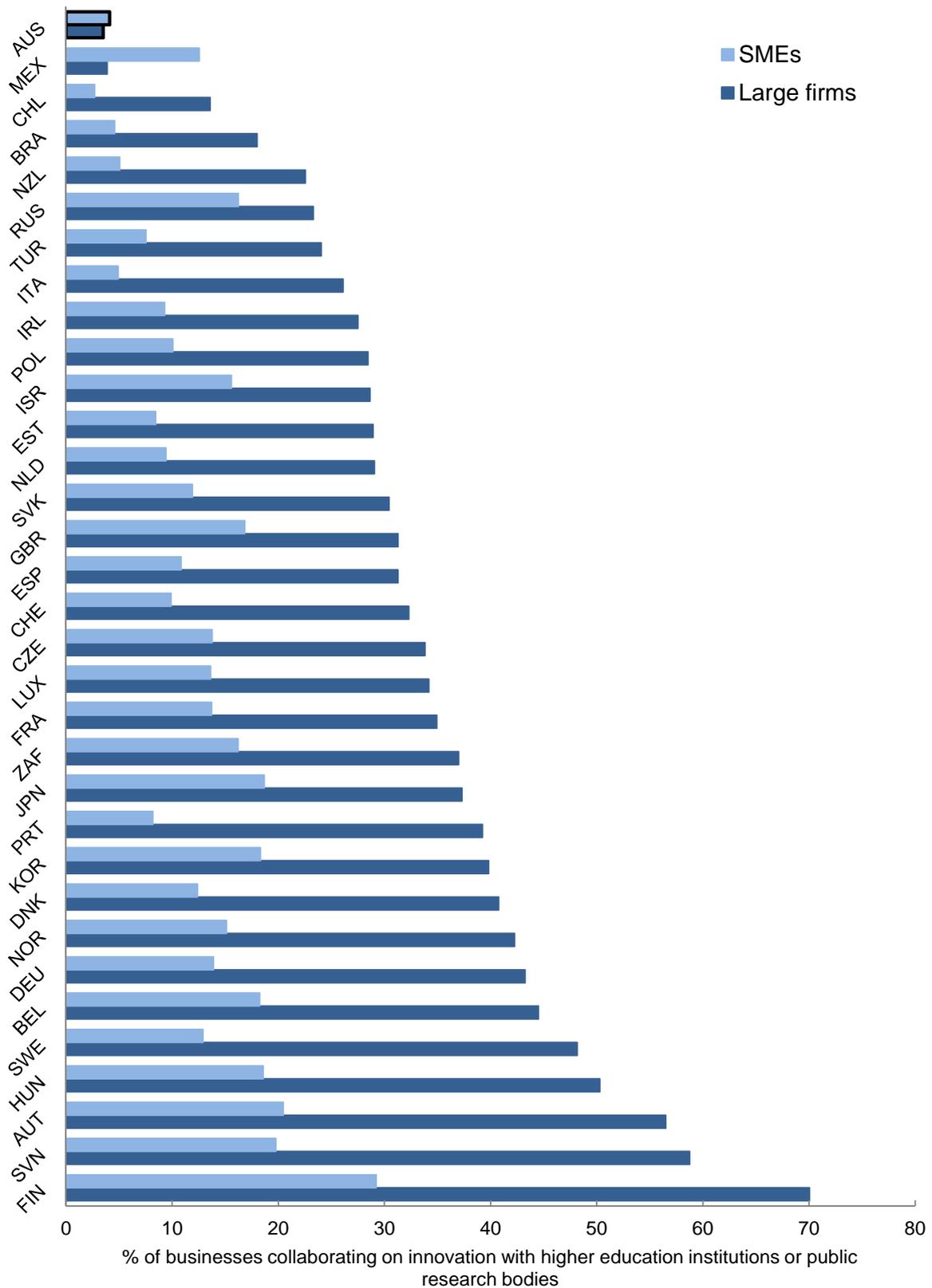
Figure 4 - Innovation and collaboration by businesses in OECD economies



Source: (OECD, n.d.)

These data are particularly concerning since only 30% of Australia’s research personnel work in industry, approximately half the OECD average; low collaboration with the public sector means that industry is not accessing most of the research talent available in Australia.

Figure 5 – Business innovation collaboration with public sector research organisations, OECD



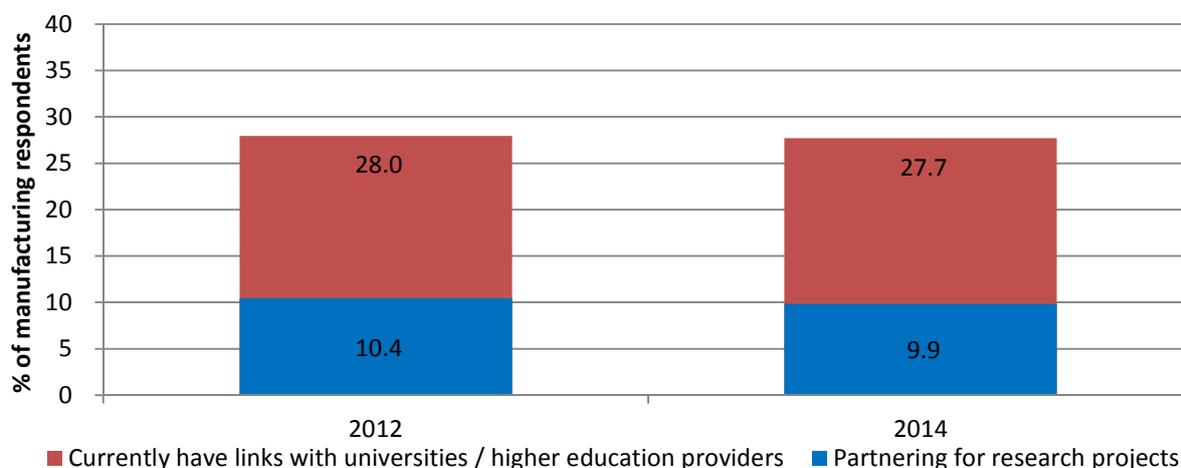
Source: (OECD, n.d.)

ABS data and the OECD comparison may not tell the whole story. Ai Group’s research, including the 2015 Business Prospects Survey and previously unpublished data from our 2012 and 2014 Industry Skills Surveys,

provides further context on this low level of business-public sector collaboration. These surveys involve quite different samples to the ABS, with a much higher rate of participation by manufacturers (manufacturing made up around 60% of the Ai Group surveys, versus around 4% of all registered businesses and 6% of all employing businesses in the ABS business register); and they phrase questions about collaboration differently to the ABS and to each other. The differences between the Ai Group survey results and the ABS data do not suggest the latter are wrong, but that rates of collaboration differ significantly between industries and that a lot of collaborative activity takes place that falls outside the ABS definition of innovation collaboration.

The Ai Group Skills Surveys included questions for manufacturing businesses only about their links to universities, including both partnerships for research projects and other kinds of relationship. Around 28% of manufacturers had links to universities, including around 10% with research partnerships with universities, or more than double the ABS figures for the rate of collaboration with public sector researchers by businesses across all industries, and closer to the OECD average of 33% for ‘collaboration’ by all businesses.

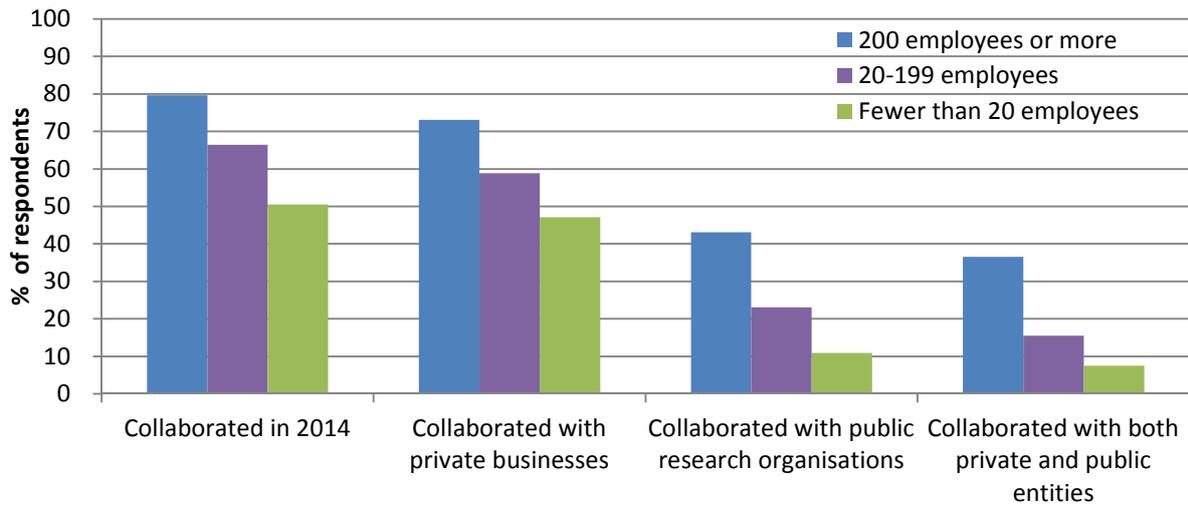
Figure 6 - Skills Survey data on manufacturer - university links in Australia, 2012 and 2014



Source: (Australian Industry Group, 2012) and (Australian Industry Group, 2014)

More recently, Ai Group’s 2015 Business Prospects Survey asked businesses whether they had collaborated with other businesses or with public sector organisations to develop or introduce products, processes, organisational practices or marketing methods (Figure 7). In this sample 43% of large and 11% of small respondents collaborated with public sector research organisations. Collaboration with other private sector businesses was significantly more common, at 74% for large respondents and 47% for small ones. These responses are much higher than the ABS data and may capture forms of collaboration well beyond the scope of formal research partnerships.

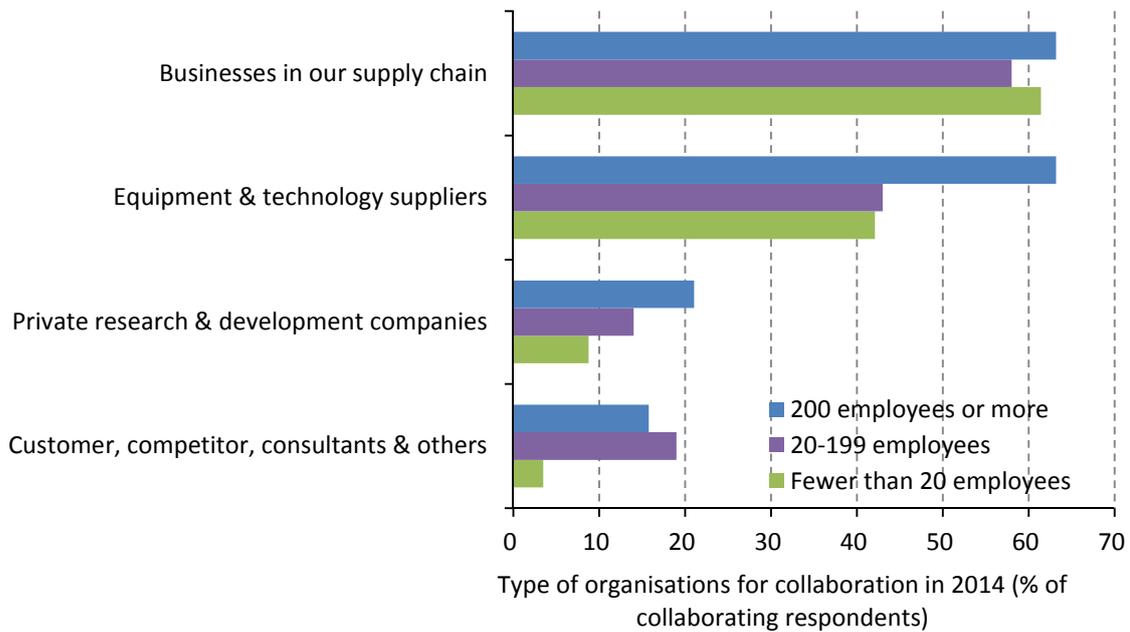
Figure 7 - Business Prospects data on rate of collaboration by Australian businesses



Source: (Australian Industry Group, 2015)

Business to business collaboration was mostly within existing supply chains, or with suppliers of technology and equipment (Figure 8).

Figure 8 - Which kinds of business did business collaborate with?



Source: (Australian Industry Group, 2015)

While the Ai Group sample was more likely than the wider ABS sample to have collaborated with public sector research organisations, 36% of respondents reported that they had experienced barriers to this collaboration. The particular barriers faced varied significantly by the size of business (see Figure 9).

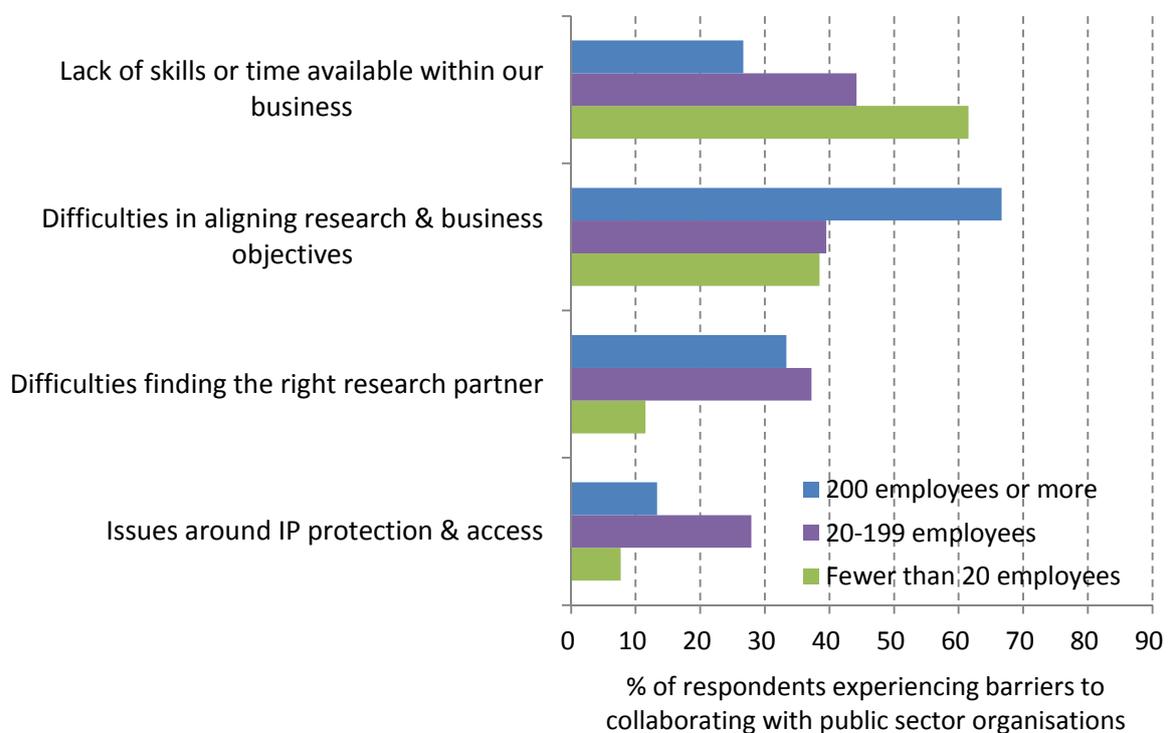
For small businesses the most frequent barrier cited (by 62% of those stating any barrier) was a lack of skills or time available in the business to pursue or manage a public sector collaboration. For large businesses with 200 employees or more, the most frequent problem cited (by 67% of those stating any barrier) was difficulty in aligning research and business objectives. Medium sized businesses experienced both problems, but were also

the most likely to cite difficulties finding the right research partner. Intellectual property issues were the least likely barrier to be cited by businesses of any size.

Overall, these results indicate that there are two significant mismatches that diminish the frequency and success of innovation collaboration between businesses and the public sector. One is between the organisational capacity of many businesses and the resources and effort required to collaborate in Australia. The second is between the mutual expectations and priorities of public researchers and business. The survey data cannot indicate whether these barriers are indeed more severe in Australia than overseas, although the relative weakness of Australian collaboration rates across all industries strongly suggests they are.

Many universities are working to improve their ability to collaborate with industry. These data suggest that improving intellectual property practices, a significant area of current activity, will be positive but not as important as bridging more fundamental gaps between the goals and capabilities of the parties.

Figure 9 – What barriers do businesses face to collaboration with public sector organisations?



Source: (Australian Industry Group, 2015)

There is another important point of contact and cooperation between universities and business: work integrated learning and the placement of graduates with industry. Ai Group research in 2014 found that of those businesses who connected to a university, 51% did so for placements or internships, compared to 27% for research (Australian Industry Group, 2014). Anecdotally, collaboration between businesses and universities on undergraduate work integration can lead to good, trusting relationships that support collaboration for innovation. Work integrated learning may be a point of leverage to increase innovation collaboration.

Nearly 70 per cent of businesses feel that they have yet to master the elements they will need for innovation success over the 10 years from 2014 (Jaruzelski, Staack, & Goehle, 2014). Meeting the challenges of an ever more complex external environment will likely necessitate the unified efforts of many individuals working across the innovation ecosystem – including individuals in industry, public sector research organisations and government.

Accordingly, a business’s ability to collaborate and network will be crucial to its ability to be innovative and

stay ahead of competition. By participating in collaborative networks businesses can learn more about what their customers want and how they can supply it.

These networks must extend beyond national boundaries. Less than one per cent of the world's innovations are realised in Australia. Unless we are closely aware of the great ideas, technologies and knowledge being generated offshore we will lag in seizing the economic opportunities they generate.

In Australia the importance of building greater interconnectedness in our innovation ecosystems is widely acknowledged (Microsoft, 2014; Australian Industry Group, 2014; Australian Technology Network, 2015; Department of Industry and Science, 2014). By deepening our connections both domestically and internationally to maximise the flow and exchange of knowledge, resources and ideas, greater opportunities for learning, creativity and, ultimately, innovation will be created.

Recent AIS reports (Department of Industry and Science, 2014) find a 70 per cent increase in the chance of achieving new-to-world innovation when firms engage in collaboration. This finding supports the association found in the case study research between collaboration and comfort with riskier and more novel innovation.

This association is interesting because Australia has a very poor track record relative to other OECD countries both for collaborating on innovation and for introducing new-to-market innovation. With some exceptions, we are largely a nation of adopters and modifiers, and are becoming even more so with an absolute decline in new-to-market goods and services innovation since the early 2000s. The degree of novelty associated with Australian innovations is also less than in the top performing innovating countries, and appears to be on the decline. In 2012-13 just under six per cent of Australian businesses introduced new-to-market innovations compared to the EU average of nine per cent, and well below the level of German (17 per cent) and Swedish (26 per cent) businesses (Department of Industry and Science, 2014).

This is troubling, since data show that national and firm competitiveness is much more likely to be elevated by the introduction of more novel, or new-to-market, innovations than by the adoption of innovations that are new-to-firm but already in the market (Department of Industry and Science, 2014). In other words, businesses that introduce new-to-market innovations are likely to capture a greater share of the market than businesses that introduce new-to-firm innovations.

If collaboration and innovation novelty are strongly correlated, Australia's relatively weak levels of collaboration are a serious problem. As summarised in the latest AIS report:

"Poor collaboration on innovation is likely to diminish Australia's ability to participate in many world-first innovations...the capacity for Australian businesses to integrate into the higher value-added parts of global value chains is [therefore] limited compared to foreign rivals."

These concerns are also relevant to the idea of economic complexity (Hausmann, *The Atlas of Economic Complexity: Mapping Paths to Prosperity*, 2011). More 'complex' economies – defined as those whose products are more diverse and less 'ubiquitous' (or widely produced) – are likely to be more successful and resilient. Complex economies may become more complex over time, though Australia has gone backwards over recent decades and is presently ranked 82nd by Hausmann and Hidalgo's metric – well behind every other developed economy (Hausmann, *Country Rankings*, n.d.). It is plausible that the level of collaborative innovation, by impacting the frequency and uptake of new-to-market innovation, can impact national economic complexity. Overall, the links between collaboration, novelty, and persistency of innovation investment (about which more below) merit further investigation.

Lessons from Business: What the Case Studies Say

Looking beyond survey research and the existing literature, case study businesses interviewed for this report shed considerable light on the state of collaboration in Australia, the benefits available and strategies for achieving them. These are explored in this section.

3.1 Australia's performance

In addition to assessing Australia's level of collaboration, it is also important to consider the type and quality of collaboration businesses are engaging in. This may include everything from crowd sourcing to more strategic forms of collaboration, including strategic partnerships⁵ and corporate venturing⁶, which require partners to have more at stake. The mode of collaboration businesses choose will depend on what they hope to get out of it and the external factors they face.

Case study businesses suggested that, based on their observations of their peers, most collaborative innovation in Australia is conducted on an ad-hoc basis as opportunities and connections present themselves, rather than arising from businesses making a strategic decision to engage in collaborative arrangements. This perception is supported by the gap between the fairly low level of business collaboration in ABS data (20%), and the much lower frequency in Ai Group's CEO Survey of growth strategies that involve partnering (3%). The CEO Survey further supported the case study businesses' assessment by finding that 45% of business-to-business collaborative relationships are between businesses that are part of an existing supply chain together. Clearly many companies turn inwardly – to people they already know and trust, or at least feel they have control over – to help solve problems.

In the experience of both case study businesses and public sector researchers interviewed for this report, collaboration is often also relatively shallow. Shallow collaboration involves:

- short timelines;
- an end to the project and the relationship when initial committed funding ends;

⁵ Formal alliances between established businesses.

⁶ Venture capital funds set up inside established non-financial businesses to invest in startups.

KEY POINTS

Business collaboration is rarer and shallower in Australia than elsewhere.

The partnership potential of Australian organisations is often reduced by short termism, lack of transparency, weak internal incentives for collaboration, lack of labour mobility and an overemphasis on controlling intellectual property.

Australia's skilled and diverse workforce and access to unique data sets improve our potential.

Benefits of collaboration on innovation include increased comfort with risk taking; exposure to new approaches; potential for specialisation; reduction in costs and time to market; and increased persistence of innovation.

- very limited sharing of resources, intelligence, risks and benefits; and
- a focus on developing an already-identified technical solution, rather than inviting collaborators to a more fundamental consideration of the problem to be addressed and the business outcome to be achieved.

Ai Group research into leadership corroborates some of these experiences. We found that 63 per cent of respondents said that the pressure on company executives to deliver short term financial performance had increased over the last five years. Current organisational cultures focus on the short term which leads to under investment in longer term goals, including changes to organisational culture to support new ways of working, and the development of an organisation’s people (Australian Industry Group, 2015).

There appear to be no quantitative data to support international comparisons of the quality of Australian collaborative relationships. Several interviewees for this report commented that Australia does not seem to have as strong a culture of valuing collaboration as that in the United States and parts of the European Union; in their experience businesses and researchers in those regions, and successful collaborators generally, are more likely to put a value on the collaborative relationship itself, not just the outcomes of the specific project at hand. A healthy relationship can lead to a stream of further projects with rewards well beyond the scope of a one-off transactional approach.

The widely confirmed infrequency of collaboration on innovation means that Australian businesses miss many benefits, with less ability to overcome preconceptions or internal limits on skills, resources or leadership. Evidence that the collaboration which does take place is more limited and instrumental collaboration in Australia suggests further missed opportunities for sustained relationships that support longer term business growth.

3.2 The partnership potential of Australian organisations

Case study interviews pointed to several cultural barriers to developing deeper and more extensive collaborative arrangements in Australia – as well as some offsetting strengths. For instance, **Signostics** describes collaboration with Australian research and medical institutions as substantially more difficult than with institutions in the United States. Differences include the lengthier and more demanding processes to confirm projects and establish the public funding component, and the lower interest or incentive for key personnel in Australian hospitals to facilitate research.

The full set of barriers and strengths is set out below.

Barriers

Frequently cited hindrances to collaborative innovation in Australia include institutional barriers and a culture across both the private and public sectors that is risk averse, focused on the short-term and often closed and non-transparent.

Short-termism: interviewees saw a preoccupation with quick fixes and rapid answers, which goes against the grain of more long-term or radical innovation and is a major blocker to extracting more from collaborative innovation. Examples of this include the fact that less and less development is done in Australia; off-the-shelf solutions are much more likely to be deployed.

Many also commented that Australians tend to focus too heavily on a defined solution to a problem and are less open to exploring new opportunities and angles on the problem. As a result, solutions tend to be less visionary, involving new-to-firm rather than new-to-market innovation. Perhaps more importantly, solutions may not consider the market and wider context for the innovation – will the market support the solution, and is it solving the right problem?

New-to-firm innovation is about exploiting existing knowledge and collaboration may offer less additional benefit. By contrast, new-to-market innovation is about exploration. It requires a firm to ask new questions, acquire new information and make decisions about matters that neither it nor competitors have considered before. There is a much clearer role for external collaborators in opening a business up to new-to-market

innovation.

Widespread short-termism may be aggravated by public policy, including a perceived lack of strategic focus; a preference for supporting low-risk and low-reward incremental innovation; and policy uncertainty, instability and frequent change.

Non-transparency was widely cited: a tendency to avoid sharing information lest a narrow and immediate advantage be lost. A focus on domestic markets may be part of this problem; more export-focussed businesses are more likely to perceive local stakeholders as collaborators rather than competitors. It is interesting to note that many of the companies approached to participate in this research did not want to share their stories for fear of losing some kind of competitive advantage.

Incentives for collaboration are widely seen to be inadequate, especially between researchers and universities. Public research funding has been allocated based on metrics that privilege raw academic output and intellectual influence via citations, with little scope to recognise commercial impact or wider economic benefits. As a result, public sector research organisations, with the best will in the world, may focus resources on more academic research and take a more transactional approach when they do work with businesses. They may be particularly unlikely to collaborate with SMEs, which may present smaller branding and reputational opportunities than larger businesses, have less financial resources to contribute, and be less able to navigate the hurdles to involvement. The formula for allocating public research funding is now being reformed to tackle this problem.

Lack of labour mobility in Australia diminishes opportunities for cross-pollination between different sectors and between researchers and industry. Researchers and other innovation-critical personnel have tended to spend the bulk of their careers in either the public or private sectors, with little crossover or direct experience of the alternative. More mobility across and within sectors would help stakeholders recognise the value that each party can offer.

Australia's **culture of self-reliance and individualism**, while presenting many benefits, has also tended to encourage linear, in-house innovation that is simply too slow in a globalized economy where many of our international competitors have embraced collaborative work.

Leadership disengagement from innovation is sometimes cited as a factor – a tendency to see innovation as something that technical staff do, rather than something intimately connected to business strategy and within the responsibilities of senior management.

Intellectual property arrangements were cited by several businesses as a major problem in dealing with some Australian universities. Universities may face pressure to maximise revenue from IP generated through collaboration, and have unrealistic expectations of businesses' willingness to accept onerous arrangements. Negotiation of IP agreements can be resource-intensive and heavily contested, undermining collaborative relationships from the outset. Many universities are working to improve their approach to IP.

Strengths

Australia does have offsetting strengths which can make our businesses strong candidates for innovation collaboration. These include:

A highly educated workforce, both in the private sector and academia, which should provide a deep well of talent to draw upon for local and international collaboration.

Domestic diversity and an international diaspora mean that Australia has a dense and constantly expanding web of connections to other economies around the world. This is helpful in boosting awareness of opportunities in Australia and overseas, and in providing cultural connections that ease the underlying personal relationship-building in international collaboration.

Australian datasets provide an advantage in some fields. For instance, data on concussions among professional sportspeople, or on motor vehicle accident victims, collected through world-leading accident compensation schemes, are goldmines for biomedical research projects and associated technology

development.

3.3 Benefits of collaboration

Case study businesses identified several key benefits from collaborating on innovation rather than acting alone. These include exposure to new approaches; potential for specialisation; reduction in costs and time to market; increased persistence of innovation; and increased comfort with risk taking.

A fresh perspective: exposure to new ideas and ways of thinking

A key benefit of collaboration cited by interviewees is that it can bring a business into contact with new perspectives, concepts, practices and technologies; these can be valuable both in themselves, and as sparks to the development of further innovations that synthesise or build on elements from familiar and new fields.

Leica Biosystems stated that they want to be able to access the best ideas globally and combine them to develop new innovative solutions to the market:

“We want to be with the winners, whether they are based in or out of our offices: those with the best ideas around the globe. We now have 500 or so people working on our platforms globally, meaning our ability to identify and develop tests for different diseases is expanded.”

Collaboration between leaders in different fields and industries can generate innovation at the intersecting frontiers of their expertise. This is another avenue through which low collaboration in Australia may contribute to our low economic complexity.

Enables specialisation: exploiting competitive advantage

Interviewees reported that by using partnerships to acquire critical skills and resources from outside, a company can invest in and focus on what it is good at. In turn, this internal capability can be used to attract collaboration partners. As **Leica Biosystems** reports:

“By using others’ specialist skills we can continue to be generalists, focusing on end-to-end workflow, rather than having to develop specialist skills in house. As such we have become a global leader in workflow solutions and can provide our partners and customers with the highest diagnostic confidence, access to markets and efficiencies that would not be possible if we were specialists.”

A flip side to this approach, not specifically raised by interviewees, is that collaboration can not only allow businesses to focus on what they are good at – it can help them overcome specific internal weaknesses and barriers to innovation, including lack of finance, knowledge, physical infrastructure, or management capability.

Lowering the cost of innovation

Acquiring specialist skills, knowledge and equipment for innovation can be very expensive – as can the time and inputs required to see an idea through to its commercial release. While some capabilities available through collaboration cannot be duplicated, others could be built or acquired – at a cost. Collaborating with companies that already have some of the required capabilities can cut costs and reduce risks.

Several interviewees also noted that collaboration not only cuts costs but can share them. This is especially important for smaller businesses that may lack the upfront capital to commercialise innovative ideas.

A distinct but related point is the reported attractiveness by some interviewees of public incentives for collaborative innovation. Where, for example, a business and public sector research organisation can access a grant through their collaboration, this can be an effective spur to encourage investment in innovative projects that would otherwise not progress or would take place elsewhere.

Reducing time to market

Some interviewees pointed to the benefit of collaboration in reducing the time it took to bring innovations to market. Collaboration enables ideas to be generated, assessed and prioritised more quickly. This can be another dimension of cost reduction, given the operating and opportunity costs involved in committing

resources to an innovative project. But there are other benefits as well. Businesses increasingly compete in a world of temporary advantage and limited-duration opportunities. With customer preferences shifting rapidly and competitors constantly improving, competitive advantages may not last long. Businesses that can push ideas through to commercialisation faster have a better chance to maintain competitive advantage.

The benefits of speed don't just apply to successful projects. The failure of an innovation can provide very useful information, but as **Planet Innovation** said *"It is always better to fail quickly and early than fail late,"* before too much time, money and effort has been invested.

Finally, it is also worth noting that while speed has been cited as an important potential advantage of collaboration, interviewees also noted that businesses are extremely reluctant to engage with innovation partners who are seen as likely to slow down the process. Interviewees cited specific experiences where the protracted processes required to collaborate with certain Australian organisations served as a powerful incentive to turn to faster-moving and more responsive partners overseas.

Persistence of innovation

Recruiting for this project suggested that businesses that collaborated on innovation were more likely to keep innovating, rather than to undertake infrequent or one-off efforts. At present this relationship is purely anecdotal, and cannot be confirmed by the specific survey research undertaken for this report. It is intuitively plausible that companies with strong collaborative relationships will be exposed to more ideas for new innovations; that they may be more likely to communicate, test and progress those ideas with partners; and that the other benefits of collaboration may increase the ability and enthusiasm of businesses to continue innovating.

Leica Biosystems argued that collaboration helps in *"filling the innovation funnel [with ideas]"*, meaning that collaboration was used to ensure they had a constant stream of ideas to assess for further development. Forthcoming work from the Department of Industry may address the potential of networking to increase both the innovation performance and the absorptive capacity of businesses – the latter being their ability to recognize the value of new, external information, assimilate it, and apply it to commercial ends.

Existing research (Department of Industry and Science, 2014) confirms that businesses that introduce new innovations on a very regular basis and can attribute a high proportion of sales to investment in innovation are likely to report higher sales performance than less persistent innovators. And Microsoft (2015) research into SME innovation also found that businesses that were underperforming on innovation were less likely to be pursuing innovation consistently if at all.

Further work to investigate the potential relationship between collaboration and persistency in innovation would be worthwhile.

Comfort with risk: embracing the unknown

Many of the foregoing benefits – speed, cost reduction, broader capabilities and perspectives – combine to make collaborative businesses more comfortable with more fundamental innovation. Innovation always involves the risk of failure and the loss of potentially significant investment. This risk is higher for more novel innovations than for incremental improvements. Interviewees said collaboration made it easier for organisations to accept and manage the risks in identifying, developing or introducing more novel innovation. This was especially important for larger organisations where barriers to exploring radical innovation can be serious, such as a substantial established business unit that is successful but vulnerable to disruption.

Collaboration allows technical and commercial risks to be shared more broadly, while also permitting them to be managed by those most equipped to do so.

The fresh perspectives gained through collaboration can also help to challenge assumptions about the commercial potential of new innovation before large amounts of capital and time are sunk into its development, distribution and marketing.

Risk can also be reduced by establishing partnerships with organisations that already have an innovation at the

proof of concept stage, where technical risks are substantially reduced and information about the market demand for the product may have been established.

For **Leica Biosystems** the de-risking achieved by partnering with external stakeholders in developing new innovations has meant that the company is comfortable with adopting what would otherwise be a riskier innovation portfolio. 'Exploitative' innovation (which makes incremental advances to meet an established need) is predominantly done in-house, but partnerships or acquisitions are frequently used to commercialise more exploratory, radical, or disruptive innovations:

"Our business model looks to reduce risk and costs and leverage existing company strengths. I would describe our approach to innovation as conservative, but by collaborating we can undertake more radical innovation while still feeling comfortable with our approach to business."

Making collaborative innovation work

This chapter draws on the case studies to look at how collaboration is done and how to manage it more effectively through three stages:

- partner identification and selection;
- managing relationships for collaborative innovation; and
- learning from the experience.

4.1. Partner identification and selection

While it is important to be open to serendipity and unanticipated opportunities, it is also vital that businesses have a plan before sinking time, effort and money into collaboration. This involves asking a few pertinent questions:

- how will collaboration shape my competitive advantage?
- what am I looking for in a partner?
- and how will I identify and select an appropriate partner?

Know your motivation: how will the collaboration shape your competitive advantage?

It is important for a business to establish their core goals and motivations – what do they want to get out of the collaboration?

Even – or perhaps especially – where existing personal relationships between potential collaborators are strong, defining drivers clearly is crucial if a business is to ensure that the collaboration caters to their fundamental business needs. Motivators may include, for example, opportunities in existing markets that they wish to explore; new distribution channels and markets to access; or regulatory hurdles that they wish to overcome.

Collaboration involves a matching of the parties’ strengths and weaknesses. Businesses considering collaboration need clear-sighted awareness of their core areas of capability. They also need to understand their limitations, including both those they are happy to embrace and those they want to rectify. Strengths or weaknesses may include, for example, research expertise in specific relevant fields; rapid prototyping or short-run production capabilities; access to essential data or customer groups; or financial capacity. Businesses need to think carefully about the role of the partnership in achieving this.

KEY POINTS

Partner identification requires businesses to think from the outset about:

- the motivation for the collaboration – how it will shape their competitive advantage;
- their own capabilities – the strengths and weaknesses a partner should complement;
- the cultural and personal fit between the potential partners; and
- their internal processes for identifying and following up on partnership opportunities.

Large corporates and entrepreneurial start-ups: a match made in heaven?

With increasingly temporary advantages, businesses need to increase the speed and novelty of innovation, especially in sectors that at high risk of disruption like retail trade, ICT and media, and business and professional services (Deloitte, 2012). Blackberry dominated the embryonic smartphone market – until that market was redefined and vastly expanded by Apple.

Collaboration between established large corporates and smaller, younger businesses can help address this need and create mutual benefits. Radical or new-to-market innovation has traditionally been the strength of start-ups, or younger, nimbler firms. These businesses are characterised by flexibility rather than control, with less emphasis on formally defined tasks and specialisation, and more use of lateral coordination mechanisms.

In contrast, the hierarchical relations and firm roles within large corporates excel at driving efficiencies in established activities but may lack the flexibility required to explore new territory (O'Reilly III & Tushman, 2004). Kodak's decline hinged on its delay in seriously pursuing digital imaging, rather than the film-based market it had defined.

Case study business **Pollenizer** helps large corporates develop an internal start-up culture:

“Large corporates are good at exploring and scaling up the known, prioritising and investing large sums of money in lower risk innovation projects, but struggle to develop and scale up the unknown.”

The structures, processes and cultures large corporates adopt constrain more radical innovation and limit variety, change and speed in response to major shifts in consumer demands. Driving cultural change across a large organisation is possible but can be difficult – particularly given the frequent reluctance to disturb existing areas of established but vulnerable success.

Partnering with entrepreneurial start-ups to is a more direct alternative to purely internal change, and can help large corporates pioneer radical innovations and avoid disruption by competitors. The benefits to such arrangements for the start-ups are access to scale, an established distribution chain and capital – all things that often prevent them from getting off the ground.

The purchase of Oculus by Facebook is an example of a large established business seeking to catch the next wave of online interaction by taking an innovative firm and providing it with the resources to refine its product, enter the market at scale, and stay the course in defining a new product category – consumer-grade virtual reality. That a business as young and hitherto disruptive as Facebook is now shoring up its future position with such acquisitions speaks again to the new evanescence of advantage.

The importance of connection: thinking about the kind of partner you want

“Innovation puts a lot of pressure on relationships,” as **Planet Innovation** said. Other case study companies agreed that personal relationships make or break innovation projects. Successful collaborators need a genuine and enduring interest in and respect for their partners and not just a focus on getting a job done.

Signostics stressed the importance of “strong social foundations built on personal relationships rather than relationships held together by binding legal contracts.”

Businesses need to think about what they need in a collaboration partner. This goes beyond rectifying gaps in their own expertise or resources. Personal attributes are also important, particularly organisational fit and the extent of ‘common ground’ and alignment of business culture. **Planet Innovation** said:

“without that cultural fit the relationship won’t work even if there is alignment of goals ... Partner identification, including an assessment of innovation ability and [cultural] fit is essential and is a skill that can be honed over time ... The fit is tacit and recognisable, but hard to express ... You get better at assessing the type of relationship it will be.”

Considering who else partners have surrounded themselves with can be a clue as to their cultural fit: other collaborators, supply chain partners, key customers. But judging fit in the abstract can be difficult. Practical experience of working with partners can be the surest way, despite the risks.

Several case study businesses recommended managing risk by starting with a smaller project and then expanding the scale of the relationship to more disruptive or resource-intensive work as the partners become more comfortable. **Siemens** said: *“early experience with one project will lead to conclusions about the desirability of further and more ambitious collaboration.”*

What makes a good collaborator? Assessing your partnership potential

Successful collaboration is not just about businesses picking the right partner to meet their needs: they also need to ensure that they themselves will be good partners. Case study businesses pointed to several rules.

Good partnerships take **two-way effort**. It is important to be active in the partnership, though this can be hard and costly where partners are not closely located.

At their heart partnerships are about the **relationship between individuals** (or groups of individuals) and not simply about structural and social antecedents. Strong R&D capabilities, prior collaboration, dedicated alliance functions and trust help, but are not the whole story.

Senior management and boards need to **understand their businesses' core strengths** and what they contribute to the partnership, as well as what they want to get out of the relationship.

Businesses should build their '**collaborative innovation CV**' through experience to improve their skills in managing relationships.

Businesses should cultivate their **technology literacy**. Digital technology is a key enabler for partnerships and for the transfer and management of knowledge.

A **strong innovation culture** is needed, characterised by dynamism, flexibility, responsiveness to changing conditions and creativity. Components of this culture include:

1. An appetite for risk and readiness for setbacks. Businesses need both courage in the face of uncertainty and timely internal decision making processes that can assess and make a call on financial and organisational commitment to new opportunities.
2. Flexible thinking. Challenges to existing approaches should be welcomed, along with ambiguity and alternate views. Staff with a 'my way or the highway' approach or an insistence on maintaining personal control may be defending existing structures and practices against the interests of the project and their own business.
3. Openness and transparency. While commercial confidentiality and intellectual property arrangements are very important, collaboration requires sharing knowledge and experiences with others. A culture of secrecy reduces cross-fertilisation and harms the ability of partners to meet each other's real needs. Case study businesses would be wary of potential partners who isolated them from aspects of a project or other key partners.
4. Commitment. Innovation can require a long haul commitment to pursue a strategy and an opportunity. It is important, particularly at the senior management and board levels, to avoid framing innovation merely in terms of technical solutions or short-term fixes.
5. Internal structures that support innovation. As **Planet Innovation** stated, "*external collaboration follows pursuit of internal collaboration.*"

Introduce a partner identification strategy

When a business has identified what it is looking for in a collaboration, it still needs to identify and assess collaboration opportunities and assign responsibility for this within their organisation.

Leica Biosystems and **Planet Innovation** have dedicated teams to identify and manage collaboration partners and draw expertise from the rest of the organisation as needed to make the most of these partnerships.

Leica's Business Unit has the role of "filling the innovation funnel", or ensuring a pipeline of innovative ideas is developed through their partnership program. **Planet Innovation** encourages all staff to look for partnership opportunities, but employs specific business development staff who are able to further explore ideas and make a well-informed assessment of their potential.

Leica Research Platform for Identifying Partners

Leica Biosystems provides an innovative service to researchers that itself generates a pipeline of collaboration opportunities and the data needed to inform decisions on them. Leica has established a dedicated, multidisciplinary team to enable the company to be a comprehensive, full-service partner for pharmaceutical and biotechnology companies developing innovative new in-vitro diagnostic solutions, including instruments, reagents and software.

One aspect of this service is the establishment of a research platform (RX Platform). This open software platform allows researchers at private companies, universities, hospitals and medical research centres around the world to develop new and novel reagents for disease detection and diagnosis.

Leica regularly conducts 'Voice of Customer' research to determine what their partners are looking for in a research platform and will then update the RX Platform to make it easier and more enticing to use. There are now more than 100 RX platforms in the market being used by thousands of researchers.

Once tests developed on these platforms reach clinical trial stage they are evaluated by alliance and project managers for their alignment with Leica's strategic plans, enabling a decision on whether or not to engage with partners to commercialise these tests. Where partnerships are established, the same managers provide continuity and partner focus as projects move from research through to clinical and commercial phases.

4.2 Managing relationships for collaborative innovation

Once a collaborative relationship is in place it needs to be managed. Interviewees agreed there is no single right approach, emphasising to need for an open mind and being prepared to learn from the experience. The right partnership for any set of organisations will be shaped by their size and resources, exposure to competition, the novelty of the innovation they are pursuing and motivation for collaborating.

Compromise and adaptation are needed to bridge differences between the partners' processes, risk appetite, capabilities and goals. These potential conflicts add to the uncertainty of a complex and constantly changing external environment. Coping with ambiguity and uncertainty is essential to maximising the success of collaborative innovation. Davis and Eisenhardt (2011) state that reconciling these differences requires recombining aspects of both organisations without excessively constraining innovation with too much structure.

In other words, the needs of both organisations need to be addressed, their strengths leveraged and their weaknesses overcome. The extent to which this occurs early in the collaborative process will have a strong influence on later stages of the development and commercialisation of innovation.

Common themes emerged from the interviews on the factors that contributed to collaboration and commercialisation success which are explored below.

Strong collaboration must benefit all

Collaboration thrives on mutual benefit and contribution, a shared vision and efficient coordination. The case study companies were clear that:

- all partners need to feel that the relationship has met their needs; and
- partners need to be prepared to learn from each other to ensure the relevant capabilities of each are utilised.

If the second point is not addressed, it is likely that the collaboration will not perform to its full potential. **Planet Innovation** said:

“If you are not combining the capabilities of the partners to realise a better outcome, then you may as well be innovating by yourself.”

To achieve **mutual benefit**, it is important for the partners to explore what they can contribute to the relationship, moving beyond pre-defined ideas about the roles that they will play. There should be equality in terms of what both partners are trying to achieve from the relationship: mutual benefit leveraging both partners' talents, rather than each trying to maximise output while minimising their own input. The collaborations that work best are not just fee-for-service relationships, but real two-way exchanges where risk, contribution and reward are shared.

Planet Innovation said while they are clear what they want to get out of

KEY POINTS

Successful relationship management for collaborative innovation involves:

- Ensuring mutual benefit;
- Discussing the commercial potential of the relationship from the outset, including the underlying business problem being addressed as well as any technical solutions identified;
- Addressing intellectual property issues at the outset;
- Using inter-disciplinary teams to share knowledge and bring diverse perspectives to bear; and
- Allowing flexibility to explore unanticipated opportunities.

a partnership and will turn down some collaboration opportunities because they feel they are not right for the company, their project success metrics consider the partner's perspective and are partly based on the partner's goals.

Leica Biosystems offers partners its strengths in end-to-end workflow solutions, including its understanding of regulatory barriers, distribution channels, and Voice of Customer research. Usually partners lack these capabilities and would need significant investment to replicate them. **Leica** gives their partners a pathway to market and in return they get a share of the earnings from the new innovation.

Mutual benefit also usually involves mutual learning, and being prepared to both impart and accept advice. Frequent interaction, open communication and trust built up in the process can decrease any competitive tensions. It also increases the likelihood that partners will exchange the detailed, potentially sensitive information and engage in the complex problem solving required to commercialise more novel innovations.

The early days of the relationship are crucial to setting its tone. **Planet Innovation** said:

"This is the stage where you determine how to work and communicate with the collaboration partner and its stakeholders. At this stage it is important that ideas are not constrained; people must be able to think freely. It is particularly important to embrace ambiguity and be open to being challenged. [The business] may need to be prepared to sacrifice a bit to get there."

Sailer, Holzmann, Katzy, & Weber (2014) also commented that most critical events for sustainable outcomes of collaboration happen in the initial stages. This is the time to normalise reflection in the relationship: cycles of learning, evaluation and adjustment are important to manage complexity and ambiguity and ensure the relationship keeps moving forward and achieving objectives (Davis & Eisenhardt, 2011).

It is necessary to develop a **shared vision** built on a common understanding of the problem, and particularly its ultimate commercial context. As **Pollenizer** commented: "*You need to explore and pursue with a passion the goal of meeting market demand,*" not just focus on the technical aspects of a given solution. "*Mutual benefit means a strong customer focus, rather than a focus dictated by specific business interests or outcomes.*"

The vision may take time to define and should be finalised in partnership, rather than being locked down prior to engaging a partner. The vision should not specify a technical solution, but clearly articulate a problem and a need. An example might be 'to increase the rate of successful embryo recovery for in-vitro fertilisation, by reducing errors and inconsistencies in the process of freezing human embryos.' The vision guides subsequent goal setting, including the technical aspects required to realise it.

Siemens described how, in order to arrive at this vision, many of the collaborations they engage in start off as 'brain-storming partnerships'. These focus on a theme or topic that Siemens feels it has particular strengths in or that it has an interest in exploring. They then work with partners to determine the focus area within this broader theme.

An established vision becomes the collaborators' mission. It can bring higher levels of commitment by all partners to innovation development and commercialisation, and can help to realise and prioritise opportunities.

This case study finding is supported by the literature. Sailer, Holzmann, Katzy, & Weber (2014) found that a co-evolution of goals and partnerships yields successful, sustainable outcomes if partners' interests and strategies are aligned early in a shared vision which enables individual activities under a common flag. This vision has to be precise, but flexible enough to realise action and establish bonding. They described the process of arriving at a shared vision as *goal finding* with *goal setting* – the definition of subordinate objectives to achieve the vision - happening as a recurring task after a vision has been established.

These approaches to mutual benefit and shared vision need **efficient coordination** but may challenge existing management approaches in several ways – levels of control, responsibility for decision making, and resolution of differences.

Switching from the traditional approach of upfront goal setting is necessary for effective management of

uncertainty, but the co-evolution of goals and partnerships means management has to back out of strict control in mass innovation; the dynamics of this process need careful attention from the beginning (Sailer, Holzmann, Katzy, & Weber, 2014).

Major decisions need mutual buy-in. Who makes the decisions in a collaboration? Leadership could be assigned to one party, or it may be shared. There are costs and benefits to each approach:

“When collaborations are predominantly lead by one partner [there is] little incorporation of [others’] perspectives ... other objectives are rarely explored, the resulting search is often narrow and lacks breadth. When partners share leadership of the collaboration ... they often make slow progress because they need to gain consensus about what to do. Given limited time, the resulting search is often shallow and lacks depth. (Davis & Eisenhardt, 2011).

If the partners are confident that everyone is working towards the same vision, then pursuing it may not always require joint decision making. More fluid leadership and alternating decision control may be better, where each partner has the freedom to contribute towards achieving the vision of the partnership (Surman, 2006). Davis and Eisenhardt (2011) explain that rotating leadership control is associated with greater innovation success and more novel innovation because it:

- accesses the complementary capabilities of both partner organisations;
- involves the ‘zig-zagging’ of objectives that recombines knowledge and resources in useful ways to help in the search for new ideas; and
- tends to mobilise a wider network of people or participants to the collaboration who bring new ideas and perspectives to support innovation (see Section 4.2.3 for more detail).

Davis and Eisenhardt state:

“Alternating decision control is likely to improve innovation performance because it facilitates partners’ access to their complementary capabilities. By controlling decisions at various times, each partner is able to make the crucial choices that bring in desired capabilities to the collaboration and is more motivated to do so.”

Collaboration will often throw up two or more viewpoints on key issues. A common approach is to choose one and discard the other as soon as possible, or to forge a simple compromise that provides clarity and clean, assured decision making (Hill, Brandeau, Truelove, & Lineback, 2015). But the most innovative solutions often arise by synthesising two apparently opposed alternatives into a new option that is better than either. Instead of an either/or approach to alternatives, a both/and perspective can generate new ideas and opportunities (Smith and Lewis (2011)). This requires a willingness to hold onto alternative ideas long enough to find new ways of recombining them.

Discuss commercial potential and IP arrangements at the outset

Establishing trust and pursuing mutual benefit are important, but a level of formality, commerciality and boundary is needed even where personal relationships are very strong. Part of this is recognising commercial issues and explicitly addressing them.

To set expectations and guide technical work in strategic directions it is important for collaborators to discuss and negotiate key issues from the very beginning of their relationship. **Planet Innovation** warned that *“problems and challenges need to be identified and addressed up front or the relationship will be compromised down the track.”*

Leica commented that

“Up front you need to consider and reach agreement on the commercial potential of the product and likely revenue after all costs (regulatory and other) have been taken into account; distribution and marketing channels that will be used (the user interface); and IP management (who will own the IP).”

In other words, the innovation project needs to be considered in terms of its aims for business success, not just narrowly defined technical goals, and the expected allocation of the benefits needs to be agreed. Intellectual property arrangements can be extremely important and a source of major friction if there is a clash of

expectations in later stages.

Voice of Customer research and other data may be needed to establish the potential value of the innovation to its ultimate customers. Once commercial potential has been assessed, decisions can be made about technical aspects of the product.

This early-stage negotiation does not mean that there is no role for serendipity and surprises along the way; partners should be willing to explore opportunities as they arise. But they will also benefit from serious discussion up front of the commercial implications of the project as then understood.

There are other problems involving IP in collaboration, particularly between business and academic researchers. Some businesses related experiences with universities where collaboration was choked off at an early stage by the insistence of the academic partner on retaining so much of the potential IP rights that collaboration offered little business benefit. Others commented that university IP approaches were at times so onerous or poorly coordinated as to create a major barrier. Early awareness and discussion of IP will help to highlight such potential problems for a collaboration.

Use inter-disciplinary teams to challenge perspectives and mindsets

Innovations most commonly arise from the interplay of ideas that occurs when people with diverse expertise, experience or points of view interact with each other (Hill, Brandeau, Truelove, & Lineback, 2015; Petraite & Janiunaite, 2010). Similarly, Rosenkopf & Nerkar (2001) found that the most innovative technologies come from a broad search that spans technological categories and organisational boundaries. Greater exposure to a diverse set of expertise can also help to broaden minds and skills within an organisation, making the culture more amenable to innovation in the future.

The implication is that collaborating businesses should boost their chances of a genuinely novel outcome by putting together teams that span different disciplines, departments and companies. Cross-functional teams – including people with experience in research, development, commercial management and IT – bring together people who think in different ways and will challenge each-other and, as **Planet Innovation** put it, “*broaden how we work and think.*”

Siemens commented that they recruit scientists, engineers, doctors and other researchers for projects globally, constructing a team able to draw on the best ideas from all over the world. This approach is also attractive to the researchers themselves, who can both share their ideas and expand their own horizons. Others have also noted the importance of ‘embeddedness’ in international and local academic networks to the success of collaborative or open innovation (Petraite & Janiunaite, 2010).

Connections to the customer are also immensely important. In some cases, end users may be able to be included in the collaborative team. In others, designers with a close focus on user experience and end user needs can be engaged from the outset of product development.

Siemens also emphasised the need to open the partnership to participation by avoiding prescriptiveness in the early stages. ‘Brainstorming partnerships’ and similar approaches allow more people with a broader set of capabilities to contribute before the project focus ultimately narrows. Involving staff who wouldn’t normally be considered specialists in a project’s field has allowed the business to achieve unexpected and welcome outcomes.

Once a diverse team of people has been assembled, the effective coordination and combination of these different competencies is vital (Petraite & Janiunaite, 2010). Leadership needs to reflect the values behind an interdisciplinary approach: **Planet Innovation**, **Pollenizer** and **Leica** all spoke about the importance of identifying and choosing project leaders or partners for their willingness to challenge the status quo, operate independently and manage ambiguity and disagreement.

Benefitting from diversity will involve passionate discussion and disagreement between team members and partners, though this needs to be done constructively and with a goal of resolution in mind. Hill, Brandeau, Truelove, & Lineback (2015) describe conflict in perspectives and ideas as *creative abrasion*, stating that to

collaborate means making oneself vulnerable to hard questions and push-back. This is an important challenge for project and team leaders to manage.

Allow freedom to explore through flexible structures and practices

This section addresses how business structures and practices can be organised to promote the flexibility needed to meet partner needs.

Ultimately collaborative businesses should avoid rigid structures that dictate how the relationship proceeds and the opportunities that can be realised through it, and instead aim for flexible, lightweight and adaptable structures that actively facilitate interaction between partners; and practices that quickly respond to opportunities as they arise. Case study businesses described governing collaborations through relatively loose memoranda of understanding, not contracts.

Planet Innovation described each collaboration as unique, defined both by the people involved and the circumstances they are working under. They approach collaboration in two stages, Stage Zero and Stage One, to ensure flexibility:

- **Stage Zero:** *“framing up problems, not solutions”*. The parties generate and test ideas, rather than jumping straight to a solution, and try to understand if there is actually an innovation worth pursuing. **Planet Innovation** caution against designing at this stage: *“Once you design a solution it is very hard to back out of it...don’t design while innovating”*. **Leica** also commented that *“Strategic plans can become almost like binding contracts and are not as good for generating breakthrough innovations.”*
- **Stage One:** once there is a clearer concept of the problem to be addressed and of the suite of potential approaches, it is time to move to more detailed assessment of key technical risks and development of a proof of concept.

Staying flexible can be hard for larger more established businesses. Davis and Eisenhardt (2011) state:

“Large companies may desire innovative collaborations with small firms, but a problem arises if their well-established routines for controlling decision making in these asymmetric relationships make it difficult for them to alternate control.”

Getting more out of innovation collaboration may necessitate changes to strategy and structure.

Pollenizer reported that process, structural and cultural constraints can make it difficult to generate more disruptive change within large corporations. Many large corporates had greater success in partnering with small start-ups to develop more radical or disruptive forms of innovation when they managed the collaboration at arm’s length from the rest of their business. With strong commitment from senior management to the partnership, this approach ensures the relationship has the necessary autonomy to truly explore opportunities.

O’Reilly & Tushman (2004) also report how companies have successfully managed to both pioneer radical innovations and pursue more incremental gains simultaneously by separating the business units that manage each type of innovation, while maintaining tight links across units at the senior management level. They describe these as ‘ambidextrous organisations’:

“The separation ensures that the new units’ distinctive processes, structures and cultures are not overwhelmed by the forces of ‘business as usual’. At the same time, established units are shielded from the distractions of launching a new business; they can continue to focus all their attention and energy on refining their operations, improving their products and serving their customers.”

4.3. Learning from experience

Collaborative innovation produces knowledge about both the ostensible subject of the project, and about the process itself and the partners in it. Gathering and using that knowledge is the subject of this section.

Ensure the collaboration partnership interacts with the rest of the business

Interviewees agreed that collaboration should boost the internal innovative activities of an organisation, as long as an active connection is maintained between the two. **Pollenizer** and **Planet Innovation** treat each collaboration as a learning opportunity and a chance to refine their metrics and procedures for future relationships.

People directly involved in the collaboration will have accumulated knowledge as a result, some of it explicit and easily articulated, some of it tacit and harder to identify or express. The challenge for managers is to identify and tightly integrate the knowledge developed and exchanged between their organisation and its partners, to widen and deepen internal knowledge bases and translate this into further commercial innovation success (Petraite & Janiunaite, 2010).

Employee placements can greatly ease transfer knowledge between partners. Physical proximity to collaboration partners – even through visits and exchanges – was important to both **Siemens** and **Signostics**. Employees with ‘T-shaped skills’ – depth of expertise in their own field, combined with an ability to understand and interconnect with other disciplines – are particularly useful for exchange and placement.

Connections back to the business ensure that learnings and opportunities for business development are not lost when a partnership ends. Those involved in the collaboration should not become fragmented from the rest of the business. Their connections and experience can influence their home organisation’s culture. They may place a greater value on flexibility, variety and change. They will certainly have lessons to impart on how to identify, select and manage successful relationships.

Implications for leadership

Leadership plays a strong role in establishing the culture, processes and structures considered above that contribute to collaborative innovation success. While collaboration partners can help fill gaps in a business’ capability, leadership problems are hard to compensate for and make effective collaboration less likely.

In turn, collaboration experience helps inform and improve leadership and the business itself. Self-assessment of partnership potential; understanding of alternative practices and approaches in collaboration partners; looking beyond technical goals to fundamental strategy; these are all pathways to a more effective organisation.

Case study businesses saw the need for leaders to identify and support change agents as particularly important, though difficult in that it involves management willingness to relax some level of control. **Leica** encourages staff who challenge the status quo while working

KEY POINTS

Making the most of the experience involves:

- Ensuring staff from each organisation participate in the innovation teams, and subsequently bring their experiences directly into their home organisation; and
- Ensuring leadership encourages the use of new perspectives drawn from a collaboration to change existing practices.

constructively to achieve goals. **Planet Innovation** considers different views and an ability to respectfully put them forward as assets when recruiting new employees. **Pollenizer** has developed profiling to identify these people, and also run leadership 'boot-camps' to change habits.

Improving Australia's collaboration performance

Collaborative innovation is important. Australia does not do enough of it. Innovative businesses have lessons for what works. What should we do with this knowledge?

Ai Group convened a focus group of innovation-active businesses, researchers and other stakeholders to consider the early findings of this research and the way forward. There was a clear consensus that responsibility for improving Australia's collaborative innovation performance is shared among businesses, research institutions and governments.

Businesses themselves have a central responsibility. Businesses have the most direct gains from better innovation collaboration in terms of improved competitiveness; Research also suggests businesses that underperform on innovation are more likely to underperform in other respects, including customer focus, technology uptake and skilled staff attraction and retention (Microsoft, 2015).

Businesses also have many levers to improve their own performance. Their leadership decisions, investments, strategic plans and other actions play a decisive role in realising the promise of collaboration. This research has identified a range of factors within businesses' control that impact on an organisation's ability to achieve success through collaborative innovation: management style and leadership; organisational structure and processes; corporate strategy and culture; technology awareness; and human capital.

There are very real constraints on the ability of many businesses to make the most of collaboration. As identified in our survey research, lack of internal skills or management time to pursue collaboration is a serious barrier, particularly for smaller businesses. Poor cultural fit or goal alignment with public sector researchers is a widespread problem even for larger better resourced businesses. Trouble finding a partner or dealing with intellectual property can nip collaboration in the bud.

But given the increasing importance of innovation to maintaining competitiveness, businesses should consider whether they can increase the priority of collaboration in allocating scarce time and resources. Absorbing the experiences of peers, such as those underlying this report, can suggest low-cost ways to improve performance.

Ai Group will support this improvement through its research and business support services. As well as this report, our recent concise

KEY POINTS

Responsibility for improving Australia's performance is shared among businesses, research institutions and governments.

Businesses need to recognise the strategic importance of collaboration and invest more effort in pursuing partners and learning from peers' successful practices.

Research institutions should:

- Value business partners' needs;
- Recognise and bridge the cultural gap;
- Ensure IP does not block collaboration.

Governments need to:

- Sharpen collaboration incentives in funding;
- Ensure business programs support collaboration;
- Provide stability and continuity in innovation policy.

guide for businesses undertaking activities with university students, *Uni students – good news for business*, outlines practical requirements and tips for Work Integrated Learning – an excellent avenue for wider collaboration with universities (Australian Industry Group, 2016).

Public research institutions play an equally important role in improvement. They have a huge wealth of expertise and infrastructure that could generate much better commercial innovation outcomes than at present. The level of collaboration with universities in particular is much lower than it should be. Universities increasingly recognise themselves that they need to lift their game, and are bringing industry and other partners into discussions of how to do so. This is positive and should continue.

There are several areas where the best universities are trying to improve, and others should follow.

Researchers should place a higher value on identifying research paths that will meet the commercial needs of their partners. By contrast business experience and research stakeholders consulted by Ai Group suggest that it is common for researchers to start with a research proposal that interests them or targets a hot topic in the academic literature, and try to identify partners who can be persuaded to support the work. While the capability, experience and enthusiasm of a researcher are central to their collaborative value, strong collaboration is much more likely when they start by considering the commercial problems to which business partners are seeking solutions.

More broadly, there is a serious cultural gap between business and public sector research organisations. Their motivations are often starkly different, and businesses find it hard to understand or plan around academic politics, institutional rivalries, public funding issues, or the emphasis on publication over commercialisation. Language and terminology can be serious barriers. Universities can foster better communication over time, including by embedding more students with industry through work integrated learning. Immediate improvements can be achieved by ensuring that all research units include business liaison staff who can translate between the cultures.

Intellectual property issues can be serious barriers to collaboration with public sector research organisations. Universities often approach IP in seriously inconsistent ways, with a confusing mass of idiosyncratic contracts and internal procedures that can be expensive and time consuming for businesses to navigate. Worse, university policies or internal incentives may encourage researchers to claim so much of the potential IP rights involved in a collaboration that it becomes unattractive to business partners. There is great potential to standardise and streamline IP approaches across universities, including standard contracts. Overseas institutions like the Warwick Manufacturing Group demonstrate that universities can prosper by building mutually beneficial long-term relationships with business, rather than taking a shorter term transactional or controlling approach to IP and other issues.

Universities can also support research collaboration through a focus on graduate employability and work integrated learning. Ai Group's forthcoming Graduate Employability Policy Statement notes that industry needs quality researchers who have the ability to work within industry and innovation systems in order to commercialise research. Higher degree by research (HDR) students need the same broad set of employability skills as undergraduates (Australian Industry Group, 2016 (forthcoming)). The recent independent Review of Australia's Research Training System recommended a national placement scheme for HDR students (Australian Council of Learned Academies, 2016). A successful Canadian program supports more than 3000 HDR candidates in industry placements annually. Higher Education providers will need to review their own workforce capabilities in order to meet these challenges.

Governments have a strong interest in innovation and many avenues of influence. There is currently an intense focus on innovation from all sides of Federal politics, and the States are likewise active. This is largely very positive, but there can be a down side to this political focus. Over the past decade Australian innovation policy has been repeatedly overturned as successive governments enacted their own visions. This has involved a great deal of organisational disruption and discontinuity without fostering a commensurate improvement in performance. This includes the common practice of closing a program and subsequently reintroducing it under a new name, sometimes after a significant hiatus. While refinement and improvement of innovation policies

will remain important, all stakeholders consulted by Ai Group emphasised the importance of building greater continuity and stability in the underlying policy structures. All sides of politics and levels of government have a role to play here.

An important substantive improvement that is particularly relevant to the Commonwealth is to sharpen the incentive for collaboration in the programs and funding that governments administer. One of the most significant initiatives in the Commonwealth's recent National Innovation and Science Agenda was to rewrite the formula for allocating research funding. Engagement with end users will now be taken into account, as well as publication track record and higher degree student completion rates, when allocating competitive grants to researchers. This is potentially an earthquake, removing a structural disincentive to researchers who may have wanted to collaborate more. However, close monitoring will be needed to ensure the new formula works as intended. Research income from industry and other end users is the proxy measurement for engagement. While this is a great improvement over the previous system, which placed little weight on engagement, it would be unfortunate if universities moved to overemphasise immediate income and transactional relationships with business over longer-term collaboration with larger ultimate economic impacts.

Finally, governments offer a range of programs to improve and support business capabilities, such as the Federal Entrepreneurs' Programme and Industry Growth Centres and comparable initiatives at the State level. Information about and encouragement towards leading practice in collaboration should be an element of every policy which touches on business performance.

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Appendix B: Survey questions

The following questions were included alongside Ai Group's 2015 Business Prospects Survey, conducted in late 2014 and attracting nearly 350 responses.

Business details

1. Company name:
2. What is the postcode of your primary business location (e.g. registered business address)?
3. In which industry does your business mainly operate? Choose one of the following answers
 - Mining and/or mining services (e.g. exploration, mining engineering or mining processing)
 - Construction (e.g. engineering, infrastructure, commercial, residential construction or contracting)
 - Manufacturing (e.g. making food, beverages, chemicals, equipment, building materials, metals, textiles, furniture)
 - Services (e.g. retail, wholesale, transport, post, IT, media, health, education, cafes, hotels, entertainment)
 - Other (specify)

The following questions are about your business experience in 2014

4. What was your approximate annual turnover in 2014? \$_____
5. How many people did you employ in 2014? _____ people
6. If exporting, what was the total value of exports from your business in 2014? \$_____
7. Approximately what percentage of all your inputs (by value) were sourced offshore in 2014? ____%
8. By what percentage did the following factors change in your business in 2014, compared to 2013?

Please write in the % change if there was an increase or decrease, please write yes in the 'no change' field if there was no change. Leave blank if not applicable.

- Annual turnover
- Number of employees
- Spending on physical capital
- Spending on research and development
- Spending on new technology
- Spending on energy efficiency
- Export income
- Imported inputs (by value)
- Input prices
- Energy prices (inputs)
- Selling prices
- Labour productivity (output per hour worked)
- Unit labour costs (cost per unit produced)
- General business conditions in your sector

9. Were general business conditions in 2014 better, worse, or the same as 2013? Choose one of the following answers

- Better
- No change
- Worse
- No answer

10. If your labour productivity changed in 2014 (up or down), what were the main factors? Please list factors

- Factor 1 _____
- Factor 2 _____
- Factor 3 _____

11. Did you change any parts of your business model, plan or strategies in 2014 due to business conditions? Choose one of the following answers

- Yes
- No
- We don't have a formal business model, plan or strategy
- No answer

12. IF your business was EXPORTING in 2014 or planning to export in 2015, at what AUD/USD exchange rate do your exports become uncompetitive with products from other countries?

___ US cents

13. IF your business was competing with IMPORTS in the Australian market in 2014, at what AUD/USD exchange rate do your products become uncompetitive with imported products from other countries?

___ US cents

14. In 2014, did you collaborate with any other businesses to develop or introduce any of the following areas? Check any that apply

- No we did not collaborate with other businesses
- Products or services
- Marketing methods
- Organisational and managerial practices
- Operational processes
- Other (specify)

15. What types of businesses did you collaborate with in 2014? Check any that apply

- Equipment and technology suppliers
- Private sector research and development companies
- Businesses in our supply chain
- Other (specify)

16. In 2014, did you collaborate with any public sector research organisations (e.g. CSIRO, universities) to develop or introduce any of the following areas? Check any that apply

- No we did not collaborate with any public research organisations
- Products or services
- Marketing methods
- Organisational and managerial practices
- Operational processes
- Other (specify)

17. In 2014, did you experience any barriers in collaborating with public sector research organisations? Check any that apply

- No significant barriers
- Difficulties in aligning research and business objectives
- Difficulties finding the right research partner
- Issues around intellectual property protection and access
- Lack of skills or time available within our business
- Other (specify)

The following questions are about your expectations for your business in 2015.

18. Do you expect the following factors to change in your business in 2015, compared to 2014? (Specify up, down, no change, no answer)

- Annual turnover
- Number of employees
- Spending on physical capital
- Spending on research and development
- Spending on new technology
- Spending on energy efficiency
- Export income
- Imported inputs (by value)
- Input prices
- Energy prices (inputs)
- Selling prices
- Labour productivity (output per hour worked)
- Unit labour costs (cost per unit produced)
- General business conditions in your sector

19. What key growth strategies do you plan to implement in your business during 2015? Rank these options from highest to lowest:

- Introduce new products / services
- Improve sales of current products / services
- Develop new domestic markets
- Develop new overseas markets
- Increase advertising / marketing
- Downsize / reduce operational costs
- Invest in energy supply or energy efficiency
- Invest in new technologies
- Partner with another organisation
- Acquire a new business
- Increase offshore sourcing of inputs
- Other (specify)

20. What factors do you expect will inhibit your business growth in 2015? Rank the following choices from highest to lowest.

- Lack of customer demand
- High and / or variable exchange rate
- Access to affordable finance / credit
- Flexibility of industrial relations
- Skills shortages

- Wage pressures of high wage costs
- Government regulatory burden
- Access to affordable new technology
- Competition from imports / internet sellers
- Higher energy costs
- Insecure access to energy supplies
- Other (specify)

