

Executive Summary

01.

Small-to-medium enterprises are the backbone of the NSW economy, comprising some 99 per cent of all businesses.

At the same time, we have a highly educated workforce and some of the finest research institutions and researchers in the world.

SMEs that collaborate with researchers often see increases in productivity, sales and business growth, supporting their competitiveness in a global economy.



2 out of 3
NSW employees work for SMEs

To date, collaboration between business and research institutions has mainly involved larger enterprises. Many SMEs understand the importance of research and development in driving the innovation economy and what it can do for their long-term productivity and prosperity.

However, partnerships between SMEs and research organisations are still very limited in number and have not yet yielded the types of business outcomes they are undoubtedly capable of. SMEs may not know how to initiate or draw on research expertise or may consider it cost-prohibitive.

Additionally, COVID-19 may have slowed the progress of a number of joint business/research initiatives, but the opportunities for lasting and lucrative collaborations remain vast.

New South Wales has world-leading business acumen and research capability and further collaboration will be essential in driving the information economy of the 21st century.

The NSW Innovation and Productivity Council (IPC) conducted in-depth research and stakeholder consultation to look at the barriers and benefits for SMEs and tertiary institutions forging meaningful partnerships.

This report focuses on the opportunities and challenges for SMEs collaborating with research organisations in New South Wales. The report identifies recommendations to encourage greater SME-research collaboration.

Doubling our current rates of collaboration between SMEs and researchers could see a productivity increase worth up to \$150 million per year for New South Wales.

The benefits of collaboration

Research and development (R&D) is essential to speed up innovation, improve existing businesses, create new products and markets, and enhance daily life.

New business innovation is responsible for over 50 per cent of economic growth in OECD countries.



Increases business competitiveness

Investment in any type of innovation, including technology by a business is a strong predictor of higher revenue, productivity and job growth. Innovation-active businesses are consistently more likely to increase employment, productivity and sales, compared to businesses that do not innovate. For businesses that collaborate on innovation, these benefits are even more pronounced.

Collaborating with research organisations can help businesses gain a competitive advantage through expertise and resources not available to their business, leveraging their intellectual capital, access to cutting-edge technology and equipment, and sharing the investment risk.

Delivers a strong return on investment

For every \$1 invested in collaborative university research in Australia, there is a strong direct return on investment to companies of \$4.50, according to Universities Australia. This does not, of course, mean that research is a one-way bet, and the distribution of returns is likely to be broad.

Collaboration with a university can also increase a company's reputation for innovation, attractiveness as an employer, and the level of positive attitude that consumers have about the company.

Increases business growth and productivity

Research-business collaboration can more than triple the likelihood of a business achieving annual productivity growth. Collaborating businesses are also 70 per cent more likely to develop new-to-world products.

Triple

likelihood of productivity growth with research collaborations



Photo courtesy of UNSW

The benefits of innovation are compounded when collaboration occurs. Research into 7,000 Australian SMEs over a five year period found that companies that introduced innovations increased their annual productivity by 2.7 per cent the following year over their non-innovating competitors, with businesses that introduced the innovations as part of a collaboration increasing their productivity by 4.4 per cent.

Similarly a Danish study of over 6,000 formal collaborations between the University of Copenhagen and businesses found companies achieved a productivity increase of up to 16 per cent relative to a control group six years after the collaboration.

Current context

We have lots of SMEs, but not many that collaborate with researchers

Currently, most research collaboration involves big business, despite SMEs comprising the vast majority of all businesses in New South Wales and two out of three employees in the State working for an SME. Thirty per cent of SMEs are based in regional New South Wales.

Nationally, only an estimated 6 per cent of innovation-active large businesses collaborate in joint R&D projects with research organisations. This however represents double the 3 per cent of innovation-active SMEs that collaborate.

By comparison, collaboration rates for the UK, Germany and Finland are between 27 to 69 per cent for large businesses and 14 to 24 per cent for SMEs.

Australia has world-leading researchers and institutions, but translating research into commercial outcomes is weak

New South Wales is home to some of the world's top-ranked research universities. The State is a world-leader in specialised growth areas such as robotics, smart sensing, materials science, data science, artificial intelligence, water supply, and engineering.

Yet Australia has low collaboration rates, reflected in our poor performance in international rankings. Australia ranks 31st out of 129 countries in innovation outputs in the Global Innovation Index 2018, and 88th for knowledge diffusion. This often means that great research and technology is underutilised or leaves the country and is commercialised overseas and sold back to Australia as a higher-value product.

Collaborating SMEs tend to be in research-intensive industries

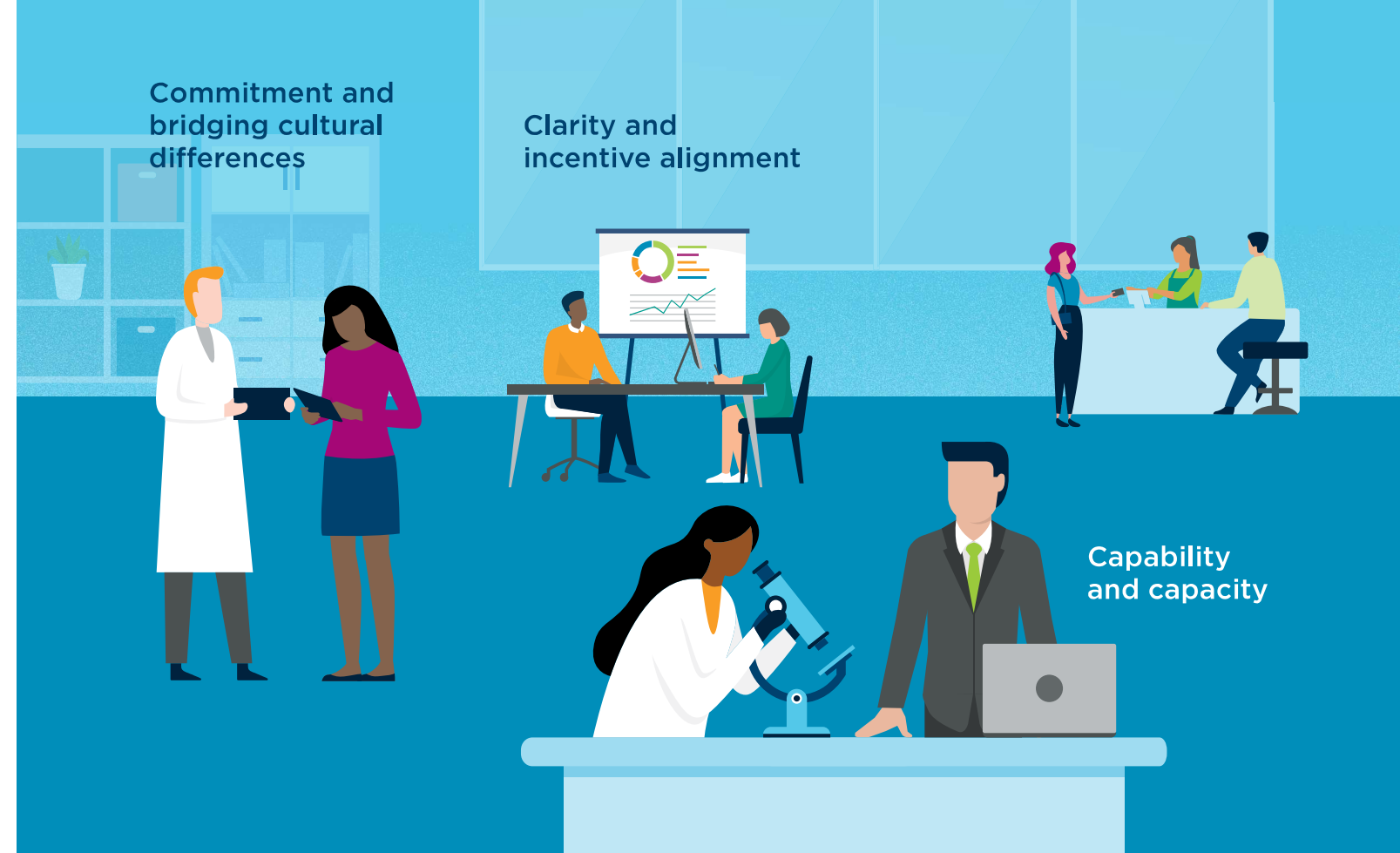
SMEs that collaborate with research organisations tend to reside in research-intensive industries such as medtech, biotechnology, advanced manufacturing or technology with higher levels of patenting activity. Nationally, R&D collaboration is highest in the mining sector, followed by professional, scientific and technical services, utilities and manufacturing.

Different sectors interact with research organisations in diverse ways due to their differing processes and business models. For example, manufacturers may require access to physical infrastructure to enable prototyping, whereas a service business may focus more on process innovation.

Collaboration is only relevant for some SMEs

There is a huge variety of SMEs in the economy—from tradespeople, accounting firms and shops and hotels, to high-tech start-ups, farms, consultancies, medical practices, and IT businesses. While many SMEs don't have an imperative for R&D, many do.

Around 45 per cent of SMEs nationally state they are actively innovating. However, with only 3 per cent of innovation active SMEs collaborating on research, this effectively means that the other 42 per cent of innovation-active SMEs are not collaborating.



Why is there a lack of collaboration?

The challenge is to address barriers to collaboration for SMEs with an imperative to innovate. Barriers include:

- **Differing objectives, priorities, and cultures**—there are challenges forging mutually beneficial collaborations given the objectives of research organisations and an SME may not align.
- **Technical and institutional challenges**—issues to overcome include management of intellectual property, knowledge transfer, and accommodating the SME imperative for nimbleness and flexibility against institutional bureaucracy.
- **Limited connections and networks**—SMEs and universities operate in very different environments.
- **External factors**—external factors can influence decision making and prioritisation, such as the types of performance criteria faced by researchers.
- **Economics and transaction costs**—most SMEs face significant financial and resource constraints.

What does good collaboration require?

- **Commitment and bridging cultural differences**—mutually beneficial collaboration requires commitment from both parties and trusted relationships which are usually driven by effective leaders.
- **Clarity and incentive alignment**—Clear roles and responsibilities that develop a mutual understanding, establish a shared purpose and manage expectations are needed. Issues such as risk allocation and intellectual property need to be quickly addressed with minimal bureaucracy.
- **Capability and capacity**—Collaboration is more likely to succeed if SMEs can identify and evaluate experts, assess the costs and benefits of collaboration and develop problem-solving skills across their workforce.

Recommendations

Government at all levels can play a vital role in bringing these sectors together and this report offers ideas that can encourage greater collaboration between SMEs and researchers. While research organisations, particularly universities, play an important leadership role in actively driving collaboration with businesses.

The IPC recommends seven mutually supporting actions to increase SME collaboration and capitalise on New South Wales’ research strengths. These actions seek to incentivise academics, increase awareness for SMEs and bridge cultural differences. They are:



- 1. Develop a NSW Research Collaboration Pact**—to publicly demonstrate the importance of collaboration and knowledge exchange between research organisations and businesses, particularly SMEs, to improve strategy and collaboration across university and government and translate research into economic and social outcomes.

It should outline the principles to embed collaboration within research organisation practices and include three key areas: incentives for researchers to embed collaboration; bridging cultural differences; and improving project delivery and commercial outcomes.
- 2. Grow researchers’ commercialisation and business engagement capacity**—to build their knowledge of key translation gaps around different stages of commercialisation, how to identify commercial opportunities, how to undertake patenting, how to pursue market validation and scaling solutions, and best practices for engagement.

Building this knowledge will encourage and equip researchers to seek out opportunities to commercialise their research, rather than trying to change the nature of academic studies for universities.



- 3. Develop tools to address organisational differences**—to better manage SME and academic expectations and set the collaboration up for success. Tools could include templates, guides and checklists, and information on intellectual property and contract requirements to ensure SMEs are well informed prior to establishing a partnership with a research organisation.
- 4. Develop a digital platform to facilitate connections**—to establish a new ‘one-stop-shop’ digital platform to help broker connections between SMEs and NSW research organisations. This will significantly improve accessibility and awareness of networks, services, events and potential collaborators.



- 5. Provide financial incentives for NSW SMEs to boost collaboration**—to lower upfront costs for SMEs and bring people together.

Financial incentives could be provided through existing NSW Government programs using tiered funding models that reflect the varying business needs and technical complexity of projects. To address barriers to collaboration in regional areas and help boost employment opportunities, specific incentives could be offered, such as regional student internships.
- 6. Build SME awareness of research partnership benefits**—by training NSW Business Connect Advisors in business-research collaboration to help SMEs better understand how they can collaborate with research organisations.

This would enable advisors to provide information to SMEs on issues such as intellectual property, contract requirements, the ‘proof of concept’ life cycle, and how businesses can develop, sell and scale to position themselves into new and emerging areas. It could also involve helping SMEs to identify and connect with research organisations with the capabilities they need.
- 7. Establish a NSW Innovation Challenge Fund**—to help support local businesses and researchers translate their ideas to market, and/or scale these ideas up.

Innovation challenges can be mission-based rather than product-based, tackling societal, environmental or industrial challenges. Alternatively, they can also be used to focus efforts on government priorities or be defined by an external stakeholder which requires innovation.

Theme	Recommendation
 Incentives for researchers	1 Research Collaboration Pact
	2 Grow researchers’ commercialisation and business engagement capacity
 Bridging cultural differences	3 Tools to address organisational differences
	4 Digital platform to facilitate connections
 Improving awareness and incentives for SMEs	5 Financial incentives for SMEs to boost collaboration
	6 SME awareness of research partnership benefits
	7 NSW Innovation Challenge Fund