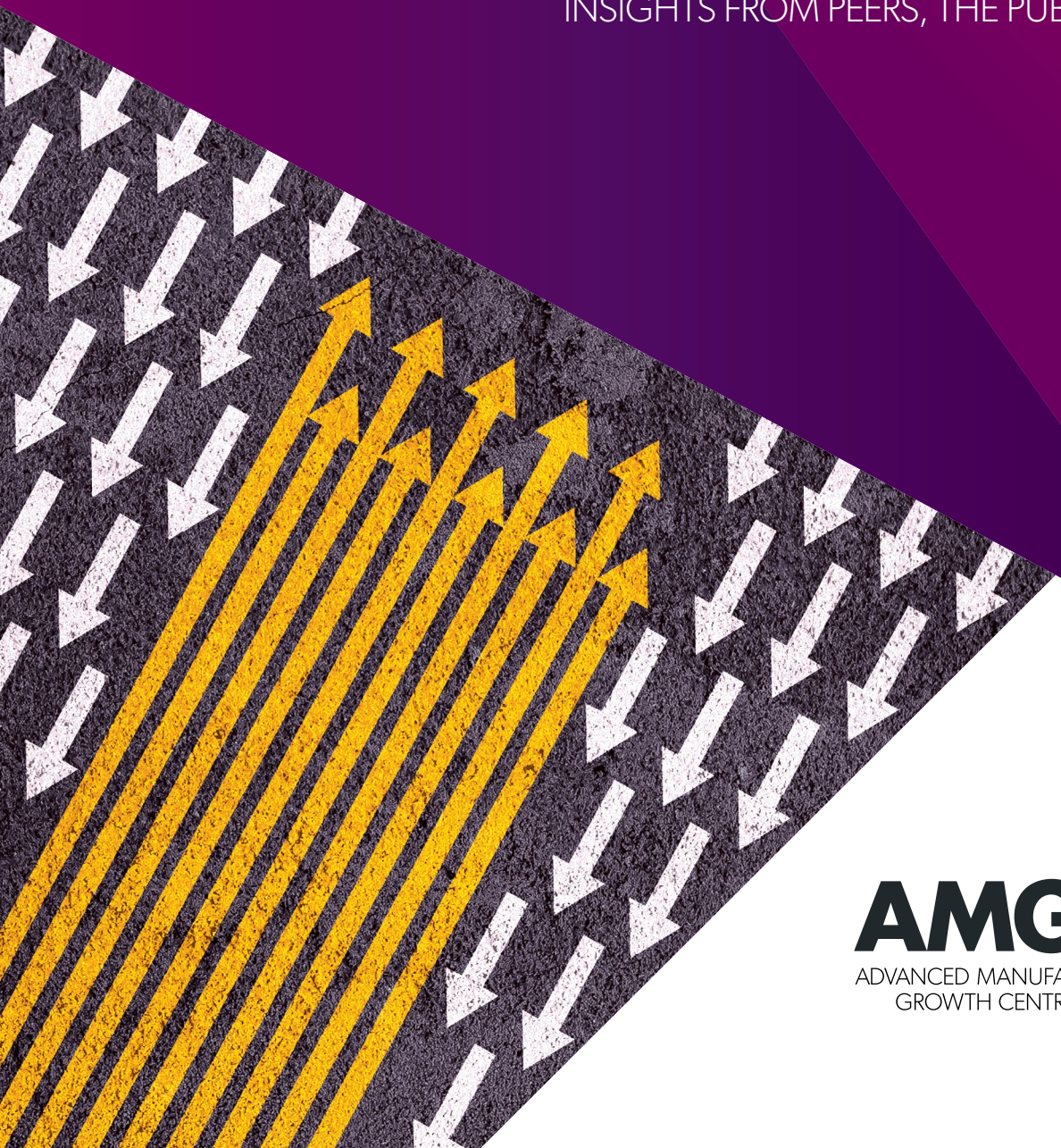
ADVANCED MANUFACTURING

TEN WAYS TO SUCCEED IN AUSTRALIAN MANUFACTURING

INSIGHTS FROM PEERS, THE PUBLIC AND AMGC

2020



AMGC
ADVANCED MANUFACTURING
GROWTH CENTRE LTD

Recognise Australian manufacturing's strength

- [x] Manufacturing is valued
- [x] Product quality is valued

Extend your market reach

- [x] Think outside the box
- [x] Incorporate market reach into your strategic plan
- [x] Use your digital presence
- [x] Maximise opportunities at events

The ten ways to succeed

Build your workforce and culture

- [x] Prioritise company culture
- [x] Encourage internal job shadowing
- [x] Create an innovative environment

Hire the right people

- [x] Hire for skills and culture
- [x] Recruit effectively
- [x] Be an advocate for manufacturing

Access capital

- [x] Update your business plan
- [x] Assess your credit worthiness
- [x] Learn more about grants

in Australian manufacturing

Focus on leadership

- Keep learning
- Be inclusive
- Lead by example
- Stay relevant

Plan for change

- Be proactive
- Prioritise working on the business
- Share leadership responsibilities

Network and collaborate

- Reach out to other manufacturers
- Join supportive industry networks
- Integrate into supply chains

Work with research institutions

- Develop networks and relationships
- Come with a plan
- Share the risks involved in advancement

Adopt technology

- Learn what technology exists
- Keep things simple
- Build relationships with global integrators and universities
- Share with other manufacturers

FOREWORD FROM THE CHAIRMAN

One goal of the Advanced Manufacturing Growth Centre (AMGC) is to conduct research to support the transformation of Australia's manufacturing. With this in mind, I am pleased to present this report, which provides a host of new insights for the benefit of both the industry and government. I would especially like to acknowledge the support of the Department of Industry, Science, Energy and Resources which made it possible for us to complete this work.

There is no doubt that manufacturing is evolving rapidly in Australia and around the world. While some businesses continue to create entire finished products within their own factory walls, it is now more common for companies to specialise in manufacturing specific components to feed into national or global supply chains. Many Australian firms specialise in providing intermediate goods that are used by leading manufacturers around the globe.

Manufacturing facilities are becoming more high-tech, automated and interconnected at a rapid pace. Leading players are collecting and analysing data to improve efficiency and cut downtime. They are investing in industrial robots, installing sensors and increasing communication between machines and other systems to radically transform their operations. One significant outcome is the ability to personalise products for customers at scale.

These changes often enjoy national support via programmes such as America's Advanced Manufacturing Partnership, Germany's Industry 4.0 push, China's Made in China 2025 approach, India's Make in India Initiative and South Korea's Industry Innovation Movement. The British Government has estimated that faster innovation and the adoption of Industry 4.0 could boost the growth of its manufacturing industry by 1.5% and 3% a year – or £455 billion over the next decade in that country alone.

At the same time, the competitiveness of many manufacturers is now being determined by their capabilities in areas that come before and after the production process including research, design, logistics, distribution, sales, and service. These areas are all becoming just as important as the actual act of making a product.

In response to these trends, Australia needs to accelerate the modernisation of its manufacturing industry to keep pace with the rest of the world. This covers everything from how we define manufacturing to our manufacturing processes and leadership skills.

Fortunately, the changes that are occurring in manufacturing can play to Australia's advantage. Our companies are proving adept at becoming intelligent and reliable players in global supply chains. We have a highly innovative, digitally savvy workforce that is well placed to offer world-class products and services. If we make the right moves now, we can further overcome our traditional obstacles of having a small domestic market located a long way from the world's largest economies.

Paul Cooper
Chairman
Advanced Manufacturing Growth Centre Ltd

FOREWORD FROM THE MANAGING DIRECTOR

It has been almost five years since AMGC was established to support Australian manufacturers to advance and succeed on the global stage. Over that time, we have met with thousands of business owners and employees around the country and engaged with many other stakeholders who are shaping the future of the industry.

What we have consistently found is a disturbing mismatch between the positive and inspiring reality of the industry and the often negative perception of manufacturing in a rather uninformed public debate. This report is designed to highlight how wide that gap still is and to provide a more accurate picture of the industry for its leaders and policy-makers. This includes the finding that manufacturing is seen as a critical capability to Australia's economy, innovative, evolving, and of interest to students.

These findings should give manufacturers courage, yet there are certainly challenges to overcome. We draw on extensive discussions with manufacturing leaders, and survey results of the general public and students, to identify key issues and potential solutions. These are captured as Ten Ways to Succeed.

As our chair notes to the left, if Australia is to remain a relevant manufacturing nation, then we need to build competitive, resilient companies that are well equipped to weather changing conditions. We must expand our view of what manufacturing is beyond the assembly line and embrace all parts of the manufacturing value chain. And we must lead to make it happen.

A thriving Australian manufacturing industry requires us to create complex and value-adding products which are globally competitive. The transition for us to advance as manufacturers requires action, and every Australian manufacturer, regardless of sub-industry or size, can 'walk' that way.

This report is intended to help you to make that journey a little easier.

Dr Jens Goennemann
Managing Director
Advanced Manufacturing Growth Centre Ltd

ACKNOWLEDGEMENTS

Thank you to the numerous individuals, manufacturing businesses, industry associations, government bodies, research institutions, and universities that provided valuable input to the Ten Ways to Succeed in Australian Manufacturing Report.

AMGC acknowledges input and support from the Australian Government Department of Industry, Science, Energy and Resources for this report. In addition, the research and analyses from the The Behavioural Insights Team and YouthInsight organisation.

This report is the result of the work of Katie O'Connell, Director Research, AMGC. Her leadership and passion to see Australian manufacturing succeed globally is carried on every page.

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EXECUTIVE SUMMARY

This report is designed to help Australian manufacturers become more globally competitive by: highlighting how successful peers are overcoming common challenges; discussing how the manufacturing industry is perceived by the public and young people; and providing practical advice.

Australia's manufacturing industry supports 1.3 million jobs (directly and indirectly) or more than 10% of Australia's workforce. It contributes more than $100 billion a year to the nation's economy. Even so, there is significant potential to grow the industry further and make it more resilient. This will be realised by encouraging individual manufacturers to become more advanced and successful.

This report draws on three new studies completed by the Advanced Manufacturing Growth Centre (AMGC) in 2019. The first of these involved conducting more than 30 focus groups, roundtable discussions and interviews with individuals within 93 manufacturing companies, industry bodies, government agencies, and universities across Australia. The industry bodies represented approximately 370 manufacturers located around the country, large and small, urban and rural. The second study was a survey of 1,000 members of the Australian public about their perceptions of manufacturing. The third included a survey of 1,000 students and focus groups to learn what they thought about manufacturing and whether it was a potential career path for them.[1]

AMGC discovered that the Australian public highly values the manufacturing industry. It is widely recognised as a crucial part of the nation's economy. Over 65% of the general public surveyed said they believed the nation's manufacturing industry was "important" or "very important" to the economy. Almost 60% thought the industry would stay at the same level or become stronger in the longer-term future.

AMGC found that many Australians understand the industry is changing and see it as an attractive career choice. For instance, interviewees said they like the idea of the industry providing the opportunity to create products that aligned to their values, being able to design and research materials, and the potential to earn a high salary.

WAYS FOR SUCCESS

However, what was revealed is that many manufacturers face obstacles in their existing businesses and are struggling to transform their operations to ensure they remain competitive in the future and attract bright talent.

To enable current and prospective manufacturers to capitalise on the broad support that is available to them and to overcome common obstacles, this report provides manufacturers ten ways for success.

1. **Recognise Australian manufacturing's strength.** AMGC found that manufacturers take deep pride in their businesses yet worry about how the industry is perceived. There is a feeling among some manufacturers that students and the general public do not value manufacturing. However, the evidence is more positive: our survey shows that Australians recognise the importance of manufacturing to the economy and are optimistic about its future.
2. **Focus on leadership.** Good leadership is needed if a business is going to make changes that stick, and it underpins all the ways outlined in this report. Business owners, CEOs or division managers in a larger business can take practical steps to become more effective leaders.
3. **Plan for change.** Proactive planning can help manufacturing businesses grow and take advantage of opportunities. However, it can be hard to know where to start and how to find the time to work 'on' the business, not 'in' the business. This report offers small, practical ways that can make a big difference.

1 For the full methodology and sample, please see Appendix 1.

4. **Network and collaborate.** Collaboration can make firms more profitable and innovative. Manufacturers should mine their social networks for collaborations and avoid 'zero-sum' thinking. They can take advantage of forums and networks that are being run or created with the support of local industry associations and governments.
5. **Work with research institutions.** Australia's most advanced manufacturing companies regularly partner with universities and other research institutions. New tools, awareness of benefits and recognition of the need to remove institutional barriers are making it easier and faster for firms to collaborate and commercialise innovation.
6. **Adopt technology.** The adoption of helpful technologies is often delayed by legacy software and the challenge of finding the right products in crowded markets. Seeking expert advice, making a plan, learning from others and taking small steps can all help firms get started.
7. **Access capital.** Accessing capital is a challenge for many businesses, including manufacturers that need to invest in advanced technology. AMGC discusses a range of options, including government grant processes, and provides advice for raising funds.
8. **Hire the right people.** Hiring the right people is crucial for long-term success. There is a pool of talented people in Australia, as well as international hires, who can be a good fit for roles across the value chain, although attracting these people might require some creative thinking.
9. **Build your workforce and culture.** Many skills gaps can be filled by retraining existing employees. Moreover, company culture has a big effect on the retention of good employees. AMGC lists ways in which to make a business more productive and innovative by focusing on workforce capability and company culture.
10. **Extend your market reach.** Opportunities to export are often 'out of sight and out of mind'. However, Australia's most successful manufacturers, are typically, strong exporters. This section discusses how to find the right overseas partners to increase the chances of success.

THE ROLE OF GOVERNMENT

In addition to these ways, government also has an important role to play in providing information and reducing structural barriers that prevent manufacturers from achieving their goals. AMGC maintains that the government could further support manufacturers by:

- enhancing the quality of information that is available to manufacturers, including data about the manufacturing industry
- facilitating connections between manufacturers and between manufacturers and researchers
- supporting the adoption of more advanced technology by manufacturing businesses
- streamlining government grants and making it easier for manufacturers to access other capital options
- reviewing visas and labour laws, and supporting educational initiatives, to enhance the capability of Australia's workforce
- helping manufacturers export more successfully and reviewing a range of key public policy areas – such as tax, energy, and transport policy – with a focus on the needs of manufacturers
- providing a stable political environment for continuity of policy and programmes.

> "Australia will always be a manufacturing nation"
>
> ~ Karen Andrews, Minister for Industry, Science and Technology

HOW MANUFACTURING IS CHANGING

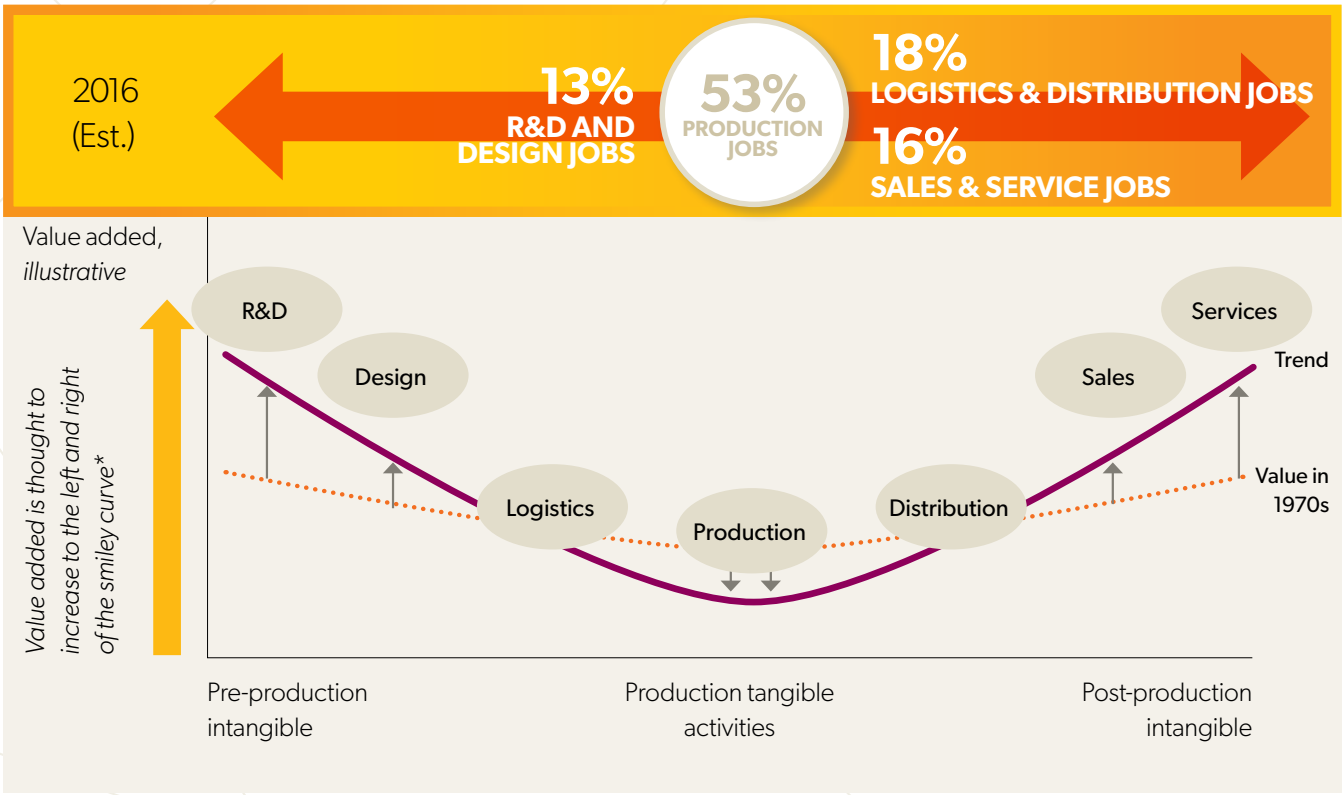
A BROADER VALUE CHAIN

Manufacturing is undergoing a dramatic transformation worldwide. Manufacturers are creatively diversifying their focus across different stages of the manufacturing process, both before and after goods are produced.

As production activities are gradually being decentralised, more Australian manufacturers are recognising the need to compete on value rather than on cost. Most commonly, this involves contributing innovative products, components or services within global supply chains. Most of the global trade volume of goods and services is now made up of intermediate goods or vertical specialisation rather than finished products originating from one country alone.

As a result, the manufacturing industry is moving away from the production of finished goods and towards other activities along the value chain, the 'Smiley Curve', such as research and development (R&D), design, logistics, distribution, sales, and after-sales services (See: Exhibit 1).

Exhibit 1 – The new manufacturing value chain



Notes: The estimates of employment in supporting industries, were calculated using input-output tables provided by the ABS.
* Curve adapted from: 'Interconnected economies benefiting from global value chains', OECD 2013.
Source: ABS, US Bureau of Labor Statistics, Analysis conducted by AlphaBeta.

01

1 RECOGNISE AUSTRALIAN MANUFACTURING'S STRENGTH

AT A GLANCE...

- Manufacturers are typically proud of their businesses yet feel that the general public and students do not value manufacturing as highly as they should.
- Our research shows Australians do recognise the economic importance of manufacturing and are optimistic about its future.
- All those in the manufacturing community must raise their voices to change the misperceptions of the Australian manufacturing industry.

AMGC's face-to-face discussions with manufacturers and industry groups around Australia highlighted that the owners of manufacturing businesses and others who work within them are proud of what their companies and the industry as a whole have achieved. Most owners consulted by AMGC were passionate and dedicated leaders whose sense of identity was strongly tied to their businesses. They felt it keenly – and bore a significant emotional burden – if their company went through difficult times. This was particularly true among the leaders of family-owned businesses.

In turn, manufacturing leaders cared deeply about how the industry was being perceived (or misperceived) by potential employees, students and the general public. Some of AMGC's business participants reported feeling that the industry was not valued by their customers, the government, students or the general public. This belief was shaping their decisions about how much to invest in initiatives for the future, such as upgrading processes and products. Where leaders felt their business or products were not valued, they were less likely to invest.

> "We need people to care about the state of manufacturing. Otherwise, despite how innovative we are or how much we want to collaborate, we will not be given prioritisation."
>
> ~ New South Wales manufacturer

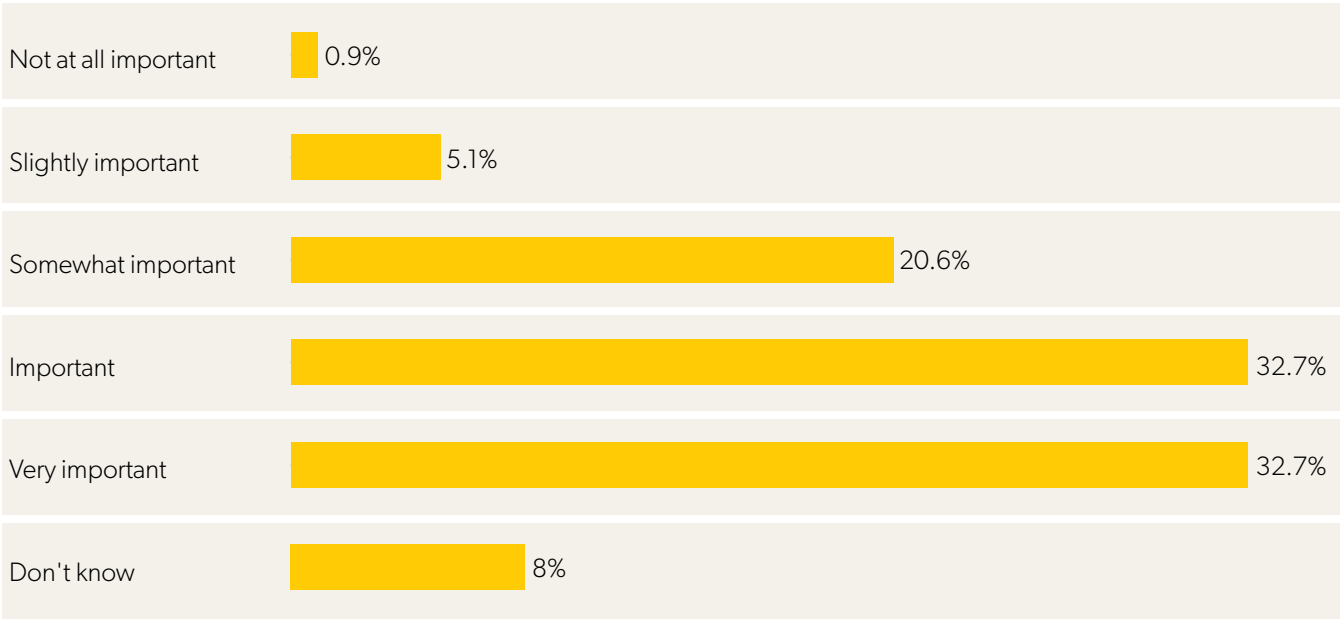
AUSTRALIANS VALUE MANUFACTURING AND PRODUCT QUALITY

AMGC's survey of the general public suggests there is widespread support for Australian manufacturers, a view not many in the industry realise. The public recognised that manufacturing work is changing. About 60% of respondents believed that future manufacturing jobs would be safer, cleaner, more innovative and more creative. They were aware manufacturing offered roles beyond labouring, such as jobs in engineering, operations, sales, and business development. Further, respondents who were familiar with the manufacturing industry held more positive views about careers in manufacturing.

In addition, there was optimism about manufacturing's future and the progress Australian manufacturers could achieve. Around 20% of those surveyed believed the industry would grow stronger in the next year while about 40% believed it would stay the same.

A majority of Australians (**65%**) saw the manufacturing industry as "important" or "very important" to the Australian economy (Exhibit 2).

Exhibit 2 – Importance of manufacturing to the Australian economy, according to the public



Note: Likert scale, *Not at all important* to *Very important*, n=1,000.
Source: AMGC Australian Manufacturing Perception Survey, The Behavioural Insights Team analysis.

1 RECOGNISE AUSTRALIAN MANUFACTURING'S STRENGTH

STUDENTS' INTERESTS ARE ALIGNED

AMGC's research shows that younger Australians are most interested in careers that offer a high degree of job security, meaning longevity of opportunity, and that the majority do not believe this is offered by manufacturing. However, the analysis and survey interactions with this audience shows there is considerable overlap between what young people are seeking and what manufacturing can offer. The survey further shows, that more comprehensive promotion of the career path benefits that manufacturing offers could be effective in raising awareness and leading more students to consider a future in the industry.

See: Hire the right people section – Way 8.

INTERNATIONAL PURCHASING MANAGERS CARE ABOUT AUSTRALIAN VALUE MANUFACTURING AND PRODUCT QUALITY

According to AMGC's Sector Competitiveness Plan, international purchasing managers and customers identified technology, performance leadership, and availability of service support as the main reasons they buy Australian products. Purchasing managers highly weighted design and technology leadership as the most important factors other than cost, with an approximate 60% weighting collectively.[2]

HOW TO CHANGE THE PERCEPTION

All those in the manufacturing community must raise their voices to change the misperceptions of the Australian manufacturing industry. Regardless of industry or role in a company, below are a few simple ways how anyone can make a difference.

Educate yourself and others. The manufacturing industry is significantly diverse and has changed dramatically even in the past decade, making it quite probable to possess outdated information and formed misperceptions. It is important for leaders to continuously learn, upgrade skills, and increase knowledge to stay relevant in this rapidly changing industry.

If manufacturers feel stuck for advanced manufacturing examples, then visit AMGC's Manufacturing Academy. It is a free on-line resource for all manufacturers. Click on "Insider Advice" tab to access short videos by Australian manufacturing companies across Australia and industries.

Be conscious of language. Language is powerful. Spoken words add up and create stories. Those stories eventually shape and create realities. Terminology used to describe manufacturing, where phrases such as "Australian Manufacturing is dying" is not only untrue, but can further exacerbate the dialogue surrounding manufacturing practices, investments, and career interest. See Exhibit 4 for counterarguments that can be used against common myths about manufacturing.

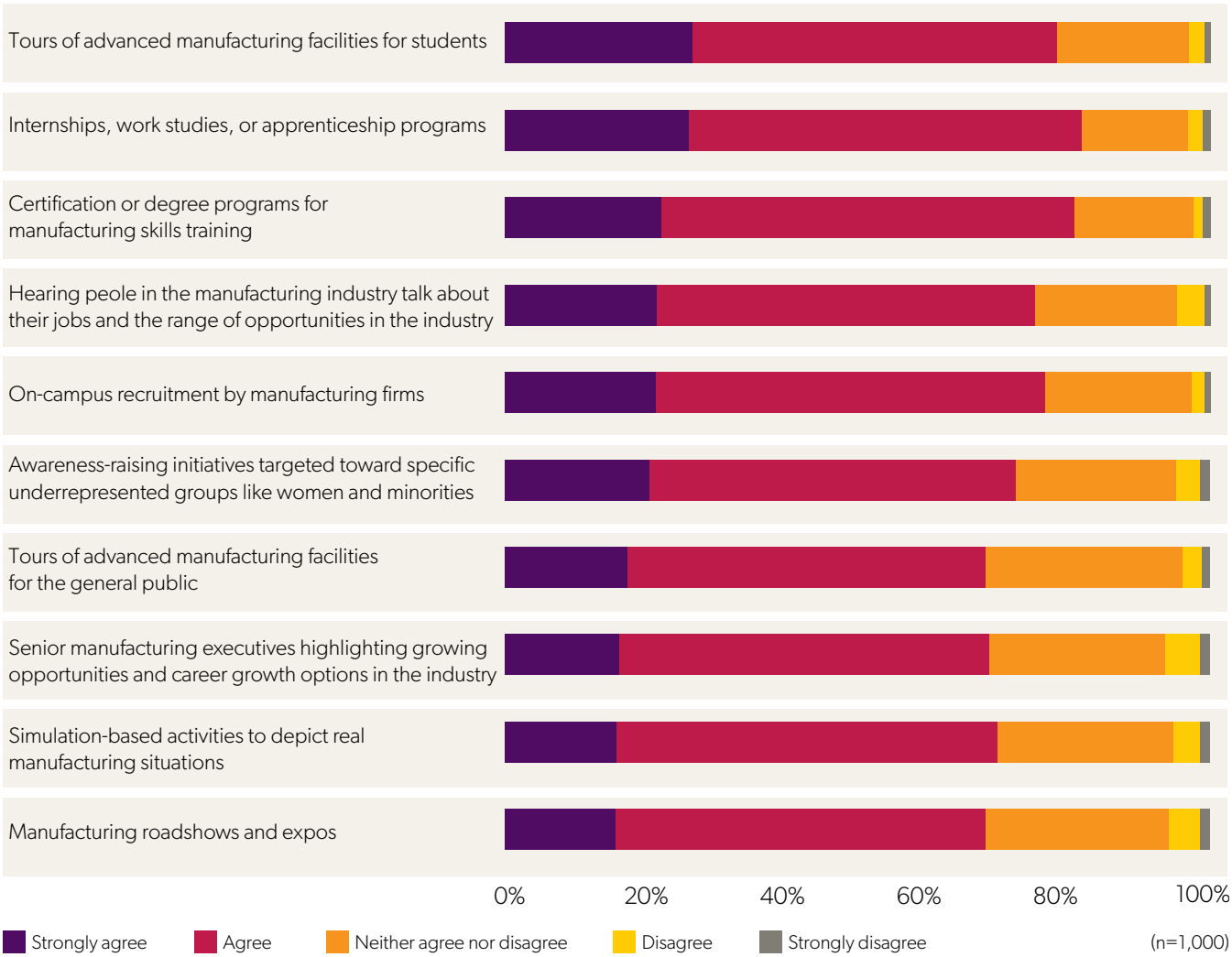
2 Advanced Manufacturing Growth Centre Ltd (2016), *Sector Competitiveness Plan* (pp. 32–33).

Work with local schools and TAFEs. Internships, work studies, and tours of facilities were the most highly rated for making manufacturing more attractive to the Australian public (Exhibit 3). Working with local schools has been found to be mutually beneficial for schools and manufacturers. When manufacturers work with local schools and TAFEs, students' awareness and perception of the industry improves. Further, it has shown to be a pathway to help manufacturers hire the right people.

See: Hire the right people section – Way 8 for how LA Services works with local schools.

Let the media know when it is misinformed. The public forms ideas from everyday experiences and exposure. According to AMGC research, approximately 45% of Australians who are familiar with the manufacturing industry receive their information from TV news, newspapers, or online news. The stories that these platforms share will inevitably shape the conversation about manufacturing. If a programme on any media platform has a negative or uninformed comment or storyline about manufacturing, then say something. Discuss with others the misperceptions being presented, write a response to the company and to the programme with the opportunity to share your company's manufacturing story.

Exhibit 3 – Programmes that would make manufacturing more attractive to the Australian public



Note: Mean agreement, Strongly disagree to Strongly agree, n=1,000.
Source: AMGC Australian Manufacturing Perception Survey, The Behavioural Insights Team analysis.

1 RECOGNISE AUSTRALIAN MANUFACTURING'S STRENGTH

Exhibit 4 – Common myths vs. reality

	Myth	Accurate?	Reality
1	Manufacturing is dying in Australia	x	The Australian manufacturing industry contributes more than $100 billion annually to the nation's economy and $9 billion in exports every month. The industry supports 1.3 million jobs, directly and indirectly, accounting for more than 10% of Australia's workforce.
2	Australians don't value Australian manufacturing	x	65% of Australians think manufacturing is "important" or "very important" to the economy 62% of Australians think manufacturing is "important" or "very important" to the standard of living in Australia
3	Purchasing managers and customers don't care about Australian manufacturers	x	c. 60% of international purchasing managers identified technology, performance leadership, and availability of services support as the main reasons they like to buy Australian products
4	Government isn't supporting manufacturing	x	It's a priority – "Australia will always be a manufacturing nation" – Karen Andrews, Minister for Industry, Science and Technology
5	Australians believe labouring is the only job in manufacturing	x	Australians believe manufacturing offers roles in engineering, operations, sales, and business development
6	Australians believe manufacturing is an industry in decline	~	c. 20% of Australians believe the industry will grow stronger in the next 12 months, c. 40% believe it will stay the same, and c. 25% believe it will become weaker
7	Young Australians do not want to pursue a career in manufacturing	~	Students value job security and believe manufacturing doesn't offer this. However, this is driven by a lack of knowledge, and providing information to students corrects these misperceptions.
8	Parents do not encourage their children to pursue a career in manufacturing	~	There is an equal split (27%) between parents who would and would not encourage their children to pursue a manufacturing career (majority c.46% neither agreed nor disagreed). However, the reasons for not encouraging a career in manufacturing were driven by misperceptions, particularly around the strength of the industry and its ability to provide job security.

Source: AMGC Advanced Manufacturing: A new definition for a new era (2017); The Ai Group Economic Resource Centre. Performance of Manufacturing Index (PMI); AMGC Australian Manufacturing Perception Survey, The Behavioural Insights Team analysis; AMGC Sector Competitiveness Plan (2017); AMGC Young Australian Perception Survey, YouthInsight analysis.

It's essential that Australian manufacturers join the conversation and work to change the perception of the industry from the inside, out.

"We all know that the nature of manufacturing is transforming, and signs of expansion and prosperity are building. The best Australian manufacturers are collaborating and innovating, to offer exceptional technical solutions and highly customised services that enable them to increase exports and compete on the world-stage. So promote this. Whether you're talking to a journalist or a friend at a BBQ, explain what manufacturing really looks like.

"When describing the manufacturing transformation, you can touch on elements such as the adoption of robotics, automation, and Industry 4.0. You can highlight that the adoption of advanced technology is boosting job growth. This job growth is possible because advanced technologies improve product quality and consistency, and help make businesses more productive and therefore better able to compete internationally. All this means customers are happier and placing more orders, which means more jobs.

"It's also important to describe how advanced technology is helping to make existing jobs easier, removing monotony and reducing tough manual labour. More and more, the manufacturing workforce is made up of engineers, designers, programmers, and people with a wide variety of skills.

"Wherever possible, try to illustrate these innovations with case studies or stories based on your own experiences. If you're trying to debunk myths about manufacturing, the best way to do so is with real-world examples. Describe innovation within your business or supply chain, or beyond."

Michael Sharpe
National Director Industry
Advanced Manufacturing Growth Centre Ltd

02

2 FOCUS ON LEADERSHIP

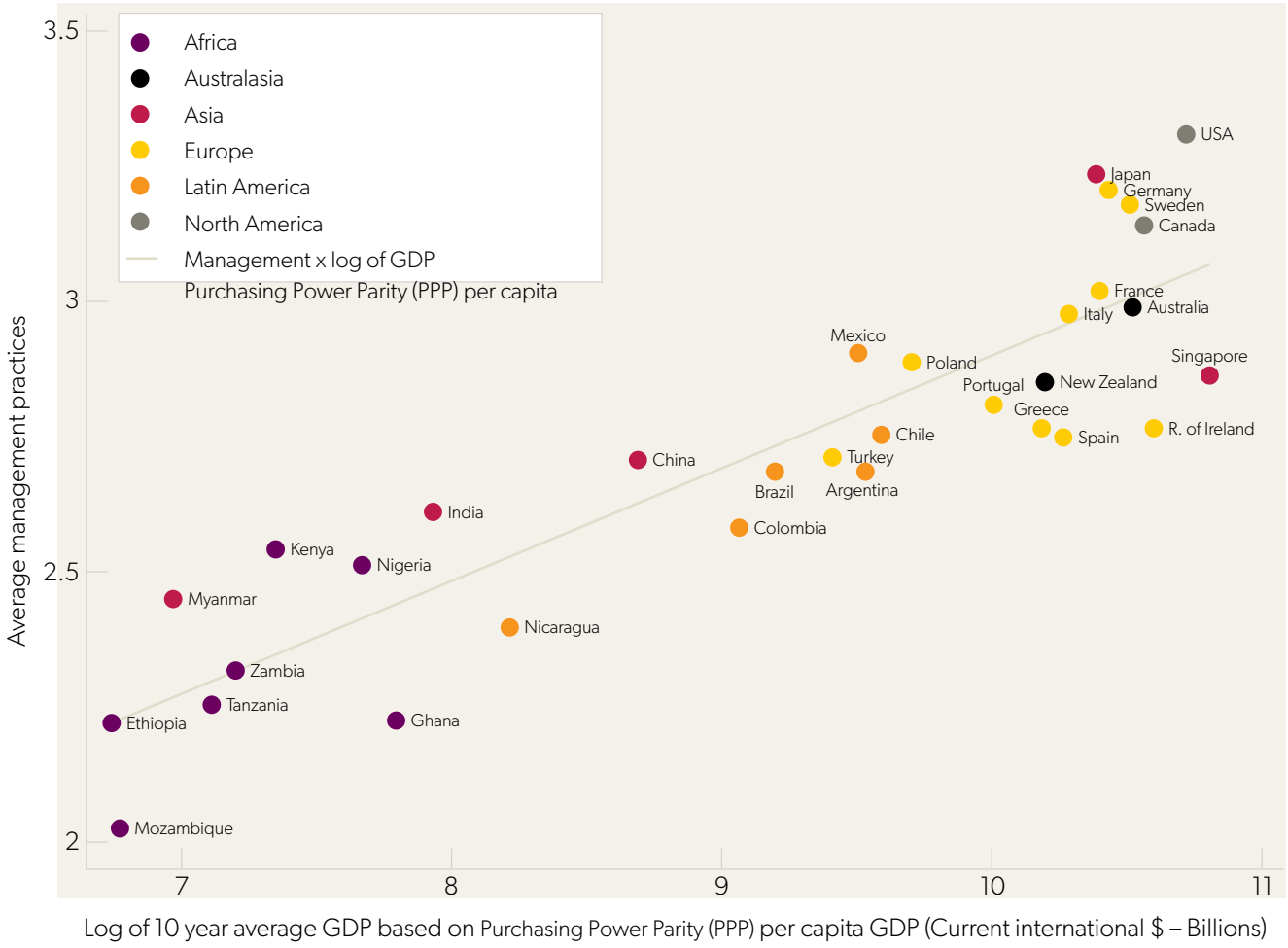
AT A GLANCE...

- Good leadership is needed to ensure changes stick and it underpins all the ways towards advanced manufacturing outlined in this report.
- Leadership is needed whether you are the business owner, CEO, or a manager within a larger organisation.
- Leadership is a skill that can be learned, and you can take practical steps to become a more effective leader.

It is difficult to thrive as an advanced manufacturer without strong leadership. Unfortunately, the Australian manufacturing industry appears to lag that of other nations when it comes to management capabilities. For example, a study of global data shows Australian manufacturing executives underperformed compared to their US peers when it came to managing staff. As shown in Exhibit 5, Australia has an index score of 3.00 points, compared with 3.28 for their US peers, according to the London School of Economics, World Management Survey 2015. When compared with companies with similar GDP, Australian manufacturers ranked below the US, Japan, Germany, Sweden, Canada, Great Britain, and France.[3]

3 Centre for Economic Performance London School of Economics (2014). *Management Matters: Manufacturing Report 2014* (p. 14). Retrieved from https://worldmanagementsurvey.org/policy-business-reports/business-reports/

Exhibit 5 – Australian management practices rate as average compared with countries with similar GDP



Source: Centre for Economic Performance London School of Economics (2014). Management Matters: Manufacturing Report 2014 (p. 14). Retrieved from https://worldmanagementsurvey.org/policy-business-reports/business-reports/

Leaders are crucial in promoting the industry, employee engagement and commitment to their company,[4] and unlocking higher productivity.[5] Evidence shows that effective leadership is associated with better all-round organisational performance[6], and with a company culture that supports innovation.[7]

Even managers within large national or global organisations may have more power to influence teams or implement changes than they believe. In AMGC interviews, many executives in larger organisations reported wanting to see senior leaders take initiative and make more changes at a local level. Other respondents noted it can take time to develop strong leadership skills. The following actions can help owners and managers succeed.

4 Barling, J, Weber, T & Kelloway, E K, (1996), "Effects of transformational leadership training on attitudinal and financial outcomes: A field experiment", Journal of applied psychology, 81(6), p. 827.

5 Dvir, T., Eden, D., Avolio, B. J., & Shamir, B. (2002). Impact of transformational leadership on follower development and performance: A field experiment. Academy of management journal, 45(4), pp. 735–744.

6 Trottier, T, Van Wart, M & Wang, X, (2008), "Examining the nature and significance of leadership in government organizations", Public administration review, 68(2), pp. 319–333.

7 Jung, D I, Chow, C & Wu, A, (2003), "The role of transformational leadership in enhancing organizational innovation: Hypotheses and some preliminary findings", *Leadership Quarterly, 14*(4–5), pp. 525–544. https://doi.org/10.1016/S1048-9843(03)00050-X

2 FOCUS ON LEADERSHIP

HOW TO BE A LEADER WHO ENCOURAGES INNOVATION

Keep learning. It helps to have a 'growth mindset' about leadership skills and to believe that effective leadership is not innate but can be developed through hard work, good strategies, and input from others.[8] Leadership training programs are effective at promoting learning and results for companies[9], and there are training programs aimed at driving cultural change in companies. AMGC's Manufacturing Academy is a good place to start to learn what other manufacturers are doing for leadership.

Remind yourself of your ability to make change. Shifting culture can feel like a difficult task, but managers can use self-efficacy exercises to remind them they can implement change. One self-reflection exercise is for a manager to think back to a situation where they implemented a change or completed a challenging task successfully.

Craft a sense of 'us'. Leaders are effective when they acknowledge they are part of a wider group that shares values and goals. To engage employees, it is important for leaders to create this shared sense of identity – 'we as a group' rather than 'I as an individual'. They can do this by using 'us' and 'we' language, acting in the group's interests and giving 'us' purpose and meaning in a wider context.

Lead by example. When implementing cultural change, it is important to demonstrate the behaviours leaders would like to see in their employees. Leadership is as much about what you do as what you say – employees will look to you for guidance about how they should behave.

8 Dweck, C, (2016), "What having a 'growth mindset' actually means", Harvard Business Review, 13, pp. 213–226. http://thebusinessleadership.academy/wp-content/uploads/2017/03/What-Having-a-Growth-Mindset-Means.pdf

9 Lacerenza, C N, Reyes, D L, Marlow, S L, Joseph, D L & Salas, E, (2017), "Leadership training design, delivery, and implementation: A meta-analysis", Journal of Applied Psychology, 102(12), p. 1686.

Set reminders to follow through. Despite having the right intentions, it can be easy to get caught up in the day-to-day running of a business. Leaders can incorporate good habits into their daily lives by setting timely reminders. For example, they might set a reminder before a team meeting about the importance of involving staff in decisions and write down their plan for achieving this.

Engage in collaboration. Remember to explore opportunities to collaborate with innovative peers and universities.

See: Network and collaborate – Way 4

> "People need the visual of what to do before they start doing it. You need to transition from being a professional enthusiast to an enthusiastic professional leader."
>
> – Victorian manufacturer

03

3 PLAN FOR CHANGE

AT A GLANCE...

- Proactive planning can help manufacturing businesses grow and take advantage of opportunities, rather than be reactive.
- It can be hard to know where to start, and how to find the time to work 'on' the business, not 'in' the business.
- Small, practical steps can make a big difference. AMGC lists a range of resources and programmes that are available to help manufacturers.

Strategic planning enables leaders and companies to create a roadmap to guide them as they pursue growth. A roadmap should form the foundation for all other business decisions – from high-level to day-to-day decisions. Nearly every manufacturer AMGC engaged acknowledged it was crucial to have a clearly defined purpose and practical plan for making the changes required to realise their vision. They reported it was important that planning be iterative, to act quickly when needed to get ahead of market trends and competitors.

However, this research found that Australian manufacturers differed widely in how effectively they planned for and implemented change. Some companies understood how to plan and were reaping the competitive advantages it brings. Others struggled to know where to start or to find time and 'headspace' to devote to planning over pressing day-to-day operational needs. Those companies which did not engage in proactive and strategic planning were seen to be missing out on opportunities to grow and improve their business.

> "You get all of these competing ideas, but you need to know where growth will come from... It is overwhelming."
>
> ~ New South Wales manufacturer

> "There is a fear of stepping out of the business operations to work on a business plan or strategy."
>
> ~ Victorian manufacturer

According to the Australian Bureau of Statistics (ABS), only 11.8% of manufacturers report having a written strategic plan in place (31% reported having a plan but not written down) – See Exhibit 6. Further, a surprising 42% of manufacturers reported not monitoring any key performance indicators (KPIs) – See Exhibit 7.[10]

Furthermore, according to the survey, of the 38% of manufacturing firms that review KPIs, only 13% of companies have long-term KPIs – more than one year.[11] This raises concerns that many manufacturing companies are not thinking in regard to long-term performance – which minimises their resilience.

FINDING TIME TO WORK ON THE BUSINESS

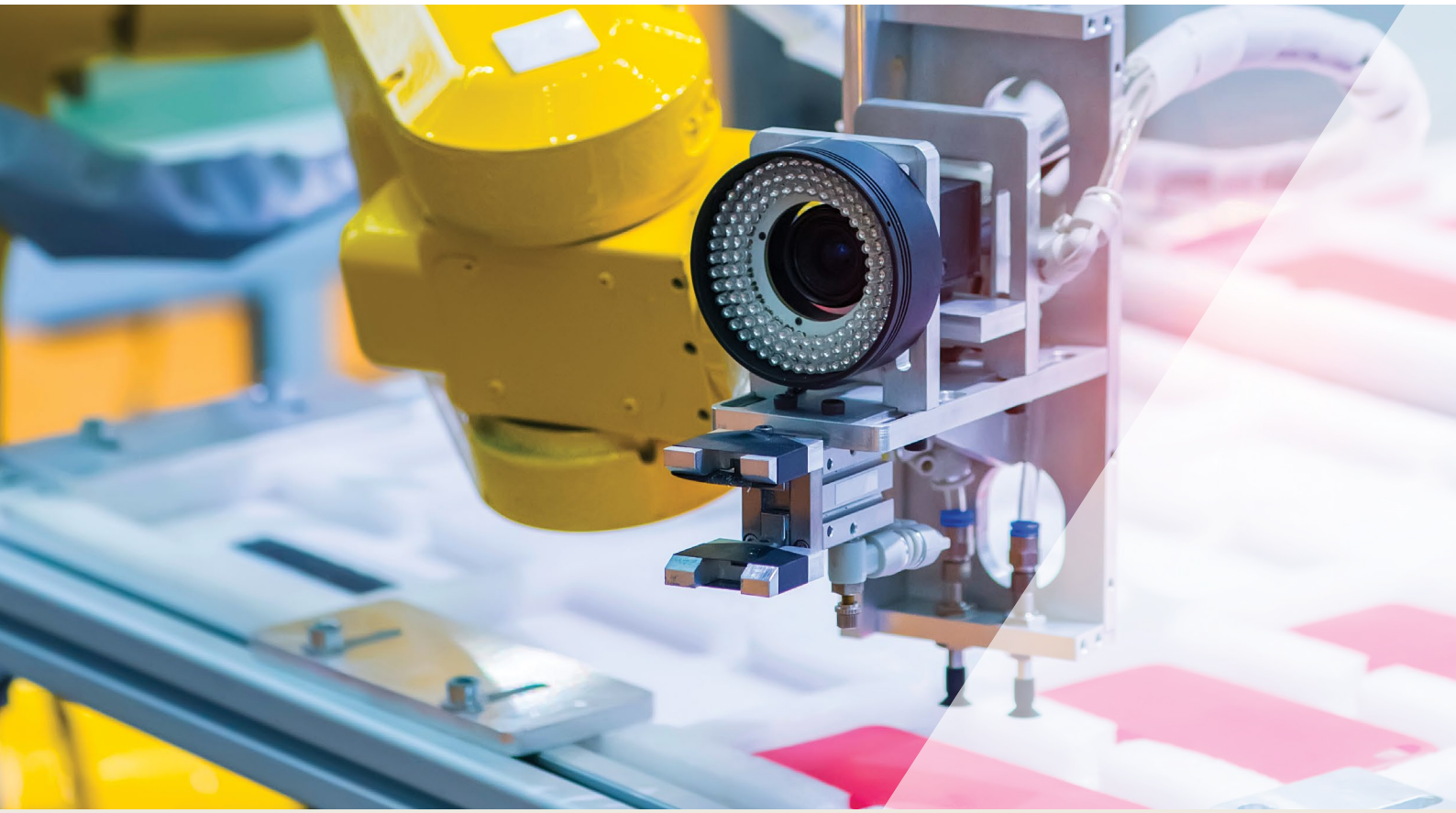
In 2018, 87% of Australian manufacturers with one or more employees were small businesses (1–19 employees)[12] and few had staff dedicated to working on business plans. This means that one of the major barriers to developing and implementing strategic plans is simply finding the required resources to allow business leaders to plan.

In AMGC's focus groups, manufacturing business leaders spoke about the lack of resources available for planning. "I have no staff to work entirely on this," one said. While some said they were responsible for strategy as the company's CEO or senior manager, they often found themselves prioritising the day-to-day running of the business. Some said they were already overwhelmed by their range of responsibilities and did not have the headspace to take on a planning role as well. "Having the bandwidth is perhaps the biggest challenge," one reported. Others feared that if they prioritised planning – working on their businesses – their operations would suffer due to the lack of oversight.

10 Australian Bureau of Statistics (2017). *8172.0 – Management and Organisational Capabilities Module of Australian Business, 2015–16.* Retrieved from: https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8172.02015-16?OpenDocument

11 ibid.

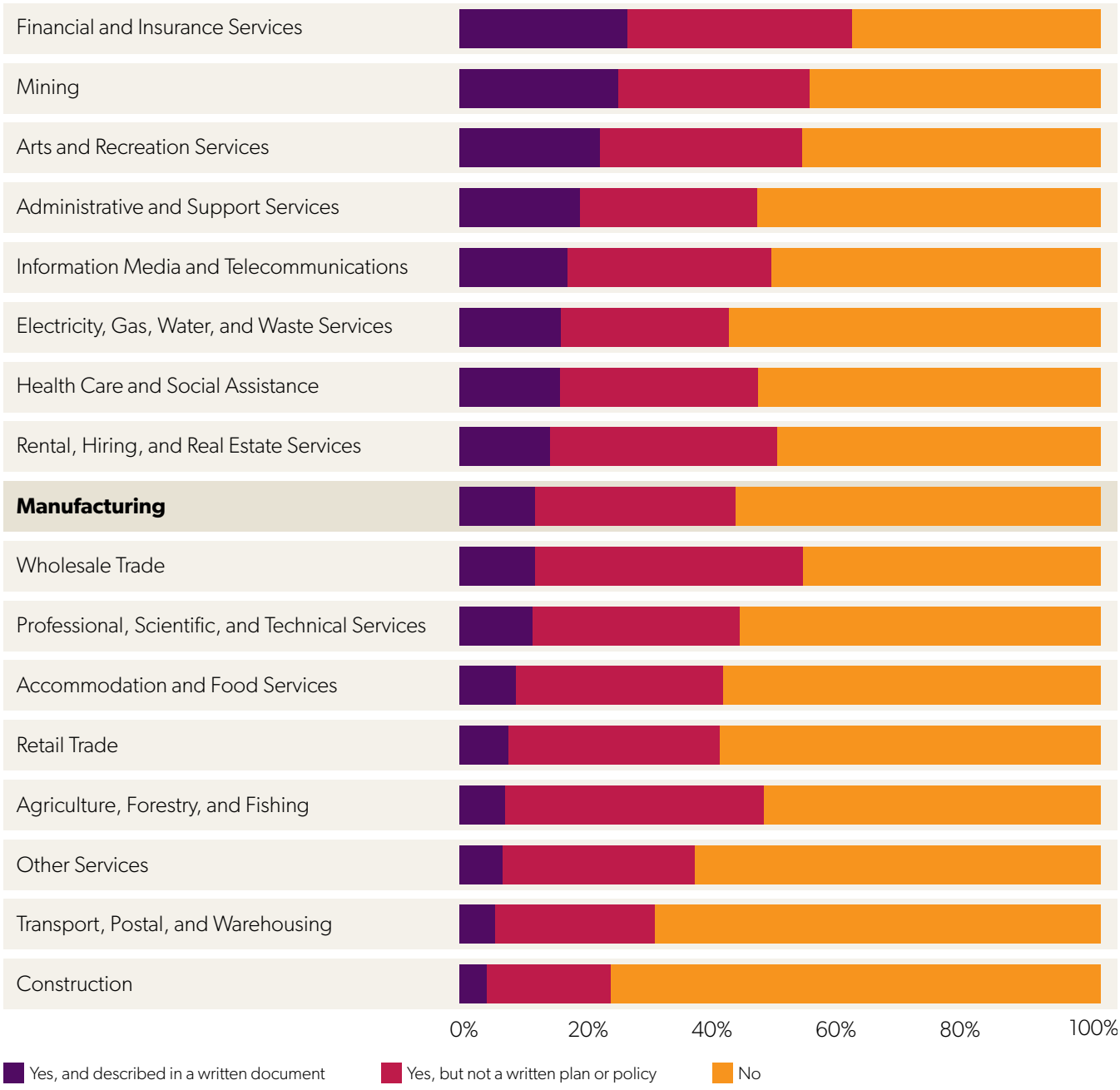
12 Australian Bureau of Statistics (2018). *8165.0 – Counts of Australian Businesses, including Entries and Exits, Jun 2013 to Jun 2017.* Retrieved from: https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8165.0Jun%202013%20to%20Jun%202017?OpenDocument



3 PLAN FOR CHANGE

Exhibit 6 – Australian manufacturers with a strategic plan or policy in place

Strategic Plan or Policy in place, by industry, 2015–16

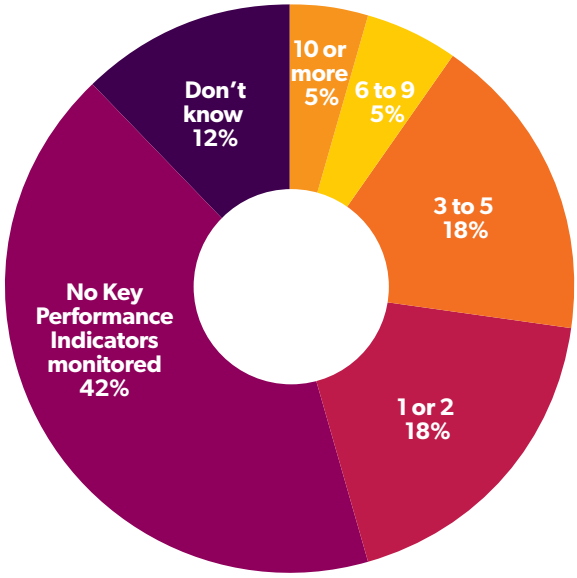


Notes: 'Manufacturing' includes sub-industries as defined by the ABS (food product; beverages and tobacco; textile, leather, clothing, and footwear; wood products; pulp, paper, and converted paper products; printing; petroleum and coal product; basic chemical and chemical products; polymer and rubber products; non-metallic mineral product; fabricated metal products; transport equipment; furniture and other manufacturing).

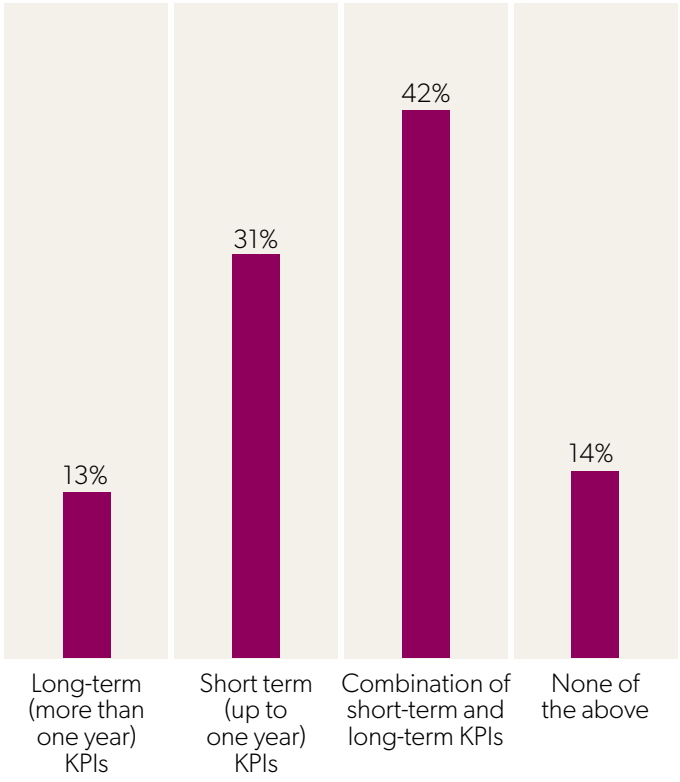
Source: ABS, 8172.0 – Management and Organisational Capabilities Module of Australian Businesses, 2015–16. https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8172.02015-16?OpenDocument

Exhibit 7 – Australian manufacturers' monitoring of key performance

Proportion of businesses monitoring KPIs, Manufacturing



Period of time covered by KPIs by manufacturers



Notes: 'Manufacturing' includes sub-industries as defined by the ABS (food product; beverages and tobacco; textile, leather, clothing, and footwear; wood products; pulp, paper, and converted paper products; printing; petroleum and coal product; basic chemical and chemical products; polymer and rubber products; non-metallic mineral product; fabricated metal products; transport equipment; furniture and other manufacturing).

Source: ABS, 8172.0 – Management and Organisational Capabilities Module of Australian Businesses, 2015–16. https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8172.02015-16?OpenDocument

3 PLAN FOR CHANGE

HOW TO PLAN

While manufacturers are typically experts in their own areas of business, not all manufacturing business owners, founders, and managers have received formal training in business management and strategic planning. Further, it is common for leaders to prioritise operational and business-as-usual tasks because that is where they feel most competent and comfortable.

However, it is essential for leaders to develop the skills – and take time – to focus on the organisation's overall direction. The following practical tips will help start the process.

Block out time and commit to planning. It is much easier to spend time on things you are good at, which for many business owners is the day-to-day operations of the business. To reap the rewards that strategic planning can offer, it is important to block out periods of time on a regular basis and to commit to dedicating this time to strategic planning. Even an hour a week or a few hours a month can suffice. Protect this time and make contingency plans for what you will do if something gets in the way.

Prioritise planning by including planning steps when developing KPIs. Make sure there is a clear link between time and resources invested in strategic planning and return on investment for the business. As a starting point, develop short- and long-term goals involving planning that might not necessarily have profit as the short-term indicator of success. For example, the goal might be clear, actionable steps that are linked to planning, such as, "Over the next six months, I will engage a planning consultant and develop a strategic plan for the next two years".

Use online resources. Online tools and courses can be a great place to start engaging in strategic planning. They will introduce core concepts and questions to ask when thinking about the future of the organisation. Examples include AMGC's Manufacturing Academy and the Department of Industry, Science, Energy and Resources' planning tools (https://www.business.gov.au/Planning).

Consider your entire value chain. A strategic plan for an advanced manufacturing business should focus on the entire manufacturing value chain, including R&D, design, logistics, production, distribution, sales and services. Plans should consider workforce, market (domestic and global) and resilience (Exhibit 1 on page 7 shows the new manufacturing value chain).

Access expert advice. Many businesses can benefit from expert advice in finance and marketing. Experts include consultants, research institutions or peers who have successfully engaged in planning with their own businesses Also see the Entrepreneurs' Programme as follows.

Leverage the Entrepreneurs' Programme.
The Department of Industry, Science, Energy and Resources has the Entrepreneurs' Programme Business Management stream, which partners firms with experienced business advisors and facilitators who provide:

- **Business evaluation**, which involves developing a business evaluation action plan with recommended strategies for business improvement or growth. The evaluation includes up to 12 months' mentoring to help implement the strategies.
- **Growth services**, which help businesses develop their unique growth plan. Advisors and/or facilitators mentor the business through the implementation of their plan, facilitating access to knowledge and expertise, research, funding, and other assistance.
- **Supply chain facilitation**, which works with firms to strengthen their supply chain and improve their ability to access new markets.

Apply for a Business Growth Grant. These grants are available under the Entrepreneurs' Programme. They provide matched funding of up to $20,000 to hire an expert to help implement advice and strategies recommended in one of the above Entrepreneurs' Programme services.

Partner with AMGC. AMGC works jointly with industry and research partners to encourage deep collaboration for greater commercial outcomes, increase connections into global supply chains, foster knowledge sharing, and promote development of advanced skills – including management skills. These co-funded projects can help business leaders to structure their ideas into viable commercial outcomes.

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4 NETWORK AND COLLABORATE

AT A GLANCE...

- Collaboration can make firms more profitable and innovative by sharing ideas, discovering opportunities, and spreading risk.
- Companies can reap these benefits by mining their personal networks, seeking out established networking programs and putting aside zero-sum thinking.
- Industry associations and forums, and governments, offer a range of networking opportunities. Firms should also promote their willingness to collaborate.

Australian manufacturers want to connect and collaborate with other manufacturers. Every manufacturer AMGC consulted wanted to talk to and collaborate more with others in the industry. **Yet only 12% of Australian manufacturers currently collaborate with other firms.[13] The evidence shows a need for more manufacturers to proactively seek out new connections and opportunities.**

> "The sense of isolation in Australia makes it difficult. You get really focused internally on what your own business is doing. You don't get to see what others are doing."
>
> ~ New South Wales manufacturer

13 Advanced Manufacturing Growth Centre (2017), *Advanced Manufacturing: A new definition for a new era.*

For example, a randomised controlled trial of more than 2,300 firms in China found an 8.1% increase in revenue among firms that participated in a year-long structured networking program, compared to those that did not have meetings.[14] Collaboration can give a business an advantage by providing access to the latest research, technology, or experts in the field. By forming partnerships, a business gains knowledge and the potential to grow.[15]

> "The biggest opportunity is to collaborate."
>
> ~ Queensland manufacturer

> "The mate down the road is not our competitor, we need to work together for global competition."
>
> ~ South Australian manufacturer

COLLABORATING IN THE SUPPLY CHAIN

Collaboration is particularly needed in relation to accessing lucrative supply chain opportunities. AMGC reported a sense of camaraderie among industry players who recognised that collaboration would lead to greater opportunities for all involved. Some thought that partnering with other organisations across the supply chain would reduce risk by enabling them to adapt their business processes. For example, partnering with distributors was viewed as a safer export strategy than attempting to go alone, with one manufacturer saying that exporting alone is "full of danger".

PEER MANUFACTURERS AND INDUSTRY ASSOCIATIONS

The voice and influence of peers matter in manufacturing. The evidence shows that peer groups are effective when trying to encourage businesses to adopt new practices and technologies. New ideas, products, and behaviours can spread rapidly through networks, especially where interactions between people are frequent and connections between them are strong.[16,17]

The most innovative manufacturers AMGC consulted said that collaborating with peers was a strong driver of change. They found that having social connections with other businesses that were trying new things motivated them to pursue technological advancements in their own businesses. However, many reported that it can be hard to know with which businesses to partner and with which to make time to connect.

AMGC has found that many of the best connections start informally. For example, in addition to collaboration on projects, social connections were used to find export opportunities. Manufacturers cited the use of informal social networks as an effective strategy for workforce recruitment.

14 Cai, J, & Szeidl, A, (2017), "Interfirm Relationships and Business Performance", Quarterly Journal of Economics. Retrieved from: https://academic.oup.com/qje/article/133/3/1229/4768295

15 Department of Industry, Innovation, and Science: Business, (2018), "How collaboration and innovation can help your business". Retrieved from: https://www.business.gov.au/change-and-growth/innovation/collaborate-and-innovate

16 Rogers, E, (1995), *Diffusion of Innovations*, 4th edition, New York, Free Press.

17 Valente, T, (1996), "Social network thresholds in the diffusion of innovations", *Social Networks*, 18, pp. 69–89.

4 NETWORK AND COLLABORATE

Company: Axiom Precision Manufacturing

Headquarters: Wingfield, SA

Employees: 51 to 200

Key Industries: Aerospace, Automotive, Defence, Electronic hardware, Food and beverage, Machinery, Medical devices, Mining, Metals and Rail.

Axiom Precision Manufacturing

Established in 1979, family-owned Axiom Precision Manufacturing specialises in advanced manufacturing for several diverse industries.

According to Axiom's Aerospace and Defence Manager, Fred Hull, "Our supply chain is critical. I'd go so far as to suggest that our supply chain is equally as important as our customers.

"With an extensive, diversified supply chain, you give yourself the flexibility and capability to take on larger projects, and a greater number of projects. Regardless of what your clients might need, you'll be confident in your ability to source the materials and hardware needed for any project. If you have a narrow supply base, filling orders in a timely fashion quickly becomes a juggling act; a broad supply chain leaves you in an exponentially better position."

Axiom's supply chain has evolved over the years, in line with the evolution of the company. "For many years, Axiom operated only in the automotive industry; our supply chain had basic requirements. But as we diversified the business and pushed into sectors such as aerospace, defence and medical devices, we needed new suppliers that were certified to the quality assurance level we required. This is particularly important to ensure our certifications to ISO 9001 Quality, AS 9100 Aerospace, and ISO 13485 Medical Device are maintained," said Hull.

Hull has some sage advice for manufacturers who are looking to diversify their own supply chains. "When expanding our supply chain, we looked for companies that were already supplying to the sectors we were pushing into. An existing presence gives you the confidence that the supplier already has all the checks and balances, and certifications needed to deliver a quality product. Word of mouth recommendations from colleagues are also a great way to shortlist potential suppliers."

HOW TO BUILD NETWORKS AND EXPAND WITHIN SUPPLY CHAINS

Manufacturers can use many different methods to increase their collaboration with industry peers, important players in their local and global supply chains, and other bodies such as research institutions.

EXPANDING NETWORKS

Harness the power of networks. Nurture existing networks and create new networks to learn from others and identify opportunities for innovation. Look for indirect connections, such as those made by AMGC through its events and extensive reach with industry associations.

Build new networks by reaching out to other manufacturers. Many manufacturers that wish to collaborate do not know where to start to find others with common interests. Taking small steps to develop a network and get a better understanding of potential partners can uncover opportunities. These might include picking up the phone to talk directly to peers and contacting research groups to better understand how they work with manufacturers. In addition, local councils are a good place to start to enquire about meetings and can provide a list of industry network groups.

Avoid zero-sum thinking. It is easy to assume that an industry peer's gain would be a net loss to another's business, and vice versa. This sort of thinking makes it hard to realise the potential gains that can arise from sharing ideas and other types of collaboration. It also does not **reflect the reality of today's highly globalised manufacturing market: where competitors are spread around the world, collaboration between Australian neighbours can lift the international competitiveness of both firms**.

EXPANDING SUPPLY CHAIN CONNECTIONS

Register with supply chain portals. Manufacturers should join portals such as the Industry Capability Network (ICN) or ensure that any existing portal registrations are kept up to date. The Centre for Defence Industry Capability (CDIC) can help Australian businesses enter the defence industry.

Visit trade exhibitions. Smaller manufacturers may not have the scale to exhibit at trade shows but can still benefit by visiting these events. Typically, it makes sense to invest in exhibiting when a company has a distinct product or service and the exhibition is well aligned to its target market.

Meet with larger suppliers. For example, the Australian Government's Department of Defence procures most of its major capabilities from global defence companies, known as prime contractors (primes). These primes then rely on their domestic and international supply chains to build, deliver, and sustain projects. A good way to become known to larger suppliers such as defence primes is to participate in projects with universities that also involve those larger groups.

Join industry network groups. Being part of groups, such as HunterNet,[18] can help manufacturers stay up to date with technology developments and network with other groups that share common interests. In addition, Regional Development Australia (RDA) is a national network of local leaders who work across all levels of government, businesses and local communities to support the economic growth of their regions.[19]

Have and maintain a quality website. Companies should ensure their website clearly outlines capabilities, products and services, and is easy to search. Global and local leaders regularly search for local partners and opportunities to deliver projects and collaborate.

18 HunterNet Co-Operative Limited is an industry cluster located in regional New South Wales. More information can be found at https://hunternet.com.au/about-us/

19 RDA is an Australian Government initiative designed to engage at local regional levels to boost economic growth and development: https://www.rda.gov.au/

4 NETWORK AND COLLABORATE

Company: R&R Murphy
Headquarters: Gateshead, NSW
Employees: 11 to 50
Key Industries: Metals, Mining, Defence

"Collaboration is key" – R&R Murphy

In 2004, Rod Murphy established R&R Murphy – a specialist fabrication and engineering firm in Newcastle. Since then, Rod has built his business from a small workshop with a dirt floor, to an award-winning company, exporting to 21 countries.

According to Murphy, "I had to make a decision in 2011. In three or four years, would I wander out to pasture? Or, would I take the company to another level? I chose option two. Diversification and collaboration have been key."

"Unfortunately, in Australia, we don't do enough collaboration. Yet, it's essential. To succeed, collaboration must be embedded in Australian manufacturers' DNA. We all need to collaborate with companies that have different strengths to our own, in order to win big projects."

Rod has leveraged several organisations – such as HunterNet, Hunter Defence, AiGroup, and AMGC – tapping into their existing networks to foster collaboration with companies such as BAE Systems, Lockheed Martin, and Boeing.

He is also working to form a consortium of local manufacturers to bid on large defence procurement projects. "With forecast government expenditure of $200 billion in the next 10 years, there is so much opportunity in defence. However, many of the projects are too big for any one SME to deliver alone. So, I've started the ball rolling with another three manufacturers. My goal is to get these local companies to work together to win bigger slices of the defence market. This will benefit our entire region, increasing employment, and enhancing skills and technology."

A passionate and inspirational man, Rod is now sharing his expertise and experience to encourage other Australian manufacturers, speaking at industry events, and mentoring other manufacturers. "I am keen to present our story to other manufacturers – to explain what we've done to get to where we are. I want manufacturers to think, 'If Rod Murphy can do it, then I can do it too.' I want to give back to my industry and inspire other people."

> Rod over the years had instilled a workplace culture at R&R Murphy that centred on resilience that promoted innovative thinking, respect & positivity at the workplace. Employees were encouraged to do what was best for the business. Decision making was encouraged & collaboration was ingrained in the employees' mindset."
>
> ~ https://rrmurphy.com

Vale Rod Murphy

Rod Murphy passed on Tuesday 24 March 2020.

Michael Sharpe, National Director Industry at AMGC, shares his very fond experiences collaborating with Rod over the past number of years.

"I believe it is a privilege to meet with manufacturers around Australia, and to share experiences and to build new collaborations. It was always better when Rod could join me.

In Cairns and Townsville, Rod connected with local industry leaders and his advice was valued on the way he had built R&R Murphy.

Together, we had a terrific site visit with the robotics welding researchers at the University of Wollongong. Rod was fascinated by the latest technologies and was setting about to implement this technology at his own firm. He cared deeply about the team at R&R Murphy and wanted the best for them, always talking about upskilling and quality improvements to grow the business.

At UNSW, Rod connected with world leaders in solar panel technologies and realised the need for new fabrication methods. Rod engaged with an open mind and developed ways to assist.

We had terrific conversations about the future for manufacturing in Australia. Rod was a mentor to many and readily shared his enthusiasm. We were both excited about the growing space industry. I invited Rod to speak at our Space Industry event in Sydney. He gave a passionate talk to an auditorium full of people and at the end he had them lined up to shake his hand and simply talk. We laughed about how next time I would have to issue tickets for people to speak with Rod Murphy!

Farewell, friend."

05

5 WORK WITH RESEARCH INSTITUTIONS

AT A GLANCE...

- Collaboration with researchers is a hallmark of Australia's most advanced manufacturing companies.
- The process of identifying and working with the right researcher can be slow and time-consuming.
- New tools, new awareness of the benefits, and new recognition of the need to remove institutional barriers are making it easier for future collaborations.

Innovation is vital to success in manufacturing. One of the best ways to develop new products and processes is to partner with a research institution. According to AMGC's research, the most successful Australian manufacturers invest on average 1.13 times more in collaborating with other organisations to complete R&D than less successful companies.[20] Additionally, AMGC research found that deeply competitive firms can outperform during industry downturns by working with research institutions to build in resilience.[21]

There is substantial scope to increase research collaboration among businesses or between businesses and specialised research groups, such as universities and CSIRO.[22] According to the Organisation for Economic Co-operation and Development (OECD), only 18.6% of Australian manufacturing firms with 5–19 employees collaborate with other firms and research institutions for the purpose of innovation, rising slightly to 24.6% for firms with 20–199 employees, and 34.2% of firms with 200+ employees.[23]

20 Advanced Manufacturing Growth Centre, (2017), *Advanced Manufacturing: A new definition for a new era*, p. 17.
21 Advanced Manufacturing Growth Centre, (2018), *Advanced Manufacturing: Building resilience in Australian manufacturing*, p. 33.
22 For example, through CSIRO's funding schemes.
23 Advanced Manufacturing Growth Centre, (2016), *Sector Competitiveness Plan*, p. 38.

FINDING THE RIGHT RESEARCH PARTNER

During the focus groups and other discussions, manufacturers reported mixed results in engaging with universities and other research groups.

While some manufacturers had great outcomes, others found it frustrating to work with research groups or did not know where to start. In some cases, manufacturers did not have a clear understanding of the capabilities of local and national research institutions. They wanted more clarity around what support is available, such as access to laboratories, equipment and other technology, and the specialisations of researchers and students.

> "I just want one person to call up to ask for help."

~ New South Wales manufacturer

The issue is often a misalignment of goals, cultures, and timeframes between research institutions and the manufacturing industry. On the one hand, research institutions are often risk-averse, focused on producing research outputs, and used to completing R&D activities over periods of years. On the other hand, manufacturers typically want to achieve specific commercial goals in a shorter timeframe to get products to market as quickly as possible.

> "Manufacturing companies don't want to give their service … to cater towards your research paper."

~ Queensland manufacturer

These issues can be challenging when manufacturers have committed funds to support research and will not see a return on their investment until a product is successfully commercialised. A further obstacle can be reaching agreement on who will own the intellectual property (IP) that arises from a research partnership. A number of manufacturers AMGC spoke to had found that research institutions sought a significant share of any IP and were unwilling to compromise.

> "We don't have the time or the money for a five-year project."

~ Queensland manufacturer

Fortunately, there are numerous examples of manufacturers that have navigated these obstacles, such as FormFlow (See: FormFlow case study – overleaf). Successful groups typically contacted many different research institutions before finding the right partner. Companies persisted until they found the best collaborator and were willing to work through contractual issues. Each understood that there is a need for greater operational transparency, so that parties could understand each other's priorities early in the process.

5 WORK WITH RESEARCH INSTITUTIONS

FormFlow

Basic information

Company: FormFlow Pty Ltd

Headquarters: Waurn Ponds, VIC

Employees: 11 to 50

Key Industries: Metals, Construction

FormFlow's university – industry collaboration experience

Metal manufacturing company FormFlow has collaborated with Deakin University to commercialise a process that allows corrugated steel to be cold bent at a sharp angle. This creates a distinctive look; seals out air, water, animals, and embers; and does away with the need for roof capping and flashing. The global sheet metal market is worth $1 billion a year.

In addition to the corrugated metal sheet bending process, the company has designed a business model based on manufacturing and licensing FormFlow bending machines to sheet metal manufacturers. This will enable other manufacturers to include bends in customised sheet metal orders and demonstrates that FormFlow has created IP that can unlock significant revenue and employment opportunities throughout the sheet metal industry.

FormFlow was created by Dr Matthias Weiss, Matt Dingle, and Ross and Lyn George of Geelong engineering business Austeng. Deakin University is a strategic R&D partner, with Weiss a long-time head of sheet metal research at the university's Institute for Frontier Materials, and the leader of one of the world's biggest dedicated roll-forming research groups.

According to Dingle, university – industry collaboration is vital for manufacturing in Australia. "We don't have large organisations that have the broad skills base that you find in some of the huge multinationals overseas. But if we pool our efforts collectively, then we have an incredible knowledge base and capability," he says.

Dingle adds that there is value in sharing IP with a research institution. "There's a real opportunity in collaboration. You're much better off owning 50 or 60 per cent of something that's really valuable than 100 per cent of something you've never been able to make work."

HOW TO COLLABORATE WITH RESEARCH INSTITUTIONS

Use a variety of search strategies when looking for opportunities. Many collaboration opportunities can be found online. For example, industry bodies offer research programs: AusIndustry has an Innovation Connections grant program to help firms find the right university or research institute to meet their needs, and CSIRO's Data61 platform, Expert Connect, allows firms to search by a field of knowledge, institution, or name to find an expert. The Source IP tool from IP Australia allows businesses to connect with Australian public sector research organisations.

Develop networks and relationships. Manufacturers should spend time networking with individuals from research groups – or others who work with them – and make it clear they are open to collaboration. Firms can develop a short pitch to use when meeting potential collaborators.

Come with a plan. When firms meet researchers, it's ideal that they have done their homework and have a clear idea of what they want to achieve. This can save significant time for all parties.

Understand each other's priorities. Manufacturers and research partners may have different priorities but can still engage in mutually beneficial collaborations. The key is to discuss objectives and needs upfront to ensure all parties are satisfied with a project's direction and outcomes.

Share the risks involved in advancement. It is important to minimise the risks involved in investing large amounts of time and capital in innovation. This can be a key part of any collaboration, such as agreeing to share required machinery and facilities.

06

6 ADOPT TECHNOLOGY

AT A GLANCE...

- New technologies can deliver significant productivity gains and make companies more responsive to customers and competitive changes.
- Many manufacturers are being held back by lack of information and a sense they need to make 'all-or-nothing' changes.
- Getting expert advice, making a plan, learning from others, and starting small can all help firms to implement the right technology for their needs.

Implementing new technology – from new production machinery to the latest digital communications systems – can be critical to improving productivity and providing higher value products and services. Businesses that have implemented digital technologies in particular enjoy better real-time data about consumer behaviours and demand than non-digital manufacturers.[24]

Yet, Australia's manufacturing industry lags behind other industries in its use of digital technology and its perceived future importance (see Table 1 and Exhibit 8). This is a concerning trend, as businesses that do not see the importance of digital technologies are unlikely to invest in them.[25]

"Leadership needs to drive technology adoption, otherwise it won't happen. However tempting it may be to do things the way they've always been done, you don't try and holdback the tide, you learn to surf."

~ Anonymous

24 Office of the Chief Economist, (2018). *Industry Insights: Future Productivity,* Department of Industry, Innovation and Science, p. 47. Retrieved from: https://publications.industry.gov.au/publications/industryinsightsjune2018/documents/IndustryInsights_3_2018_ONLINE.pdf

25 Ibid.

Table 1 – Manufacturers' use of digital technology

Indicators of adoption	**Percentage**
Firms with a web presence	65.1
Firms with a social media presence	40.0
Firms that received orders via internet	57.8
Firms that used paid cloud computing	29.5
Indicators of future adoption	**Percentage**
Introduced or changed a digital business strategy	5.2
Approved investment in new digital tech/infrastructure	8.0
Introduced new training programs to upskill staff	8.2
Indicated data analytics is important	10.1
Indicated artificial intelligence is important	14.7
Indicated Internet of Things (IoT) is important	15.0
Indicated cyber security is important	26.7
Indicated E-commerce capability is important	27.2
Indicated Cloud Technology is important	36.7

Notes: 'Manufacturing' includes sub-industries as defined by the ABS (food product; beverages and tobacco; textile, leather, clothing, and footwear; wood products; pulp, paper, and converted paper products; printing; petroleum and coal product; basic chemical and chemical products; polymer and rubber products; non-metallic mineral product; fabricated metal products; transport equipment; furniture and other manufacturing). "Importance" was measured on a Likert scale from 'Not at all' to 'A major extent'. Importance in the above table was found by adding the prevalence for participants reporting 'A moderate extent' and 'A major extent'.

Source: ABS, (2017). 8129.0 – Business Use of Information Technology, 2015–16, Table 12 and 18. https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8129.02015-16?OpenDocument

Davo's Fencing Clip

Davo's Fencing Clip is working hard to keep up with demand.

Nicole and Rod Davidson operate an engineering business on their farm in a small regional town in western Victoria. Combining their two passions they have invented a new type of fencing clip that has attracted buyers from across Australia and from international markets.

Replacing the awkward staple method, Davo's Fencing Clip is becoming wildly popular on social media. Nicole set up a Facebook page as an alternative way to spread the message, which was recently picked up by a YouTuber and taken to a global audience. In just five days they received serious enquiries from more than ten countries. In fact, Nicole has not spent a dollar on advertising. Instead, she posts on popular buy/swap/sell Facebook groups. Plus, the brand has received its Australian Made certification reaching an audience of over 2 million potential customers.

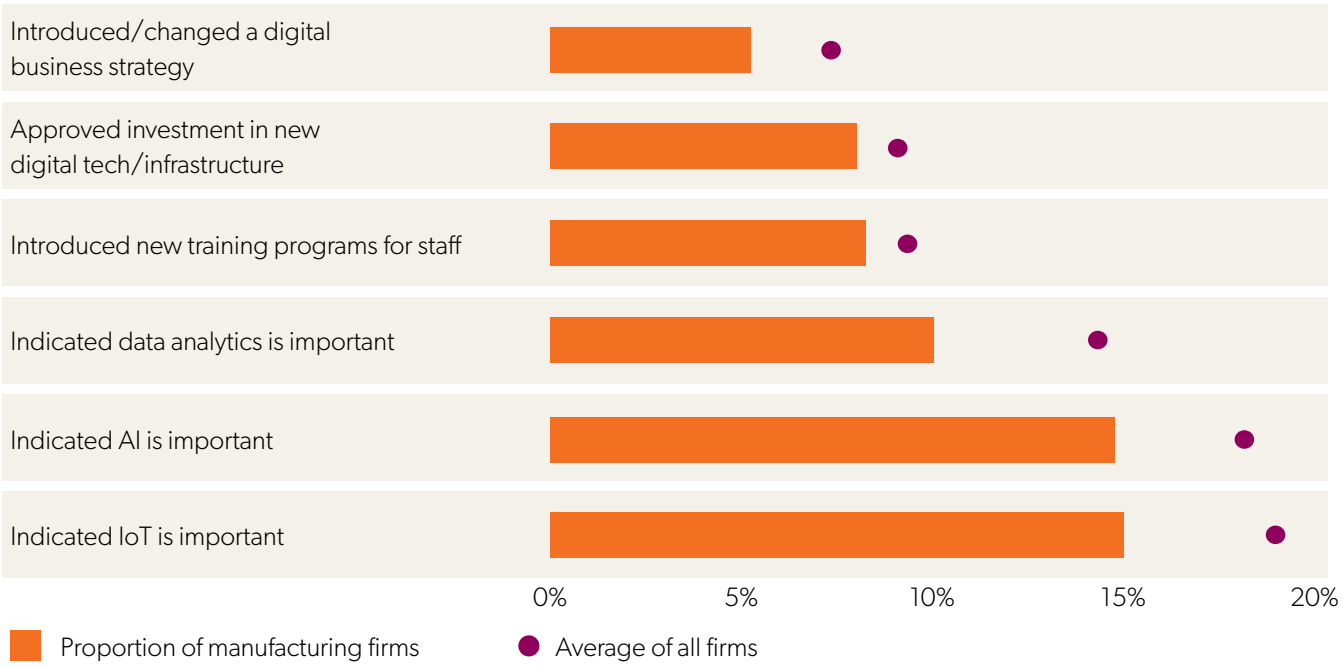
This highlights that a business with a bright idea, and no previous marketing experience, can start small, using the power of social media to reach more buyers than traditional methods. Davo's Fencing Clip has modernised a heritage method of construction and put a modern twist on the marketing.

https://www.facebook.com/davoeng/

6 ADOPT TECHNOLOGY

Exhibit 8 – Manufacturers that reported the importance of digital technology

Indicators of future adoption of digital technology in manufacturing, 2015–16



Source: Office of the Chief Economist, (2018). Industry Insights: Future Productivity, Department of Industry, Innovation and Science.

BARRIERS TO ADOPTION

Manufacturers seeking to implement digital technology face a range of challenges.

The first is a difficulty of readily accessing the information they need to make decisions. Many manufacturers AMGC interviewed were interested in adopting software and digitalisation to advance their businesses, but said they were not sure where they could get information about the different types of technology available, or how peers and competitors were using it. According to the 2016 ABS Business Characteristics Survey, 4.6% of manufacturers reported that a lack of knowledge or technology had hampered their ability to develop or introduce a new product or service (Exhibit 9).[26]

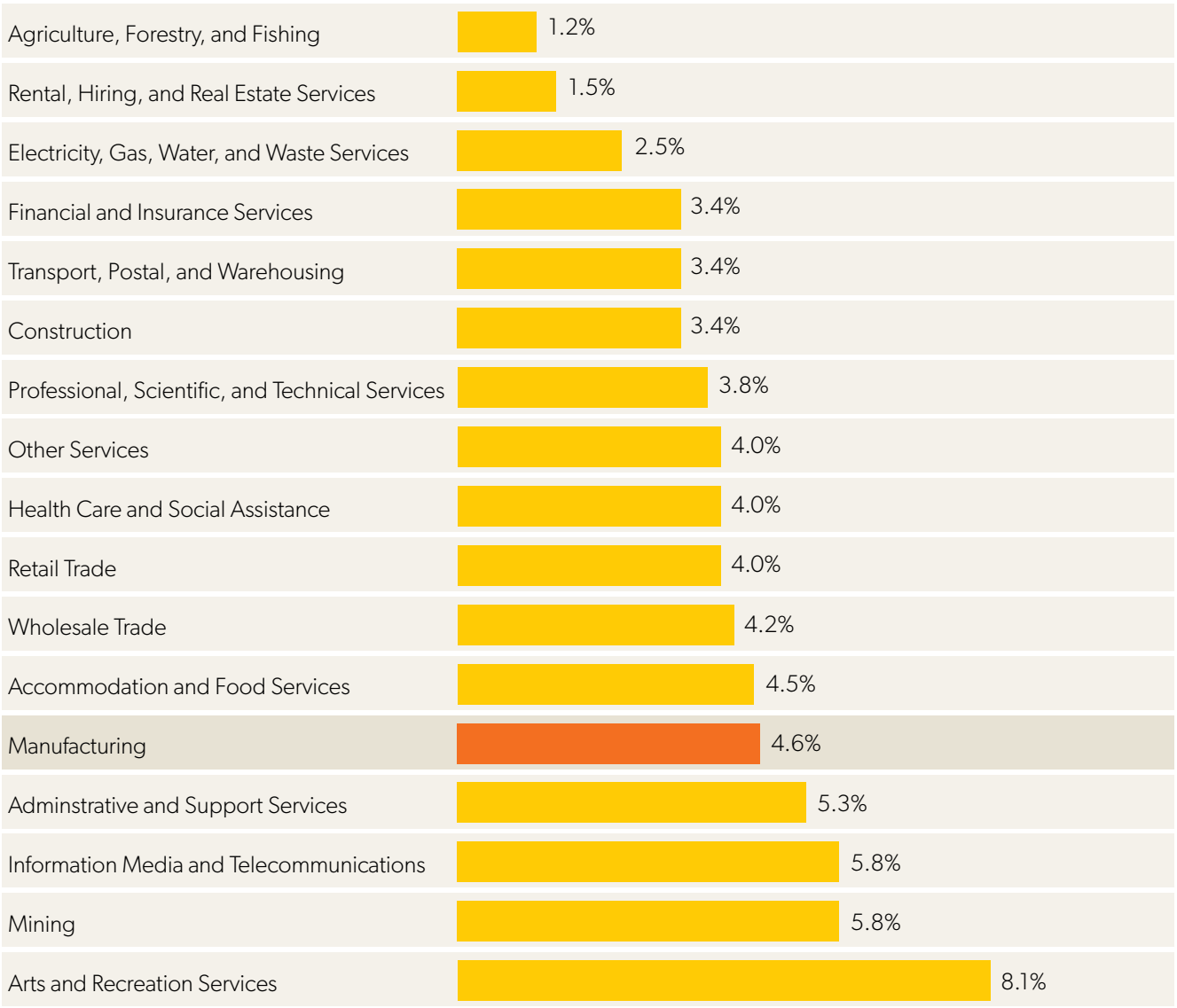
Manufacturers told us they wanted personalised advice and information. They said it could be difficult to understand the types of technology other manufacturers were implementing and how it was performing, based on discussions alone. Some reported using consultants to assess the best technology fits and implementation strategies for their business but admitted this could be expensive.

The second challenge is that many firms interviewed have a negative perception of new technology, based on painful experiences of mis-sold products, severe implementation and integration problems, and the difficulties of moving away from legacy software. As a result, the cost of change was perceived to be high. Many manufacturers felt they had to take an all-or-nothing approach: make a huge, once-per-decade investment in overhauling their business or stick with the status quo. This contrasts with the small steps of prototyping, tinkering, and banking incremental gains.

26 Australian Bureau of Statistics, (2018). *8167.0 – Selected Characteristics of Australian Businesses, 2016–17,* Barriers to General Business Activities or Performance – Table 2. Retrieved from: https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8167.02016-17?OpenDocument

Exhibit 9 – Manufacturers that reported being hampered by lack of knowledge of technology

Lack of access to knowledge or technology to enable development or introduction/implementation



Notes: 'Manufacturing' includes sub-industries as defined by the ABS (food product; beverages and tobacco; textile, leather, clothing, and footwear; wood products; pulp, paper, and converted paper products; printing; petroleum and coal product; basic chemical and chemical products; polymer and rubber products; non-metallic mineral product; fabricated metal products; transport equipment; furniture and other manufacturing).

Source: ABS, (2018). 8167.0 – Selected Characteristics of Australian Businesses, 2016–17, Barriers to General Business Activities or Performance – Table 2. Retrieved from: https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8167.02016-17?OpenDocument

6 ADOPT TECHNOLOGY

Company: Iron Matrix

Headquarters: East Perth, WA

Employees: 2 to 10

Key Industries: Construction, Energy, Metals

Iron Matrix

Located in Bullsbrook, Western Australia, Iron Matrix is introducing a revolutionary new way of building.

Iron Matrix is a patented, modular, high-grade structural steel construction system that can be entirely clad in solar panels to replace traditional building materials. A hydronic heating and cooling system can run through the structure storing excess energy in thermal mass. Battery technology has also improved vastly in recent months ensuring Iron Matrix can generate, store, and deliver energy cheaper than fossil fuels.

With the Iron Matrix system designed to suit autonomous and robotic manufacturing techniques, the company is at the forefront of Industry 4.0.

According to the system's creator and company co-founder David Morgan, the adoption of advanced technology has helped the company deliver higher value products. "At its core, Iron Matrix in an energy company. We seek to apply any technology that allows us to access more energy, while using less, to create the greatest energy wealth."

"To achieve this, we use the latest in solar and battery technologies in our products. We designed all of the components specifically to be manufactured by robots, rather than designing the part and then asking: can a robot make this? We also use advanced software in the design of our products."

The decision to prioritise the adoption of technology was easy for Morgan; it was imperative to creating a globally competitive business. "In order to create a competitive advantage, you need to be one step ahead of the competition. The application of new technology is what holds the potential to achieve this."

For Australian manufacturers looking to implement new technology, Morgan has this advice: "Value YouTube degrees over Bachelor's degrees. Technology is moving so fast that if you're not seeing what other people are doing right now, you'll be left behind."

"A foundation education in maths, physics and chemistry is important, but equally so is a willingness and desire to continuously learn from others," said Morgan.

6 ADOPT TECHNOLOGY

HOW TO ADOPT NEW TECHNOLOGY

Align technology with business strategy. Part of the leadership process and planning for change, companies should set an overall direction by identifying the opportunity they are seeking to capture or the problem they wish to solve. Digital technology can then be evaluated in terms of how it will help meet the specific goals.

Take small steps. Adopting technology does not happen overnight and there is no one-size-fits-all approach. Manufacturers should look for simple measures that fit their needs, circumstances and capabilities. For example, sensors and their accompanying data analysis can often be an add-on to existing machinery and processes, rather than a change that requires rebuilding from the ground up.[27] Movus is an example of a company that retrofits sensors and wireless technology to generate machine learning analytics to detect issues and failures early and alert the appropriate people.

Keep things simple. The American author John Gall wrote, *"A complex system that works is invariably found to have evolved from a simple system that worked. A complex system designed from scratch never works and cannot be patched up to make it work."*[28] This has become known as Gall's Law, which means it is best to create a simple system that works, then improve it over time, especially when it comes to implementing a new technology.

Partner with universities to create prototypes. Partnering with universities enables businesses to adopt digital technologies more quickly by working with researchers to develop capabilities such as: rapid prototyping, data integration and visualisation analytics, and business innovation. A list of technical universities offering industry – university collaborative spaces can be found in Exhibit 10.

Build relationships with global integrators and primes. When considering larger investments and overhauls, it may be worth building relationships with global systems integrators and prime contractors. This might involve investing in equipment and software to ensure manufacturing systems are compatible with those of a larger group, including complying with cyber security requirements. As one interviewee said, *"If you're connected to a prime, it pulls you up."* Another agreed, saying, *"You're dragged on the journey if you're with a prime."*

Loan or share equipment. One way to lower the cost of technology adoption is to borrow or share equipment such as 3D printers that are not needed at all times. For example, the Queensland medical equipment maker iOrthotics saw an opportunity to use 3D printing for its own manufacturing processes and offer a 3D printing service to others for additional income.

> "Using technology to create Standard Operating Procedures on the fly comes from the business plan."
>
> ~ South Australian manufacturer

27 Advanced Manufacturing Growth Centre, (2018), *Industry 4.0: An Opportunity for every Australian manufacturer.*

28 Gall, J, (1986), *Systemantics: the underground text of systems lore: how systems really work and especially how they fail,* Ann Arbor, MI: General Systemantics Press.

29 Note: this list may not be comprehensive. Enquire with your local university if they provide such services or facilities.

30 For more information on Curtin University's Makerspace, visit https://makerspace.library.curtin.edu.au/

31 For more information on Swinburne's Factory of the Future, visit https://www.swinburne.edu.au/research/strengths-achievements/strategic-initiatives/factory-of-the-future/

32 For more information on Swinburne's Digital Innovation Lab, visit https://www.swinburne.edu.au/research/strengths-achievements/strategic-initiatives/digital-innovation-lab/

33 For more information on RMIT's Advanced Manufacturing Precinct, visit https://www.rmit.edu.au/about/our-locations-and-facilities/facilities/research-facilities/advanced-manufacturing-precinct

34 For more information on Flinders University's Australian Industrial Transformation Institute (AITI) visit https://www.flinders.edu.au/australian-industrial-transformation-institute

35 For more information on UQ's Centre for Advanced Materials Processing and Manufacturing, visit http://ampam.mechmining.uq.edu.au/

36 For more information on UNSW's Design Futures Lab, visit https://www.making.unsw.edu.au/dfl/

37 For more information on UTS' ProtoSpace, visit https://www.uts.edu.au/about/faculty-engineering-and-information-technology/protospace

Exhibit 10 – Universities offering industry – university collaborative spaces[29]

Western Australia

Curtin University – Bently, WA

Curtin Makerspace provides a creative learning space to support the Curtin community to make things. The space has a range of tools, software, equipment, and materials that can be used in the space.[30]

Victoria

Swinburne University of Technology – Hawthorn, VIC

Swinburne's Factory of the Future provides industry and organisations with state-of-the-art facilities to explore conceptual ideas for manufacturing next-generation products.[31]

Swinburne's Digital Innovation Lab enables research, translation, and innovation and provides capabilities such as developing rapid digital prototypes to test new ideas.[32]

RMIT University – Carlton, VIC

RMIT's Advanced Manufacturing Precinct brings design and engineering together with a particular focus on 3D printing of advanced high value add products and components.[33]

South Australia

Finders University – Bedford Park, SA

Flinders University's Australian Industrial Transformation Institute (AITI) is involved in partnerships aimed at building higher levels of manufacturing innovation maturity in industry through peer to peer capability building and action research partnerships.[34]

Queensland

University of Queensland – St. Lucia, QLD

UQ's Centre for Advanced Materials Processing and Manufacturing offers industry the opportunity to work with research members to blend technology and processes to create new unique opportunities for materials development, processing, and manufacturing.[35]

New South Wales

University of New South Wales – Sydney, NSW

UNSW's Design Futures Lab aims to inspire innovation and research into fabrication, emerging technologies, and design theories.[36]

University of Technology Sydney – Sydney, NSW

UTS's ProtoSpace is an advanced additive manufacturing facility, offering industry partners access to cutting-edge 3D technologies, software, and technical expertise, and focussing on rapid prototyping, education, research, and development.[37]

7 ACCESS CAPITAL

AT A GLANCE...

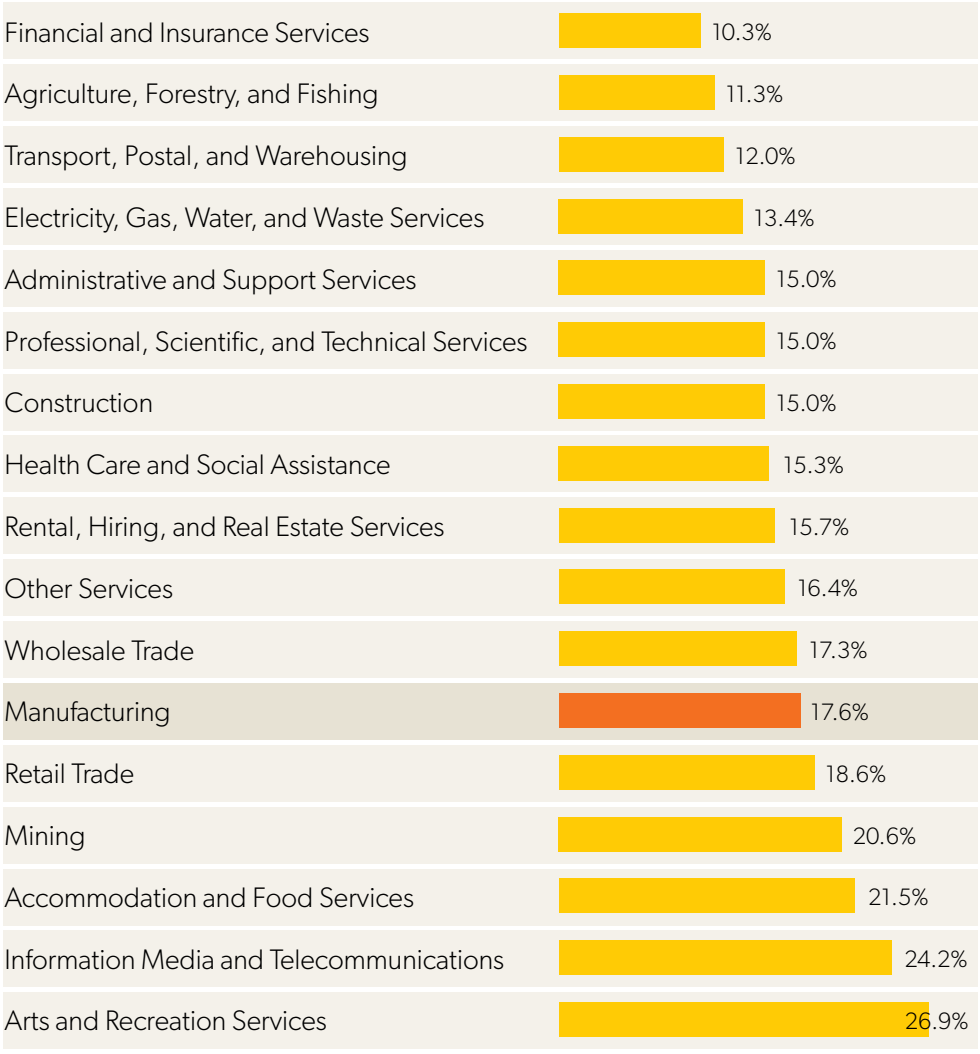
- Access to capital is a perennial problem for smaller businesses, and particularly for manufacturers looking to invest in advanced technology.
- Preparing loan applications, financial modelling and navigating grant processes require different skills than those used for the day-to-day running of a manufacturing business.
- Companies can take practical steps to increase their chances of securing funding and gain an advantage by learning to navigate complex government grants.

Closely related to the challenge of deploying new technology is the challenge of accessing funds for that technology and other business improvement initiatives. Many manufacturers AMGC interviewed cited this as a significant obstacle. In one ABS survey, 17.6% of manufacturers said lack of access to additional funds was a barrier to general business activities or performance (See: Exhibit 11).[38]

38 Australian Bureau of Statistics, (2018). *8167.0 – Selected Characteristics of Australian Businesses, 2016–17,* Barriers to General Business Activities or Performance – Table 1. Retrieved from: https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8167.02016-17?OpenDocument

Exhibit 11 – Obstacles to general business activities or performance

Lack of access to additional funds



Notes: 'Manufacturing' includes sub-industries as defined by the ABS (food product; beverages and tobacco; textile, leather, clothing, and footwear; wood products; pulp, paper, and converted paper products; printing; petroleum and coal product; basic chemical and chemical products; polymer and rubber products; non-metallic mineral product; fabricated metal products; transport equipment; furniture and other manufacturing).

Source: ABS, (2018). 8167.0 – Selected Characteristics of Australian Businesses, 2016–17, Barriers to General Business Activities or Performance – Table 1. Retrieved from: https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8167.02016-17?OpenDocument

17.6%
of manufacturers report lack of access to additional funds as a barrier to general business activities or performance.

15.8%
of manufacturers report cost of inputs as a barrier to general business activities or performance.

18.6% of manufacturers report outstanding accounts receivable as limiting cash flow and acts as a barrier to general business activities or performance.

19.6%
of manufacturers report lack of access to additional funds as a barrier to innovation.

14.2%
of manufacturers report costs of development or introduction/implementation as a barrier to innovation.

7 ACCESS CAPITAL

BANKS, PRIVATE CAPITAL, AND INVESTORS

Manufacturers that AMGC consulted reported difficulties in obtaining financing from banks and private investors in particular. This was in line with research on small businesses in Australia more generally: one in five small businesses have said it is hard to access finance.[39] Those smaller firms that can borrow often encounter much higher interest rates than larger peers and face stringent collateral requirements, including real estate. The process of applying for finance is a difficult, lengthy process and involves heavy paperwork. It is hard to get advice from banks on how to obtain finance and how to choose the right lending product. For their part, lenders are concerned about the relatively low level of financial capability among small businesses: up to 45% do not use accountancy software to maintain financial records, and many have no financial modelling experience.[40]

Internationally, private capital often fills the gap for smaller enterprises seeking to fund relatively risky innovation projects. Private capital is available in Australia, but the total amount is relatively small compared to other advanced economies, even after recent increases. At the same time, many venture capital and private equity interests are weighted toward software and medical technology firms and manufacturing is often not seen as an investment opportunity.

This means that manufacturers often resort to using personal credit cards or other facilities to fund their day-to-day operations when starting out. More established businesses regularly fund expansion out of profits, which can significantly curtail the scale and speed of their growth.

> "The bank is not set up to help manufacturers as they do not understand the business and what is needed."
>
> ~ South Australian manufacturer

39 Reserve Bank of Australia, "Access to Small Business Finance". Retrieved from: https://www.rba.gov.au/publications/bulletin/2018/sep/access-to-small-business-finance.html

40 Australian Small Business and Family Enterprise (2018). *"Affordable capital for SME growth"*. Retrieved from: https://www.asbfeo.gov.au/sites/default/files/documents/ASBFEO-affordable-capital-for-SME-growth.pdf

TIPS FOR ACCESSING CAPITAL

Despite these obstacles, Australian manufacturers can secure the capital they need and can greatly improve their chances of accessing funds by ensuring they have a well-documented business plan, accurate accounts and can show how any funding will be used.

According to the Australian Small Business and Family Enterprise Ombudsman (ASBFEO),[41] business leaders should undertake four steps before applying for funding. Their advice is to:

- **Fix your business accounts.** Remember that lenders will assess whether you can repay them, so you need to ensure your finances are in order. Separate personal and business finances, check the Australian Taxation Office records for your business, and check that your bank statements are clear and free of recent overdrawing and defaults.
- **Prepare or update your business plan.** Investors need to see that you have a clear plan going forward and will use your history to evaluate the likelihood of future success. Include a profit and loss statement, balance sheet, budget, and cash flow forecast. Ensure that your goals are ambitious but realistic.
- **Assess your credit worthiness.** Lenders can access a great deal of information about you and your business, so check your personal and business credit rating and tax portal and get your Personal Property Securities Register (PPSR) report. Tidy up any outstanding issues before seeking funding.
- **Find the right funding for your business.** Assess your needs and find the right type of funding for your business. Use the ASBFEO's Funding Decision Flowchart and Funding Matrix to help you choose the most appropriate funding for your needs.[42]

In completing these steps, you may find it useful to get the help of an advisor (such as an accountant with strategic experience or a broker). Consider using digital accounting and point-of-sale systems to help you maintain up-to-date and accurate financial records and to save you time by being able to access them quickly.[43]

St George Bank

While accessing capital can be difficult, there are banks that provide specialist advice to the industry.

St George Bank actively partners with industry groups, including AMGC, to understand the important forces shaping the industry. Their manufacturing industry specialists can help you optimise your working capital, manage your cashflow, and provide expert advice to help you access capital.

According to Matthew Kelly (Head of Manufacturing and Wholesale NSW, St George Bank), "Our advice to Australian manufacturers is to have good quality and up-to-date financial information available; this makes access to finance much easier, and really does help you on your journey to grow your business.

"A clear business plan is also essential. In this business plan, you need to articulate how you fit into the existing market and identify your point of difference. You need to demonstrate that you understand the supply chain.

"It's important to define your terms of trade and working capital cycle to ensure you have the right facilities in place for the 12 to 18 months' ahead. With a volatile Australian dollar, we consider how to help manage currency risks. Finally, we look at your balance sheet. Lending is not based solely on your assets – we take into account whether you have the right fundamentals in place, including the right amount of equity in your balance sheet.

If manufacturers do not have all these elements in place, St George Bank can help. "If you have the right banking partner, they will help you to build the right balance sheet, to implement the right business strategies, and to reduce your personal risks. The right bank will help you continue to grow," said Kelly.

41 Australian Small Business and Family Enterprise (2018). *"FitsME Essential Guide to Business Funding"*. https://www.asbfeo.gov.au/sites/default/files/FitsME-Guide%20-%20latest%20version.pdf

42 Australian Small Business and Family Enterprise (2018).

43 Australian Small Business and Family Enterprise (2018). *"Affordable capital for SME growth"*. Retrieved from: https://www.asbfeo.gov.au/sites/default/files/documents/ASBFEO-affordable-capital-for-SME-growth.pdf

7 ACCESS CAPITAL

GOVERNMENT GRANTS

One of the pathways by which governments try to help smaller businesses overcome difficulties in accessing finance is to provide grants. Unfortunately, many of the manufacturers AMGC consulted emphasised how it can be prohibitively hard to access these funds due to complex eligibility criteria (particularly employment requirements), time-consuming paperwork, and inflexibility in how money can be used.

One Western Australian manufacturer reported that it spent 10% of the money it received from a grant on a consultant it hired to ensure its paperwork was correct. These kinds of overheads can make the benefits of a grant marginal.

One grant discussed by manufacturers was the Commonwealth Government's R&D Tax Incentive. Many manufacturers are positive about the incentive and say it has been instrumental in their business success, especially to help start-up companies grow, but still point to barriers to its effective use. These include needing consultants to help them navigate the process and increasingly difficult compliance requirements. Up to 25% of the incentive was lost to consulting fees and interest on the loans they needed to take out prior to receipt of the grant funds. For smaller companies, it was perceived as "not worth getting the tax cut" (QLD manufacturer). Other manufacturers said the R&D Tax Incentive was not working efficiently and only worked for larger companies or when profits were low.

These inefficiencies are a deadweight loss to the industry. The current mix of funding types and the design of the R&D Tax Incentive does not maximise the achievement of objectives. In order to best achieve these objectives, AMGC has outlined recommendations for government in its Sector Competitiveness Plan.[44]

> "Sometimes [the grant application process] feels like wading through setting concrete."
>
> ~ Western Australian Manufacturer

> "I don't know the first thing about how to go about market sizing. If someone can show me how to do it, or give me some help, that would be really good. I just don't know where to start."
>
> ~ New South Wales Manufacturer

44 Advanced Manufacturing Growth Centre (2016). *Sector Competitiveness Plan*, p. 74.

LEARN MORE ABOUT GRANTS

The following steps will help in getting a better understanding of the grants landscape.

Seek advice. While advisors may charge a fee for services, many manufacturers have received positive outcomes from engaging with their expertise. It is an opportunity to learn firsthand how to better structure investment proposals which can be applied for future government grant and loan purposes. Manufacturers can search for a nearby advisor at https://www.business.gov.au/Expertise-and-Advice

Use online resources to help decide which grant is appropriate. For example, Jobs for NSW has created a Funding Roadmap to help SMEs apply for appropriate funding opportunities throughout the life of their business: https://www.jobsfornsw.com.au/__data/assets/pdf_file/0018/141327/Funding-roadmap.pdf. Another useful guide is Ben Cusack's free 5 Steps to Landing a Government Grant: https://www.bulletpoint.com.au/5steps

Keep records up to date. Whether manufacturers are applying for government grants or private funding, they need to provide key information about their business, including up-to-date financial records. Manufacturers should ensure they continually update records to minimise the work required when writing a single application. Investing in digital accounting and point-of-sale systems can help to fast track this process.

Be patient. Applying for a grant can be a time-consuming and frustrating process, especially when manufacturers are busy trying to run a business. However, these grants have been provided to assist manufacturers and the long-term rewards can greatly outweigh the costs of applying. Manufacturers should take time to consider the costs and benefits of writing a given application and if they apply, invest adequate time and make it count.

8 HIRE THE RIGHT PEOPLE

AT A GLANCE...

- Hiring the right people can be difficult, but it is crucial for long-term success.
- Australia has a talent pool, as well as international hires, who could be a good fit for roles across the value chain.
- Reaching talented people can require thought about how and where a company should advertise.

Many of the manufacturers AMGC consulted reported difficulties recruiting and retaining skilled staff. Some of those interviewed said they had experienced issues with recent graduates who lacked practical experience and were unwilling to start from the bottom or 'muck in' on lower skilled tasks such as manual labour. For example, one Queensland manufacturer commented, "they think that they know everything when they come in as an engineer".

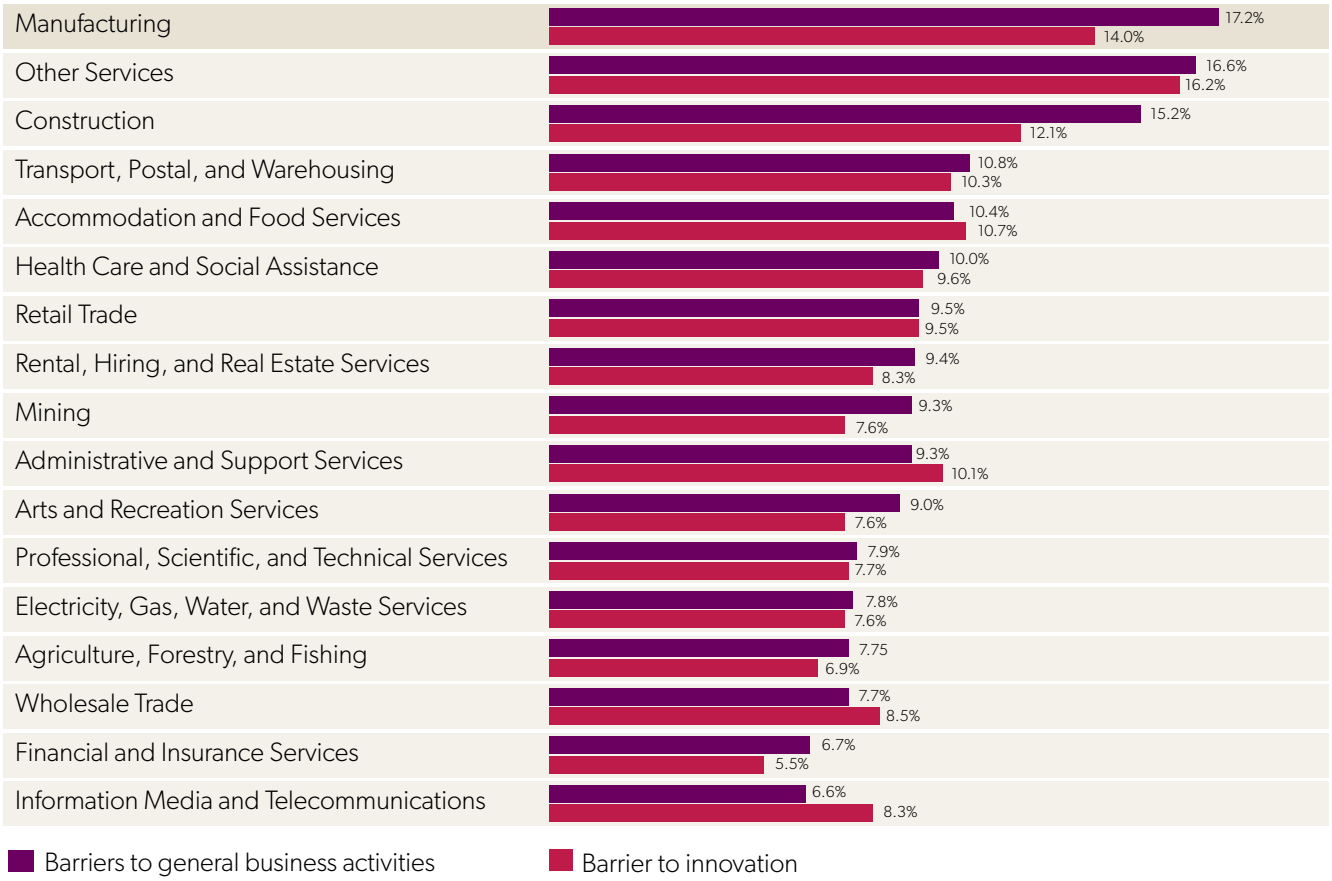
As a result, manufacturers often rely on internal basic training or recruit migrant workers to meet their requirements. This is backed up by an ABS finding that 17.2% of manufacturers said that a lack of skilled people in the labour market was a barrier to general business activities or performance, and 14% said it was a barrier to innovation.[45] As Exhibit 12 shows, this was among the highest rates in any industry in Australia.

Recent changes to migration rules, such as the 457 visa regime, have also negatively impacted some businesses that rely on foreign skilled personnel – especially in regional areas. For example, a regional New South Wales manufacturer stated, "Without the 482 and 489 visa allowance, which has allowed us to hire seven overseas experts, I would need to take my business offshore."

45 Australian Bureau of Statistics (2018). *8167.0 – Selected Characteristics of Australian Businesses, 2016–17. Barriers to General Business Activities or Performance, Table 1 and* 2. Retrieved from: https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8167.02016-17?OpenDocument

Exhibit 12 – Manufacturing suffers one of the highest rates of skills shortages in the labour market

Lack of skilled persons within the labour market



Notes: 'Manufacturing' includes sub-industries as defined by the ABS (food product; beverages and tobacco; textile, leather, clothing, and footwear; wood products; pulp, paper, and converted paper products; printing; petroleum and coal product; basic chemical and chemical products; polymer and rubber products; non-metallic mineral product; fabricated metal products; transport equipment; furniture and other manufacturing).

Source: ABS, (2018). 8167.0 – Selected Characteristics of Australian Businesses, 2016–17, Barriers to General Business Activities or Performance – Table 1 & 2. Retrieved from: https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8167.02016-17?OpenDocument

RECRUITING AND RETAINING TALENT IN THE AUSTRALIAN JOBS MARKET

The manufacturing industry's challenge in finding and retaining talent reflects systemic factors, such as competition from other industries and gaps in the relevance and quality of TAFE training.

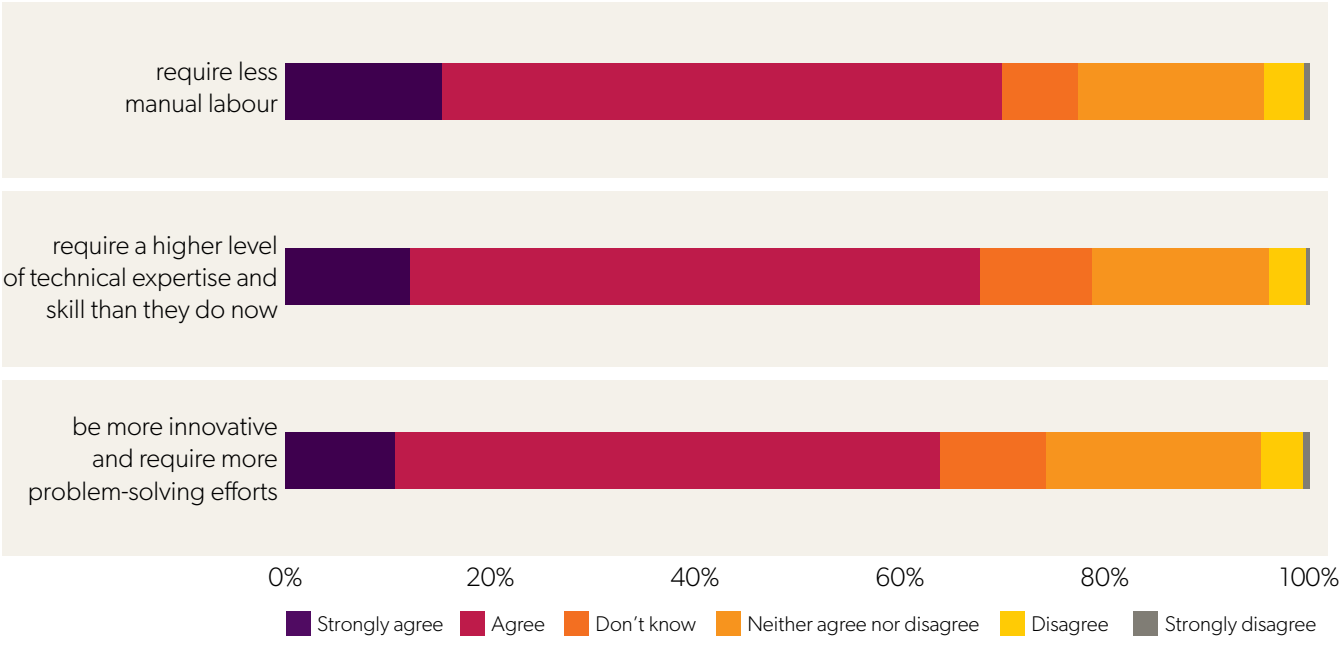
It is also driven by factors that are under companies' direct control. This presents an opportunity for individuals and companies within the industry to improve the situation. Furthermore, this research suggests there is scope to attract more people to work in the industry.

As discussed in Recognise Australian Manufacturings' Strength, there is a belief among many firms that students and their parents do not believe manufacturing is an attractive career option. Many believe there is a perception the industry is declining and that 'smart young people' have been advised by their parents and careers advisors to go elsewhere.

However, AMGC's survey of 1,000 Australian students and 1,000 other members of the general public paints a more positive picture for the industry. Around two-thirds of the general public recognised that manufacturing was an innovative and constantly evolving industry, and said they believed that future jobs in manufacturing would be more innovative (See: Exhibit 12).

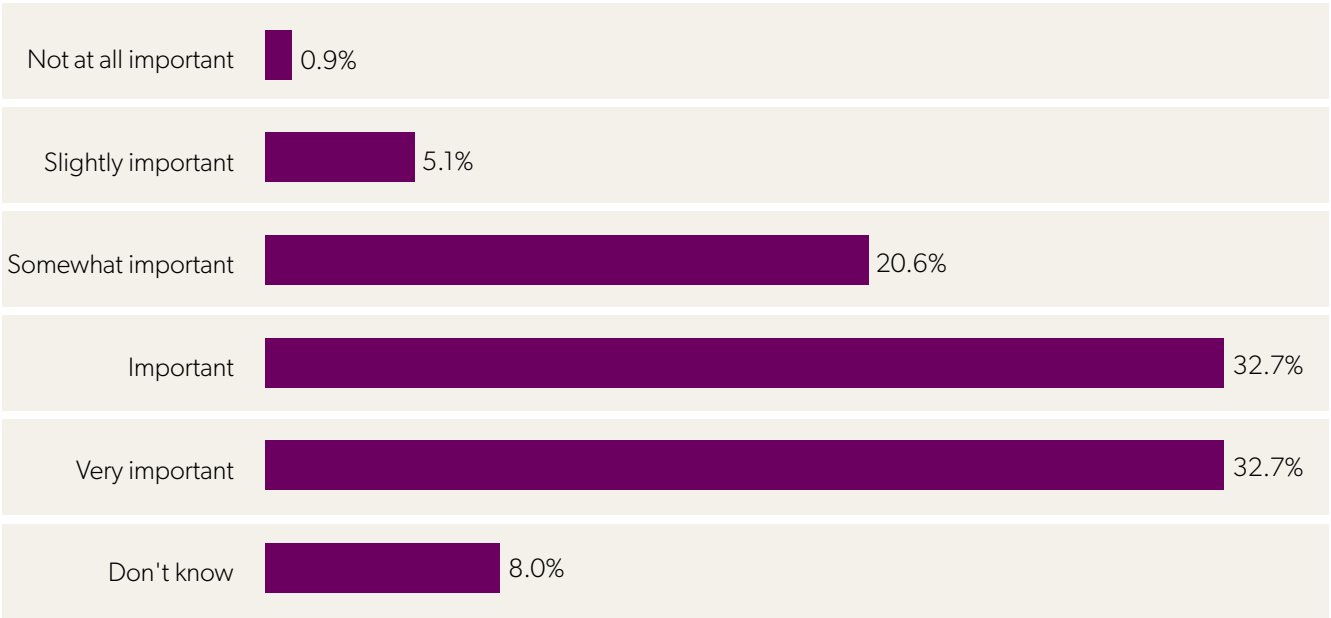
8 HIRE THE RIGHT PEOPLE

Exhibit 13 – Mean agreement with the statement "Future manufacturing jobs will..."



Notes: Likert scale, Strongly Agree to Strongly Disagree, n=1,000.
Source: AMGC Australian Manufacturing Perception Survey, The Behavioural Insights Team analysis.

Exhibit 14 – Mean rating of the perceived importance to maintaining a strong Australian economy



Note: Likert scale, *Not at all important* to *Very important*, n=1,000.
Source: AMGC Australian Manufacturing Perception Survey, The Behavioural Insights Team analysis.

In addition, approximately 65% of respondents to the survey of the general public saw manufacturing as important to the Australian economy (See: Exhibit 14).

Only a small percentage (3%) of Australian students said they were actively considering a career in manufacturing. This typically reflects a lack of familiarity and this research reveals a high level of potential alignment between what most Australians want in a career and what they believe the manufacturing industry offers. The top left quadrant of each figure in Exhibit 15 shows the biggest overlap in what Australians (A) and Australian students (B) want – and what manufacturing is perceived to offer – which is high salaries, fun environments, flexible working conditions, sustainability, and job security.

AMGC believes that through education, more people would come to recognise manufacturing's value. This could help counteract the negative and often incorrect material published about the health of Australia's manufacturing industry. For instance, the reduction in the size of Australia's car manufacturing industry is often overstated because journalists and others focus on the production of whole cars and miss the large amount of component production, design, and other high-value-adding activity that continues to occur around the country.

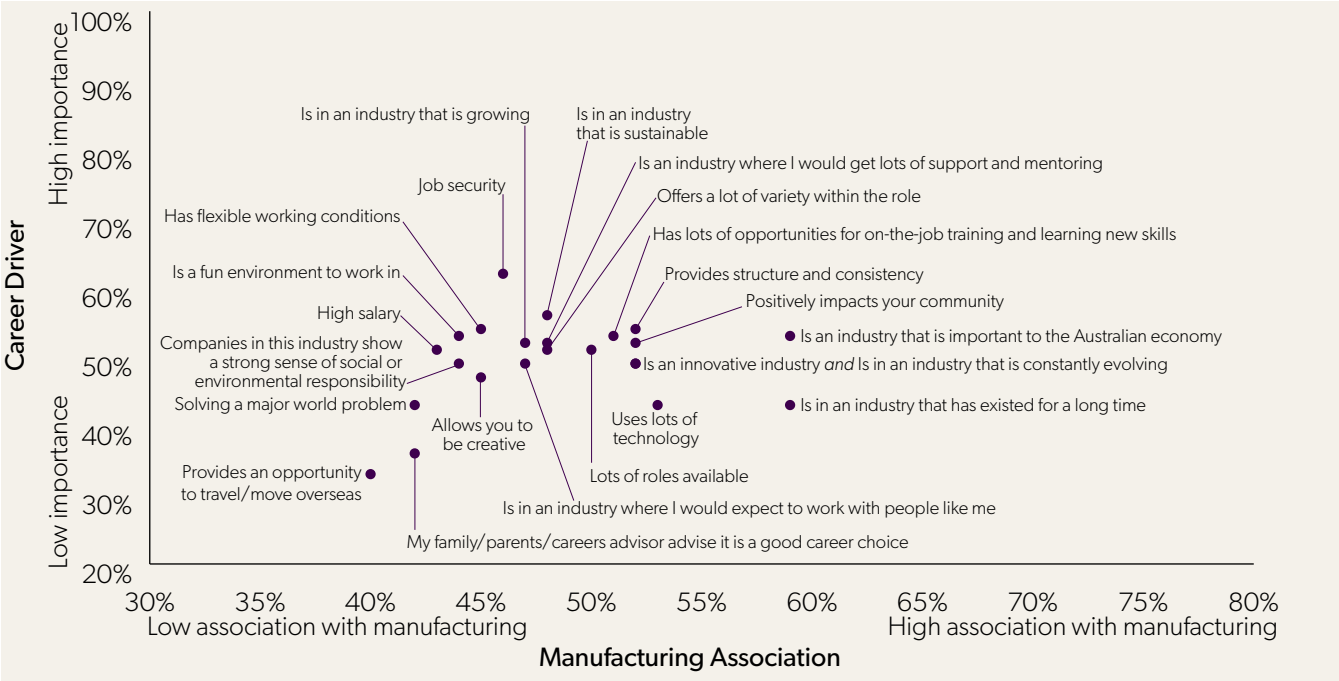
When AMGC showed survey respondents some short films and infographics highlighting these elements, as well as the diversity of roles on offer and the good health of the manufacturing industry as a whole, the effects on interest levels in manufacturing careers were dramatic. Approximately half of both the general population and students registered increased interest (See: Exhibit 16).

From being exposed to approximately 3 minutes and 30 seconds of manufacturing awareness building content, 112 students and 428 general public became "super interested" and "a lot more interested" in manufacturing as a career.

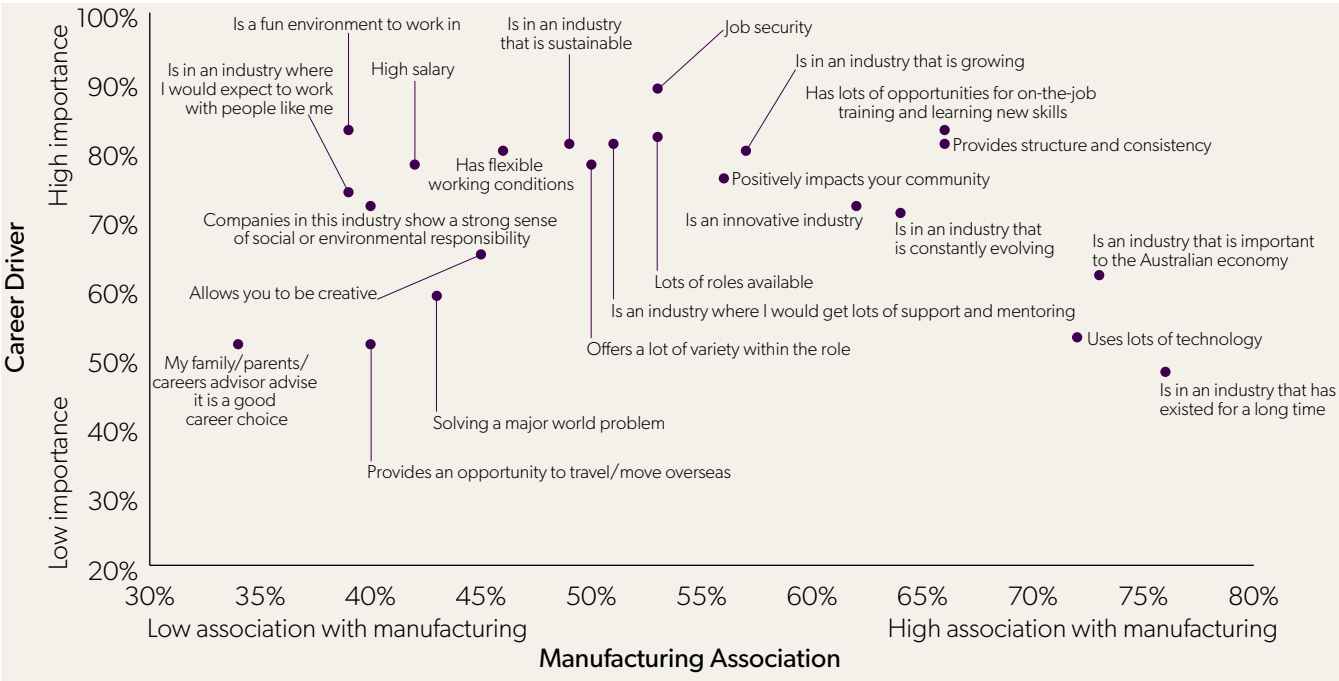
8 HIRE THE RIGHT PEOPLE

Exhibit 15 – Importance of factors to career choice versus perceptions of what manufacturing offers for the general public and Australian students

A – General Public

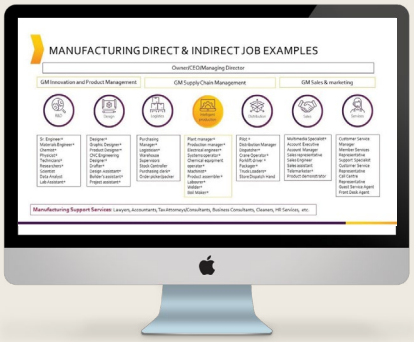
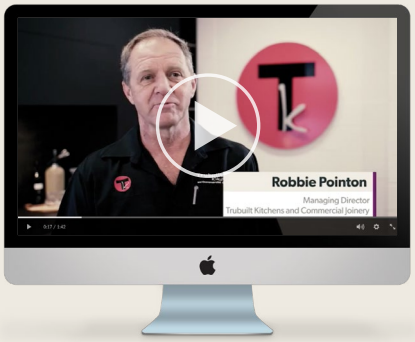


B – Australian students



Source: AMGC Australian Manufacturing Perception Survey, The Behavioural Insights Team analysis (A); AMGC Young Australian Perception Survey, YouthInsight analysis (B).

Exhibit 16 – Mean ratings of the impact of an informational video on level of interest in manufacturing for Australian students and the general public

Video 1 – Industry Facts in 37 seconds (Net Increase)	Careers in Manufacturing Image (Net Increase)	Video 2 – Manufacturers talking about employees in 1 minute 41 seconds (Net Increase)
Students +8% Public +24%	Students +13% Public +26%	Students +13% Public +29%
		
Industry Facts – emphasising the size and strength of the industry (37 seconds – hosted by Dr Jens Goennemann) › 9 billion in exports › Largest output generator for Australia › 10% employer of Australians › Manufacturing is more than production	**Infographic: Manufacturing Job Image**	**Manufacturing Jobs – visualising what manufacturing jobs and employers are like today (1 minute 41 seconds – featuring diverse manufacturing companies)** › Tradesmen › Business sizes › Job security (years in company) › Working with universities to get students into the jobs that lead to full-time jobs › Designers, engineers

8 HIRE THE RIGHT PEOPLE

HOW TO ATTRACT TALENT

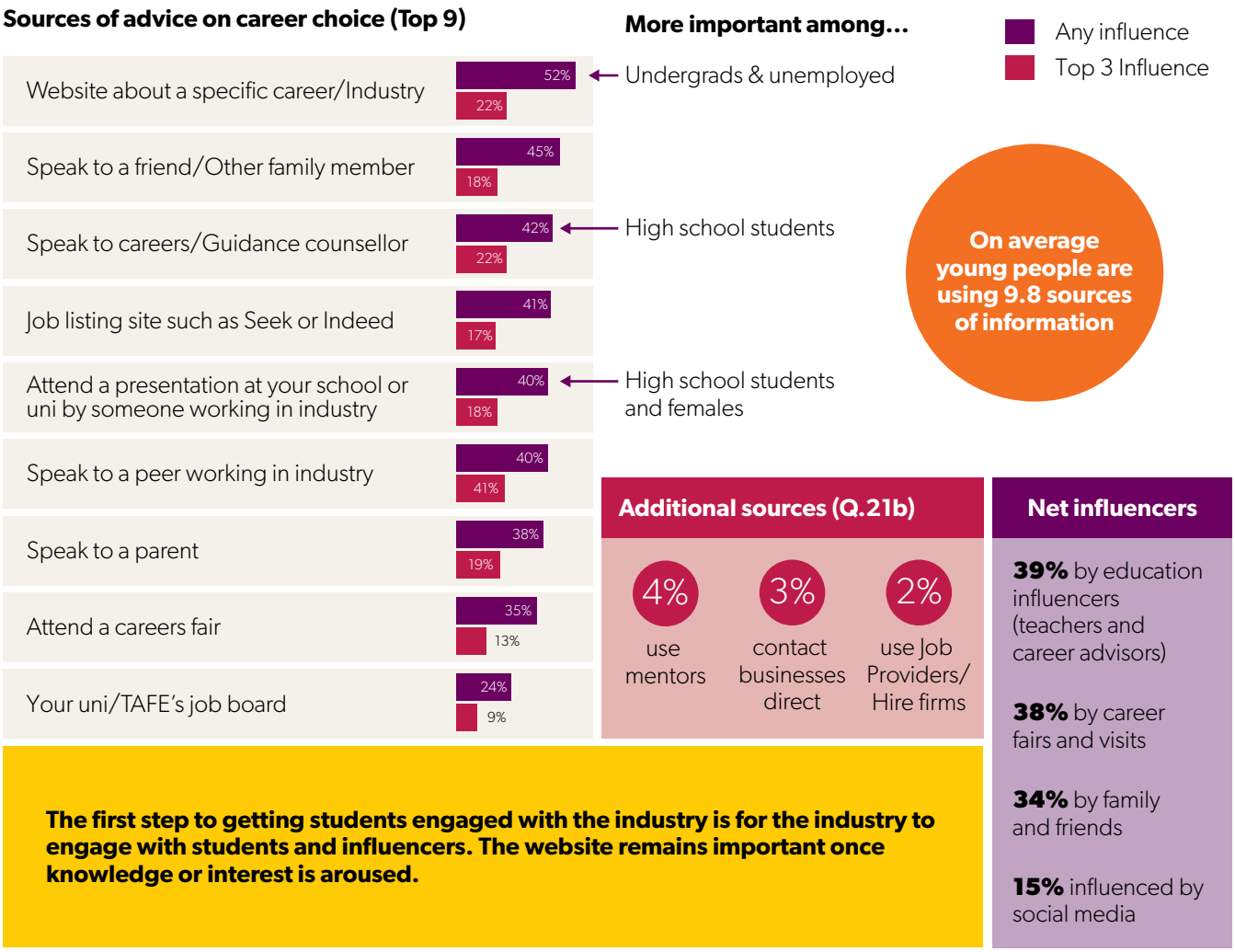
As well as offering good news in general, AMGC's research with the general public and students has pointed to practical steps manufacturers could take to reach new talent. These are outlined below.

Identify strengths to emphasise in job adverts. In AMGC's student and general public surveys, job security, the availability of support and mentoring, and opportunities for flexibility and variety all emerged as areas that are important, but they were not as associated with manufacturing as they could be for the general public or students (See: Exhibit 15 on page 52). Manufacturers should consider their strengths in these areas and emphasise them in job adverts and website content.

Maintain a high-quality careers website page and use social media. As well as the advert itself, a cleanly designed, up-to-date careers page on the company's website will help convert interest into job applications. In AMGC surveys with young people and the general public, opportunities for on-the-job training was listed as important when making career decisions, so it is "important" to explain the opportunities for learning and progression over a multi-year period, rather than just posting current vacancies. Additional use of targeted social media advertising can be the most direct and cost-effective way to reach young people.

Ensure good coverage on online jobs boards. Among the students AMGC interviewed, Seek, Indeed, Gumtree and university or TAFE jobs boards were their first ports of call when job hunting. Firms should use these channels to communicate the wide range of jobs available in manufacturing (See: Exhibit 17).

Exhibit 17 – Word of mouth from experts, family and friends are all key sources of advice, with websites as a point of reference



Source: Young Australian Perception Survey, YouthInsight analysis. (n=1,000)

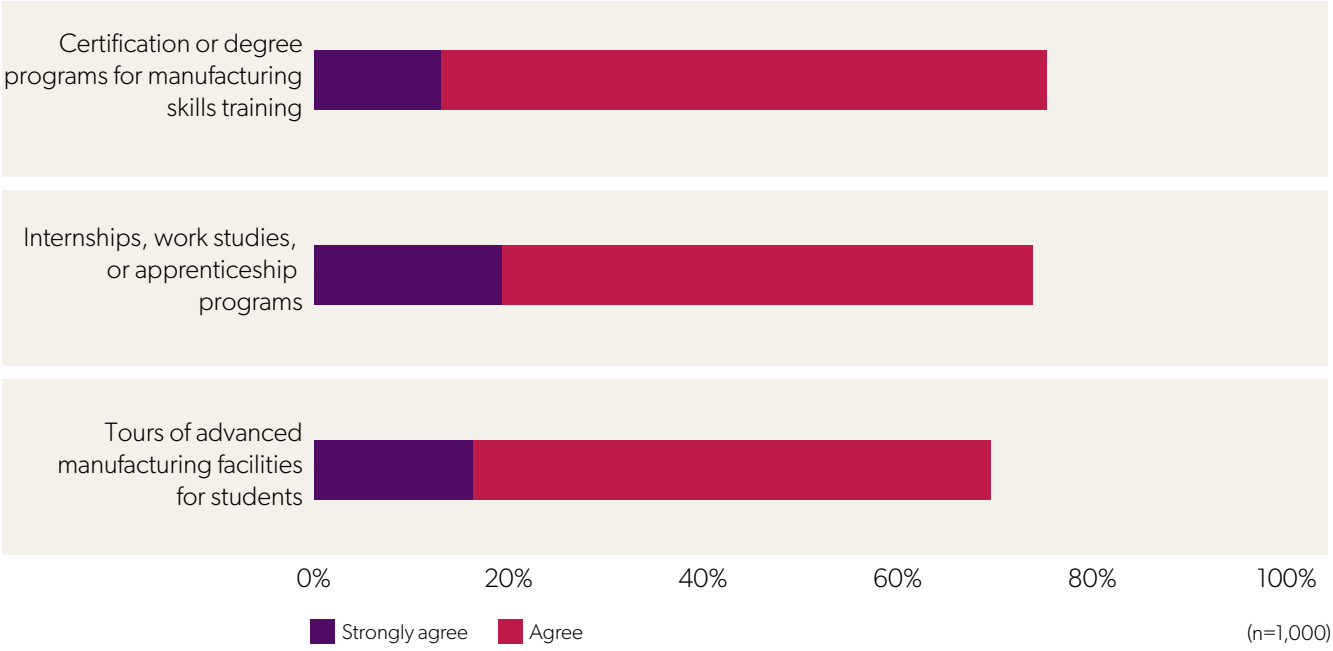
Work with other manufacturers. Taking advantage of some of the most common recruitment avenues – having a consistent presence on TAFE and university jobs boards and at careers fairs, for example, or building a reputation as a regular employer of graduates – is hard to do on a small scale, such as where a company might only be hiring a handful of people each year. Firms could consider partnering with other manufacturers to share the burden and develop a joint offer to students that can compete with the graduate programs available in the professional or service industries. This can help to bust myths about manufacturing and 'rebrand it' as an industry that is growing and is focussed on human skills and qualities.

Offer internships and work experience. Many Australian students career decisions are swung decisively by a few moments, with exposure to actual working environments chief among these. Many talented young people who have not yet graduated are open to a variety of different roles and industries, provided employers do not set unrealistic entry requirements in terms of previous experience. This survey of the general public showed that young Australians think internship programs would make manufacturing more attractive as a career choice (See: Exhibit 18), so firms should consider providing internships, and part-time, flexible and entry-level roles to attract a larger and more diverse pool of applicants. While these placements already exist, companies should frame them to increase their attractiveness to students and graduates with a wider range of experience.

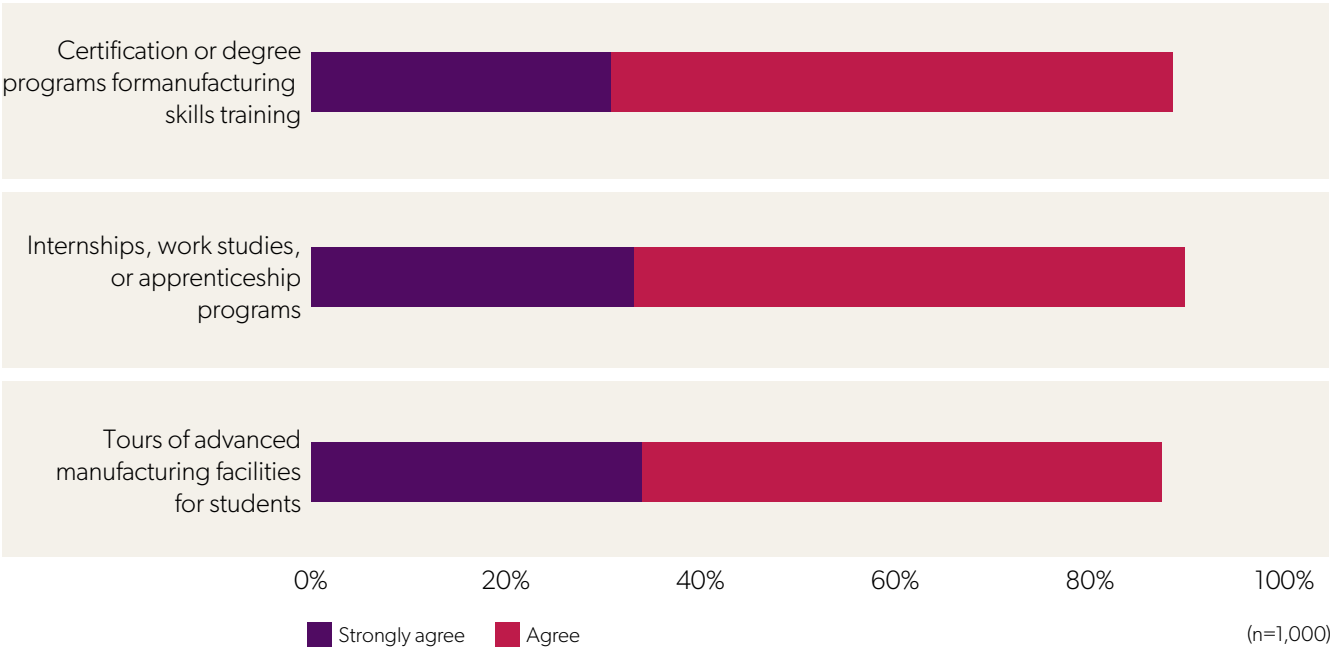
8 HIRE THE RIGHT PEOPLE

Exhibit 18 – Mean ratings of programs that would make manufacturing more attractive to the Australian public, by age (Young = 18–35 years; Older = 55 years +)

Young



Older



AMGC chose to compare young vs. older age groups to emphasise that program customisation is needed to attract different age groups. For full result see Appendix 4 Exhibit A9.

Source: AMGC Australian Manufacturing Perception Survey, The Behavioural Insights Team analysis.

Company: LA Services

Headquarters: Revesby, NSW

Employees: 11 to 50

Key Industries: Engineering, Metal Fabrication

How LA Services works with local schools

In 2016, Western Sydney welding and fabrication experts LA Services began to realise that a significant portion of its workforce was edging toward retirement and attracting the next generation of employees was a major issue. Initially, LA Services focussed on mentoring to fill in the gaps, but quickly found this approach just wasn't enough.

Instead, LA Services undertook an industry-education engagement experiment with nearby Liverpool Boys High School. "Liverpool Boys High School utilises industry placements and passion-based project learning, rather than relying solely on the curriculum. So we decided to collaborate with the school," explained David Fox, General Manager.

"We have engaged with three students. The first student was disengaged with school. Over four months, he worked with us one day per week. During this time, he gained more confidence and enthusiasm, and is doing better at school.

"The second student is very bright and needed challenging. We brought him into a project focussed on the Internet of Things (IoT), AI and data science we were working on with UTS. The model proved successful as a learning platform, so another student was added. As part of this project UTS agreed to mentor the students in mathematics, coding and programming."

"Industry must have a place in the education system. Manufacturers need to understand how the next generation of workers thinks, so they can better engage. Students need to understand what it is we do, so manufacturing becomes a viable career choice. Similarly, schools need to understand the skills that industry needs, and industry needs to understand the challenges the education system faces.

"The best way to forge ahead together is for manufacturers to engage with schools and students. The key to success is learning from one other, spanning different generations and technologies. I've learnt just as much from the students and the school, as they have from LA Services," said Fox.

09

9 BUILD YOUR WORKFORCE AND CULTURE

AT A GLANCE...

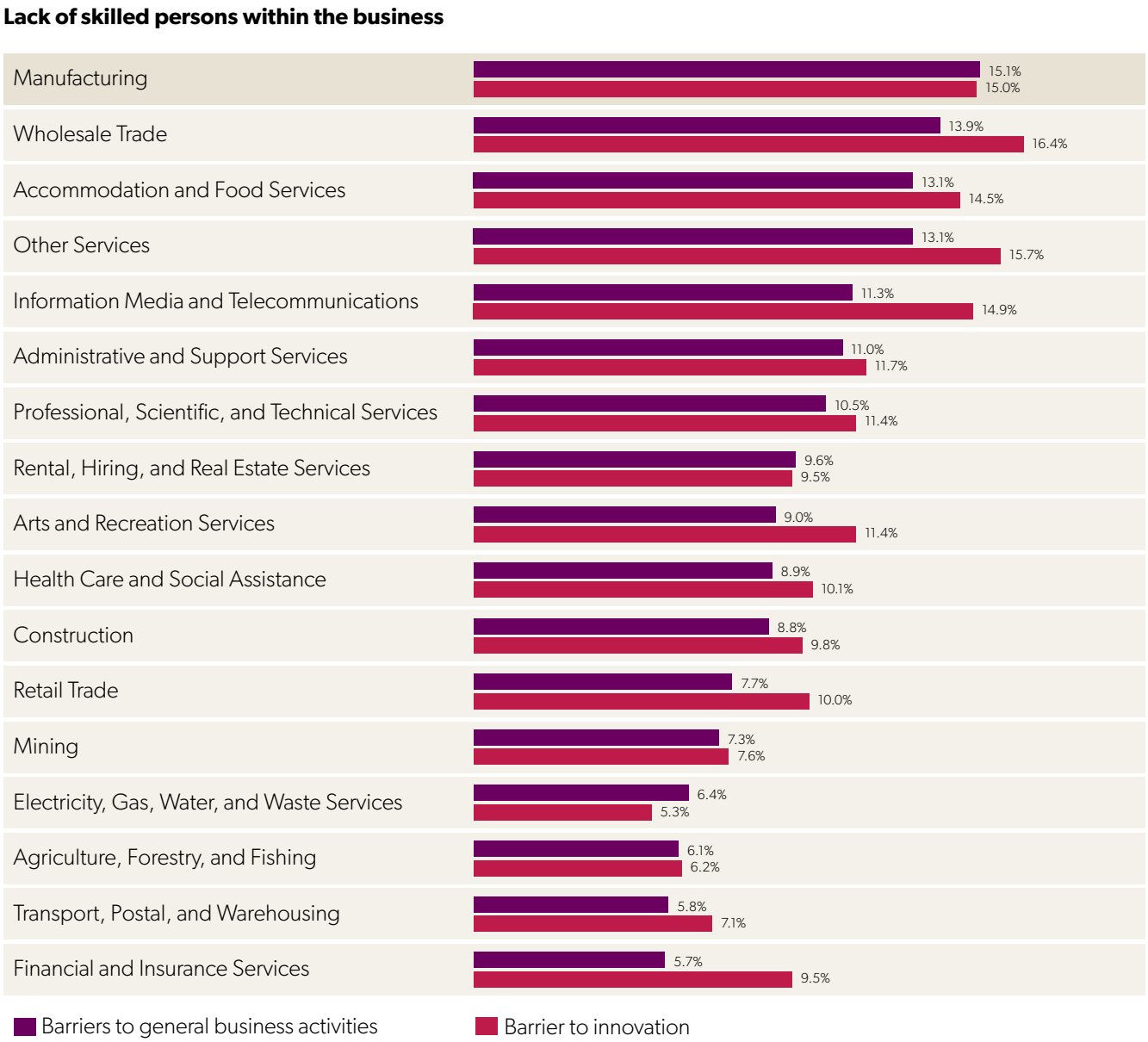
- Many skills gaps can be filled by developing the abilities of existing employees.
- Company culture has a big effect on employee retention and many successful manufacturers make it a priority.
- A collaborative culture that prioritises communication and invites employees to speak up can make businesses more productive and innovative.

DEVELOPING SKILLS INTERNALLY

AMGC's focus group discussions revealed that many manufacturers reported frustrations around a lack of internal skills. This sentiment is supported by findings in the ABS's Business Characteristics Survey showing that approximately 15% of manufacturers report that a lack of skilled people in their business was a barrier to general business activities and innovation (See: Exhibit 19).[46]

46 Australian Bureau of Statistics (2018). *8167.0 – Selected Characteristics of Australian Businesses, 2016–17. Barriers to General Business Activities or Performance, Table 1 and 2*. Retrieved from: https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8167.02016-17?OpenDocument

Exhibit 19 – Manufacturers lack skilled people in their firm, affecting business activities and innovation



Notes: 'Manufacturing' includes sub-industries as defined by the ABS (food product; beverages and tobacco; textile, leather, clothing, and footwear; wood products; pulp, paper, and converted paper products; printing; petroleum and coal product; basic chemical and chemical products; polymer and rubber products; non-metallic mineral product; fabricated metal products; transport equipment; furniture and other manufacturing).

Source: ABS, (2018). 8167.0 – Selected Characteristics of Australian Businesses, 2016–17, Barriers to General Business Activities or Performance – Table 1 & 2. Retrieved from: https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8167.02016-17?OpenDocument

9 BUILD YOUR WORKFORCE AND CULTURE

Manufacturers identify that this challenge reflects systemic factors and gaps in the relevance and quality of TAFE training.

To address skills deficiencies, many manufacturers are training staff in-house. One Adelaide business registered as a TAFE so that it could train its own control engineers. While it is positive that businesses are taking responsibility for building capabilities, some experienced difficulties with in-house training. Smaller manufacturing businesses in particular said they lacked the infrastructure, training support and skills to train people well. Once trained, manufacturers reported difficulty retaining staff, resulting in an ongoing drain of time, resources, and effort.

> "Everything we've built we've done in-house."

~ Western Australian manufacturer

ENCOURAGING INTERNAL JOB SHADOWING

In-house training is usually informal and mostly conducted using peer learning and mentoring methods. A few businesses noted that it was time-consuming; for example, one SME noted that the productivity of a senior staff member would be halved due to providing on-the-job training to new staff. TAFE or university training were seen as often unsuitable solutions for specific training needed in the short term.

Some manufacturers reported difficulties with knowledge transfer among staff, saying that often the skilled person was not an effective mentor. One firm commented that generally it did not use mentoring, instead choosing job shadowing, which was quicker and less burdensome.

Manufacturing companies with experienced technical staff who struggle to deliver effective mentoring and training programs could engage professional help. Mentorship can be short and simple to teach. Outcomes include learning the skills of mentoring, such as active listening and providing positive verbal reinforcement that noticeably helps the mentoring performance. For example, TAFE Enterprise offers a short course in coaching and mentoring delivered to individuals that can be customised for teams.[47]

PRIORITISE COMPANY CULTURE TO RETAIN STAFF

AMGC research found that manufacturers with high staff retention reported investing in their company culture as a top priority. This encompasses many things, but generally refers to the underlying values, beliefs, and expectations that everyone within an organisation holds.[48] These shared traits guide how employees approach their work and interact with each other. Some manufacturers told AMGC that having a good company culture was key to retaining valued employees. According to AMGC research a successful manufacturing company's culture consist of creating innovative environments and fostering internal collaborations and communications.

> "Culture is not a 'nice thing to have' – it is a necessity."

~ New South Wales manufacturer

> "Culture is the glue that binds it all together."

~ Queensland manufacturer

> "We are often able to retain, based on culture, even though workers can get paid twice as much at [competitor]."

~ Western Australian manufacturer

47 TAFE NSW (2020). *Leadership and Management Training Solutions*. Retrieved from: https://www.tafensw.edu.au/enterprise/training/leadership-management?gclid=CjwKCAiAgqDxBRBTEiwA59eEN77qNoAAa1TQGuo29TZY2LatVIHMw9r3E9AIqb2QQPhQ4MaKeNdG7xoC1PIQAvD_BwE

48 Denison, D R, (1996), "What is the difference between organizational culture and organizational climate? A native's point of view on a decade of paradigm wars", *The Academy of Management Review, 21*(3), 619–654.

Company: Elphinstone

Headquarters: Burnie, TAS

Employees: Over 250

Key Industries: Engineering, Mining

Elphinstone – Company Culture

Based in Burnie, Tasmania, Elphinstone has been designing, manufacturing, and supplying heavy equipment to the mining industry for over 40 years. Today, Elphinstone Pty Ltd employs over 250 people and has achieved revenues of >$80 million.

According to Managing Director, Kelly Elphinstone, "Elphinstone commenced manufacturing in 1975, and we have currently 275 people employed right here on the north-west coast of Tasmania. This ranges from tradespeople like boilermaker welders and diesel mechanics, right through to our Product Development team of 35 people."

The key to Elphinstone's success is the specialised design, engineering, and manufacturing knowledge of their skilled local workforce, explains Kelly.

"Our advice to any business out there – whether you're a manufacturer or not – is to look after your people. Your people will always be your most valued asset. If you continue to invest in and engage with your people, they will continue to give back. That's the single most important thing in our success story.

"Trades today have changed significantly from those that the current generation's fathers and grandfathers may have participated in. Today, the careers created within the manufacturing industry are extensive. However, if we are to continue attracting the next generation of employees into critical trades-based roles, we need to continue investing in technology and the skills of our tradespeople.

"It's very important our tradespeople are able to evolve their skills with new technologies used to manufacture the products we sell every day. We have robot welders, and our machining centres are all driven by software programming. We are even starting to use simulators as another way to train our tradespeople," said Kelly.

Elphinstone's leaders actively support their tradespeople to complete further study if they choose, so they may progress their trades into other fields such as engineering, for example, and become a valued member of the company's Product Development team.

9 BUILD YOUR WORKFORCE AND CULTURE

HOW TO CREATE AN INNOVATIVE MANUFACTURING ENVIRONMENT

Many manufacturers shared with AMGC that they would like employees to challenge current ways of thinking, suggest better ways of doing things, and occasionally take risks. These are essential steps for advanced manufacturing and require a special type of culture. Several manufacturers told AMGC that creating an environment where all employees feel they can speak up, challenge the status quo, and share new ideas has been crucial to their company's success.

> "[It is about] setting up the right environment so that they feel empowered, so that they can perform at their best."
>
> ~ Queensland manufacturer

Encouraging innovative thinking is linked to other positive outcomes such as greater employee engagement, more knowledge-sharing[49] and better company performance.[50] One study of 51 work teams within a manufacturing company found team members engaging in learning behaviours, such as taking time to work out how to improve work processes, produced better work that was more likely to exceed customer expectations.[51]

> "You restrict the percentage of growth of a business to the percentage of people who are allowed to contribute ideas."
>
> ~ Queensland manufacturer

Manufacturers with high staff retention shared the following recommendations on how manufacturing companies can improve their culture and environment.

Be transparent and consistent. Building company culture can take many years before it reaches fruition. It is important that you frame expectations for your employees and communicate why they are important. This will help ensure that everyone is on the same page and working towards a common goal.[52] One manufacturer from Western Australia mentioned, "*You have to have people who bring the team along. Have the knowledge and ability to make them understand the change.*"

Once the team is on the journey, it is important to maintain consistent direction in vision execution until you reach your goals. A Queensland manufacturer shared that, "*Some people jumped on board quickly [when we implemented more digital technology into core business]. The struggle was with the boilermakers who needed to clock on and off jobs and fell back to using their old manual systems which they were familiar with even years later. You have to go the whole hog and need to be very consistent in your approach as a management team. You need to be strict at times to have a uniform approach. Need to actually make decisions then stick to them.*"

> "It's damaging to your culture if you don't live your values. You need consistency. Integrity of holding those values high."
>
> ~ New South Wales manufacturer

49 Siemsen, E, Roth, A V, Balasubramanian, S & Anand, G, (2009), "The influence of psychological safety and confidence in knowledge on employee knowledge sharing", Manufacturing & Service Operations Management, 11(3), 429–447. https://doi.org/10.1287/msom.1080.0233

50 Edmondson, A C & Lei, Z, (2014), "Psychological safety: The history, renaissance, and future of an interpersonal construct", Annual Review of Organizational Psychology and Organizational Behavior. https://doi.org/10.1146/annurev-orgpsych-031413-091305

51 Edmondson, A, (1999), "Psychological safety and learning behavior in work teams", Administrative Science Quarterly, 44(2), 350. https://doi.org/10.2307/2666999

52 Edmonson, A. C. (2018, November 14). How fearless organizations succeed. Retrieved from https://www.strategy-business.com/article/How-Fearless-Organizations-Succeed

Considering how staff fit in culturally. 'Culture fit' is defined as an individual's attitude, values, and beliefs being in line with the core values and culture of an organisation.[53] Culture fit is hard to measure individually, however, it can be helpful for manufacturers to consider how a person relates to and will contribute to the core values of the organisation.

"We first do an assessment of skills but then we also do a culture interview (we want to make sure they will fit with our company culture). In our business, people need to be focused on the 'we' and not the 'I' – there are no egos in the room, we hire people who are willing to be humble and willing to learn." – Queensland manufacturer

> It is necessary to distinguish that 'culture fit' should not be confused with how a person fits into the company on a social level. Employees with a diverse background can be great at the job you need done. Making great hires is about recognising great matches for the objectives the company needs to achieve – not who you want to have a beer with.[54]

Further, sometimes the culture a business had in the past is not the culture it wants moving forward. In this instance, manufacturing companies should review how existing staff contribute to the future vision of the company.

> We often have had people who were good at their job but bad for the other 20–30 people."
>
> ~ Queensland manufacturer

Empowering staff to speak up. For employees to feel empowered to speak up at work, they need to feel as though their input is genuinely welcome and taken on board. To encourage this, it is helpful to demonstrate humility – acknowledge that management might not have all the answers. Forums enable employees to have a say and feel valued when their responses have been genuinely listened to.

"Decisions are not just made by senior leaders, the culture tries to make sure that the person who gets to make the decision is the person in the best place to do so (which may not be the person at the top)." – Queensland manufacturer

Responding productively to risk-taking. Failure is a necessary part of innovation. Organisations must accept failure as a necessary evil, so that employees feel safe enough to take risks. Expressing appreciation for the efforts of employees and the way they navigate their work, rather than only praising outcomes, leads to impact. Celebrating failures produces learnings for companies.

> Yes, things will fail but you have to be in a position that people can feel they can try things…"
>
> ~ Western Australian manufacturer

Providing continued learning opportunities. Manufacturers recognise that providing continuous learning opportunities are a necessary pathway to meet future needs to modernise and stay relevant in today's market.

> We try to foster a culture of constant and consistent learning."
>
> ~ Queensland manufacturer

Increasing diversity. Diverse backgrounds are important. People can raise issues and go against the grain. It tends to be outsiders who are practised in doing this.

53 Company Match. *Cultural Fit – a definition.* Retrieved from: https://www.companymatch.me/en/content/4468/cultural-fit-a-definition.html?lang=en

54 McCord, Patty (2018). *How to Hire.* Harvard Business Review January-February 2018 Issue.

9 BUILD YOUR WORKFORCE AND CULTURE

HOW TO ENCOURAGE INTERNAL COLLABORATION AND COMMUNICATIONS

Many of the firms AMGC interviewed reported that they wanted a collaborative culture that encouraged open communication and teamwork while valuing individual contributions.[55] This culture was linked to positive outcomes, including improved organisational performance and employee retention, and could act as a drawcard for new employees.

> "You don't need fancy things to make good conversation happen."
>
> ~ New South Wales manufacturer

Making regular communication the norm. Making regular communication the norm can be achieved by holding frequent check-in meetings, and diverse input is encouraged by inviting a different person to set the agenda each time.

Holding participatory meetings. In this format, supervisors step aside and encourage workers to share their thoughts, discuss problems and solutions with the group, and set personal goals. Participatory meetings have been shown to increase productivity.[56]

Bringing diverse teams together. Having people from different teams come together to work on a problem brings a variety of perspectives, which can lead to new insights and prevent groupthink.

Avoiding silos. Uniting employees with a single vision encourages different teams to work towards common goals. Matrix management – in which an individual has a direct manager and works with one or more other managers, typically on projects – can also encourage people to work across a variety of teams.

Changing the physical environment to encourage collaboration. Setting up the workplace to encourage regular communication avoids silos, for example by creating common areas for all employees to gather often instead of having different spaces for different teams.

55 Lopez, S P, Peon, J M M & Ordas, C J V, (2004), "Managing knowledge: The link between culture and organizational Learning", *Journal of Knowledge Management, 8*(6), 93–104. https://doi.org/10.1108/13673270410567657

56 Wu, S J & Paluck, E L, (*under review*), "Lewin at work: Increasing productivity through group influence". https://www.sherryjwu.com/s/wd6vpityxquddfejn7gtsl07g34ib9

10

10 EXTEND YOUR MARKET REACH

AT A GLANCE...

- Companies that export can transform their growth trajectory and profitability.
- Export opportunities are often 'out of sight, out of mind', and easily missed.
- Manufacturers can increase the likelihood of finding the right overseas partner.

Evidence shows that productivity, profitability, and wage benefits accrue to firms that export.[57] By tapping into a pool of billions of potential customers worldwide – in contrast to Australia's small domestic market – direct and indirect exports offer increased customer demand and market diversity, leading to greater sales volumes. In turn, this reduces production costs per unit, increases leverage with suppliers, improves forecasting and planning, and provides greater potential for automation.

Healthy export volumes are a hallmark of many of Australia's most advanced manufacturers. If a business is not already selling overseas, then now is the time to focus on strategic expansion and exporting. However, it is difficult to systematically plan to engage in these activities. For example, where export does happen, it is often the result of personal connections and happy accidents, rather than planning.

The majority of Australians (80%) recognise that the trade and export of Australian goods benefit the economy. However, a smaller proportion believe that the majority of Australian manufacturers compete on a global scale (See: Exhibit 20). According to previous AMGC research, Australia's most successful manufacturers engage in global trade, but they are few in number: just 5% account for 99% of the industry's total export value.[58] If many of the remaining 95% are to advance, they must focus on high-potential export markets, including for intermediate goods – products that are used as components of larger total products and solutions.

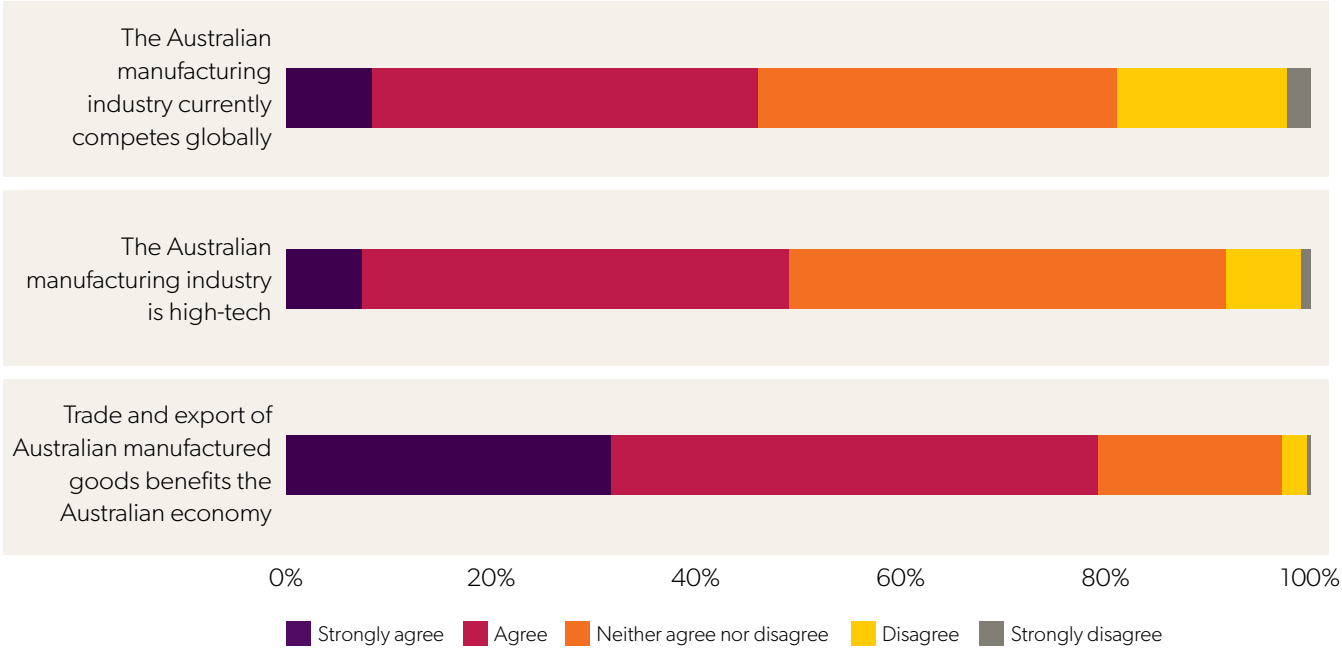
Many manufacturers that AMGC met who were not currently expanding but were interested in doing so reported not knowing how to forecast or find the best market for their product. Many wanted to develop forecasting skills and to make better use of online and consumer analytics and digital platforms. This relates back to Way 2 – Focus on Leadership and Way 3 – Plan for Change.

57 OECD and World Bank Group, (2015), *Inclusive Global Value Chains: Policy options in trade and complementary areas for GVC Integration by small and medium enterprises and low-income developing countries*, p 14. http://www.oecd.org/tad/tradedev/OECD-WBG-g20-gvc-report-2015.pdf

58 Advanced Manufacturing Growth Centre, (2018), *Advanced Manufacturing: A new definition for a new era*, p. 28.

Exhibit 20 – Australians recognise the benefits of trade and export of manufactured goods, but are less sure of how competitive the industry is globally

How much do you agree or disagree with the following statements?



Source: AMGC Australian Manufacturing Perception Survey, The Behavioural Insights Team analysis.

10 EXTEND YOUR MARKET REACH

HOW MANUFACTURERS CAN STRATEGISE TO EXPAND AND EXPORT THEIR PRODUCTS

Take it step by step and incorporate market reach into business-as-usual planning. Manufacturers should consider market reach as an action area by setting export specific goals. Templates for export business plans and guidance are available from the Export Council of Australia and Austrade. It helps to break the process down into manageable steps. Export Finance Australia (formerly the Export Finance and Insurance Corporation) and Austrade can help manufacturers develop international business skills, conduct international market research and build global networks. Austrade can also assist by connecting manufacturers with overseas distributors and international partners.

Linking into global supply chains. Australian manufacturers have among the weakest links with international manufacturers of any major economy. Manufacturers must make it a priority to build relationships with international manufacturers – not only those with supply chains they are selling into, but also those who could provide a source of inputs for their goods and services. Collaborating with other manufacturers can help break into multiple markets and generate export opportunities.

Recognising and maximising opportunities for 'chance events'. Many exporters have said their export opportunities came about after chance events or encounters. Attending events and trade shows wherever possible can facilitate networking with other manufacturers. In particular, the networking-focussed elements of these sessions can maximise opportunities for new connections.

Using technology to facilitate strategic expansion and exports. Understand the importance of a business's online presence. Digital tools such as video conferencing provide a cheap way to facilitate international discussion, compared to international travel, and can facilitate networking.

Identifying and reaching untapped markets and segments. Manufacturers should think outside the box about how their product, service, or equipment could be used to access new types of markets. Austrade, Export Finance Australia and other government assistance programs can help manufacturers identify underserved overseas markets and develop strategies for market entry. Manufacturers should focus on identifying markets where the firm enjoys a competitive advantage.

Financial guidance and finance for export. Although export is an extension of the existing business, finance for export is specialised. Access to finance from domestic banks is more challenging than for domestic business expansion or for equipment located within Australia. The Australian Government's Export Finance Australia assists exporters by filling this gap with loans, bonds, and guarantees on a commercial basis as an augmentation to funding by Australian banks. In addition, there are targeted grants such as the Export Market Development Grant (EMDG) that provides a proportional reimbursement of overseas marketing and development costs. EMDG consultants can assist new applicants in accessing this and other export related grants.

> "We [manufacturers] know we cannot stay competitive in a single market – be creative in 'where you play'."
>
> ~ South Australian manufacturer

Company: Norweld

Headquarters: Cairns, Qld

Employees: 11 to 50

Key Industries: Arts/Recreation, Automotive, Engineering and Metals

Using your digital presence

Norweld has garnered itself a strong social media following, boasting upwards of 45,000 followers on both Facebook and Instagram. With fans all over the world, a quick glance at their Instagram account delivers photos of their heavy-duty products being enjoyed in some of the world's most amazing locations, from the beaches of Stradbroke Island, to the streets of Riyadh, and even next to an elephant in the wilds of Africa.

"Social media was a long-term strategy for us. We spent a lot of time making sure our content is relevant and appeals to our customer. Our content is focussed on the product and where it can take you – rather than on the company itself. It tugs at the heartstrings and focusses on quality time spent with the family in the bush, on the dream of travelling around Australia for an extended period of time."

Digital marketing activities, like Search Engine Optimisation (SEO) have been key to Norweld's success. "We don't spend much on Google Ads. Instead, what made the biggest difference for us was SEO. You have to make sure that, if people are searching for your products online, your website content is relevant and that it is being pushed through at the right time.

"Mobile devices are the main source and tool for search now – something like 70% of our website visitors are using mobile devices. So, we are in the process of building a new website that correlates to that usage. You have to be nimble, able to pivot and adapt" said Isaac Edmiston, Sales and Marketing Director.

APPENDICES

In developing this report, AMGC conducted research into the barriers that manufacturers face in transitioning to advanced manufacturing. Three main research activities were undertaken, which are detailed below. Insights from these were collated and form the basis of this report.

APPENDIX 1 – INTERVIEWS AND FOCUS GROUPS TO UNDERSTAND BARRIERS FOR MANUFACTURERS

From February to March 2019, AMGC ran 30 focus groups, round table discussions and individual interviews with 93 manufacturing companies, industry networks, government agencies, and universities across Australia. The industry organisations interviewed have a collective network of about 370 manufacturers. The sample was representative across states and company sizes, with 29% of manufacturing companies interviewed being small (fewer than 20 employees), 57% medium (20–199 employees) and 14% large (200+ employees). Interviews were conducted with companies in urban (62%) and rural (38%) locations, and the majority of participants were not AMGC members (See: Exhibit A1). Exhibit A1 shows the location of all focus groups, interviews and round table discussions across Australia.

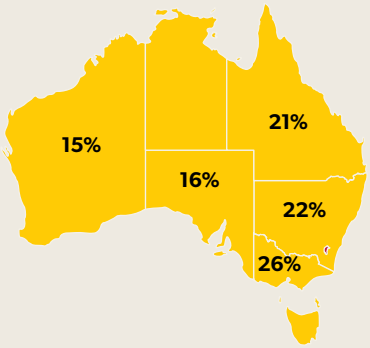
Participants were asked about the barriers to competitiveness they perceive to exist within four overarching areas:

- Readiness to change (change management, forecasting skills, and leadership capabilities)
- Product value (product development, access to finance, and collaboration practices)
- Workforce skills (training methods, workforce development, and internal culture)
- Market reach (market penetration and diversity).

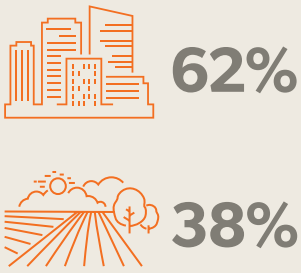
Insights from these focus groups, round table discussions, and interviews were collated and grouped into the key topics discussed in this report.

Exhibit A1 – Manufacturing Focus Group Sample

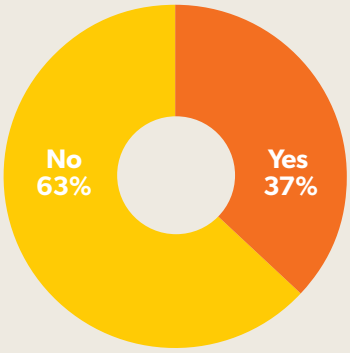
State



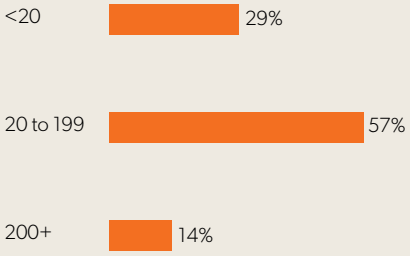
Region



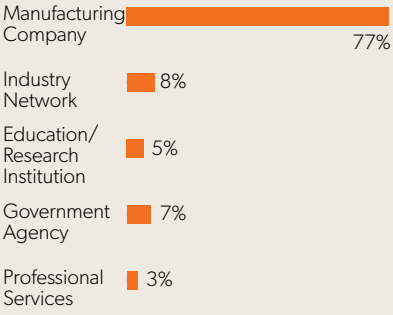
AMGC Member



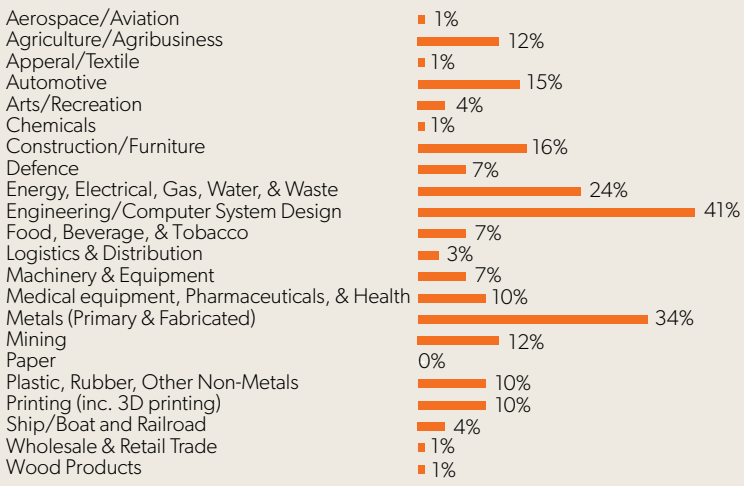
Company Size



Business Type



Sub-Industries



Source: AMGC Focus Groups.

Exhibit A2 – Map of Australia illustrating the location of interviews, focus groups and round table discussions conducted by AMGC

APPENDIX 2 – SURVEY AND FOCUS GROUPS WITH STUDENTS

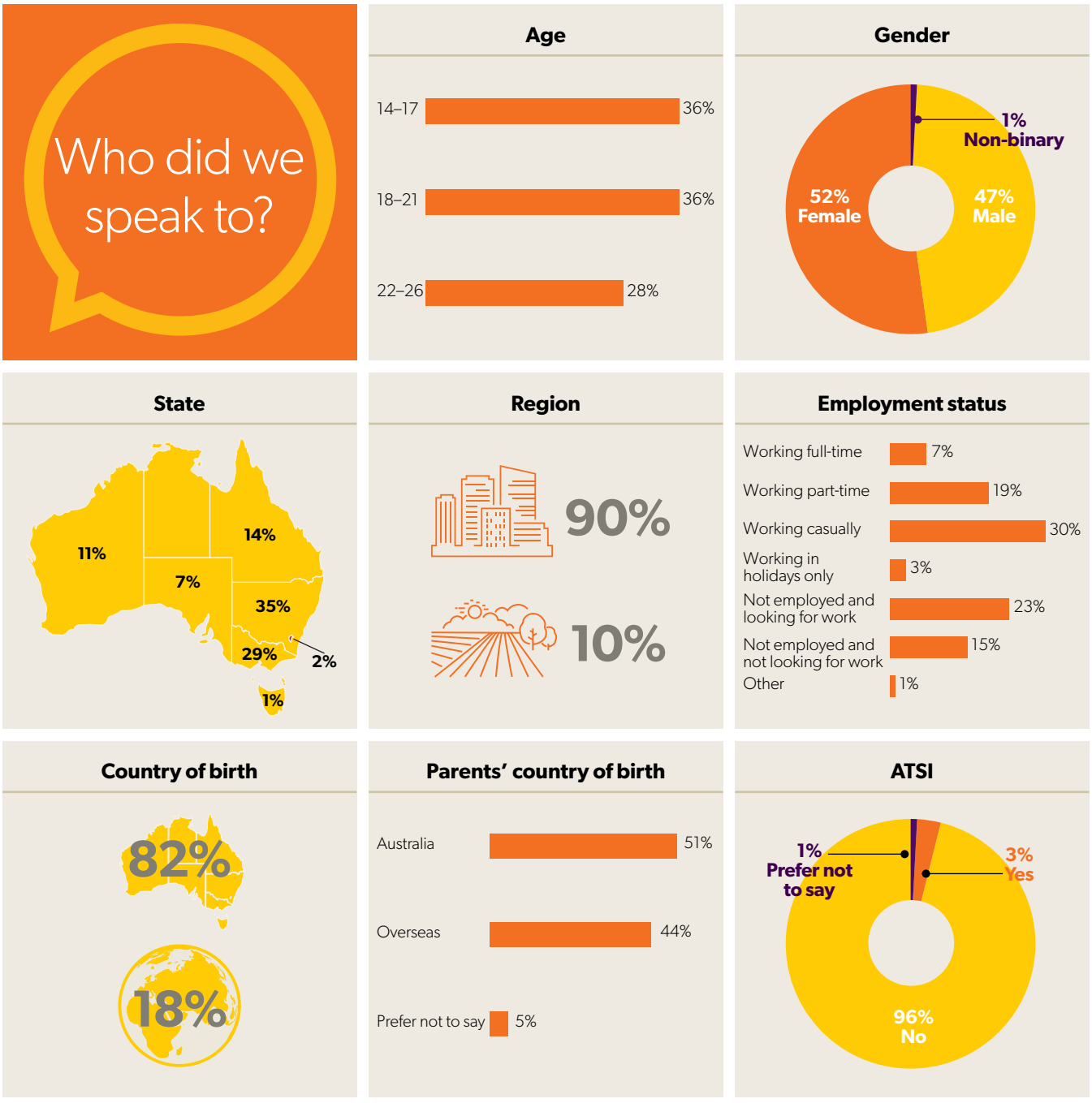
To understand how students in Australia perceive the manufacturing industry, AMGC surveyed 1,000 students aged 14–26. The participants were selected to be nationally representative of the different states and rural/metro areas. Small variations in demographics were managed through weighting.

Table A1 – Age and gender breakdown of student survey sample

Gender			
	Sample	**Target**	**Weighted sample**
Male	47%	50%	50%
Female	52%	50%	50%
Non-binary	1%		
Age			
	Sample	**Target**	**Weighted sample**
14–17	36%	34%	34%
18–21	36%	33%	33%
22–26	28%	33%	33%

Table A1 shows the age and gender breakdown of the sample. Participants were from all states and territories except the Northern Territory, and the majority (90%) lived in metropolitan areas. The majority of students (82%) were born in Australia but 44% reported that at least one parent was born overseas, and 3% identified as Aboriginal or Torres Strait Islander. The sample was reasonably evenly split between high school students (40%) and university undergraduate students (44%), with an additional 9% in postgraduate university studies and 7% in vocational training. The largest cohort of students (38%) were not employed, 30% were in casual work, 19% worked part-time and 7% worked full-time (See: Exhibit A3).

Exhibit A3 – Young Australian Perception



Source: AMGC Young Australian Perception Survey, YouthInsight analysis.

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Participants completed a 20-minute questionnaire online. It aimed to understand student perceptions of the manufacturing industry and the sources of these perceptions, and drivers of career choice and the decision-making processes of young people, to try to determine how to position manufacturing as a desirable career option. At the end of the survey, participants were shown two short videos and an infographic about manufacturing in Australia and were asked whether their interest in manufacturing had changed as a result. Key insights from this survey are detailed in the current report.

To supplement the quantitative results, qualitative research was used to 'deep dive' into some of the issues raised. In September 2019, AMGC conducted two focus groups in Sydney with 13 students. Table A2 outlines the demographic details of all focus group participants.

Focus group participants were asked to provide detail on what drives their career interests and to comment on how best to encourage young people to work in manufacturing. Students were also asked about their perceptions of Australian-made products and why they thought young people may choose to buy products made overseas. Insights from these focus groups were collated and have informed the current report.

Table A2 – Demographic details of students who participated in focus groups

Focus group 1			
Gender	**Age**	**Current studies**	**Employment**
Male	18	University 2nd year undergraduate	Not employed and looking for work
Male	19	TAFE	Not employed and looking for work
Male	23	University 3rd or more year undergraduate	Working part-time
Non-binary	18	University 1st year undergraduate	Working casually
Female	23	TAFE	Working full time
Female	19	University 2nd year undergraduate	Working casually
Female	21	University 2nd year undergraduate	Working casually
Focus group 2			
Gender	**Age**	**Current studies**	**Employment**
Female	18	High school Year 12	Not employed and looking for work
Female	18	University 1st year undergraduate	Working part-time
Male	20	University 1st year undergraduate	Working casually
Male	22	University 3rd or more year undergraduate	Working casually
Male	18	University 1st year undergraduate	Not employed and looking for work
Female	22	University 3rd or more year undergraduate	Working part-time

APPENDIX 3 – SURVEY WITH THE GENERAL AUSTRALIAN PUBLIC

To understand perceptions of manufacturing among the general population, AMGC conducted an online survey of 1,000 Australians aged 18 or over. The sample was nationally representative (Table A3). A small proportion of the sample (4%) identified as Aboriginal or Torres Strait Islander, and the majority of the sample (66.5%) lived in metropolitan areas compared to rural areas (33.5%).

Table A3 – Demographic details of members of the general public who participated in focus groups

		Current sample (%)	National sample (%)
Gender	Male	50.5	50.7
	Female	49.2	49.3
	Non-binary	0.3	
Age	18–24	11.8	~13.3
	25–34	18.2	13.8
	35–44	17.1	14.3
	45–54	17.6	13.7
	55–64	15.2	11.6
	65+	20.1	14.0

Almost two-thirds of the sample (62.6%) reported having children. The most commonly reported highest level of education completed was high school (31.1%), followed by TAFE (29.6%), and an undergraduate degree (26.3%).

The questions were developed to align with the student survey and with similar studies that have been conducted elsewhere.[59] The questions centred around perceptions of the current manufacturing industry in Australia, the future of manufacturing, Australian-made products, drivers of career choice, and what careers in manufacturing can offer. As in the student survey, participants were then shown two brief videos and an infographic about manufacturing and their level of interest in manufacturing was assessed. Key quantitative insights from this study are described in this report.

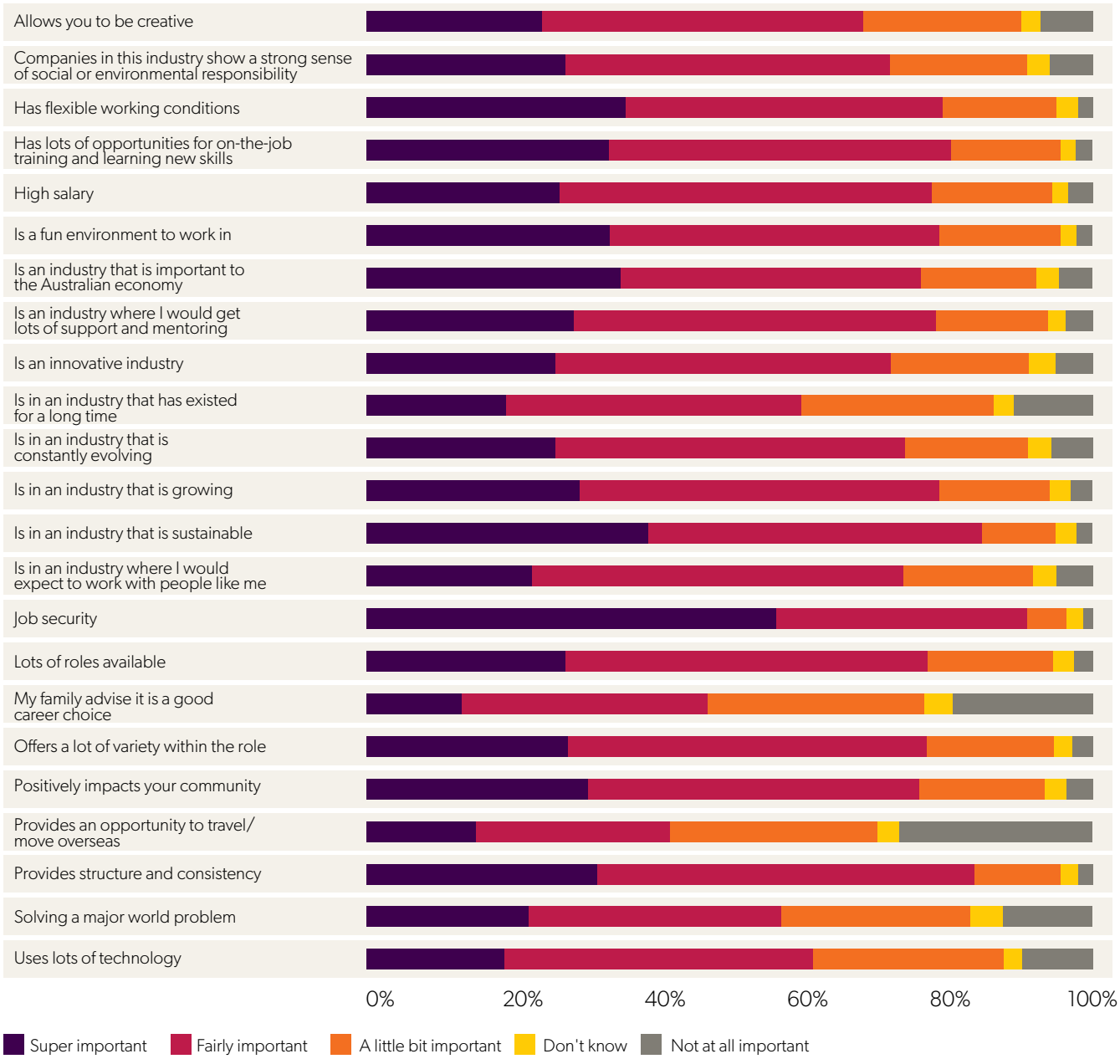
59 The Manufacturing Institute (2017). *A look ahead, how modern manufacturers can create positive perceptions with the US public*. Retrieved from: http://www.themanufacturinginstitute.org/~/media/9607397D3AFC423AB68133505EE2C348/2017_US_Public_Perception_Manufacturing_Study.pdf

APPENDIX 4 – FURTHER GENERAL AND YOUNG AUSTRALIAN PERCEPTION RESULTS

For further information on perception results contact AMGC at enquiries@amgc.org.au

Exhibit A4 – Job security is the most important factor in Australians' personal career choice

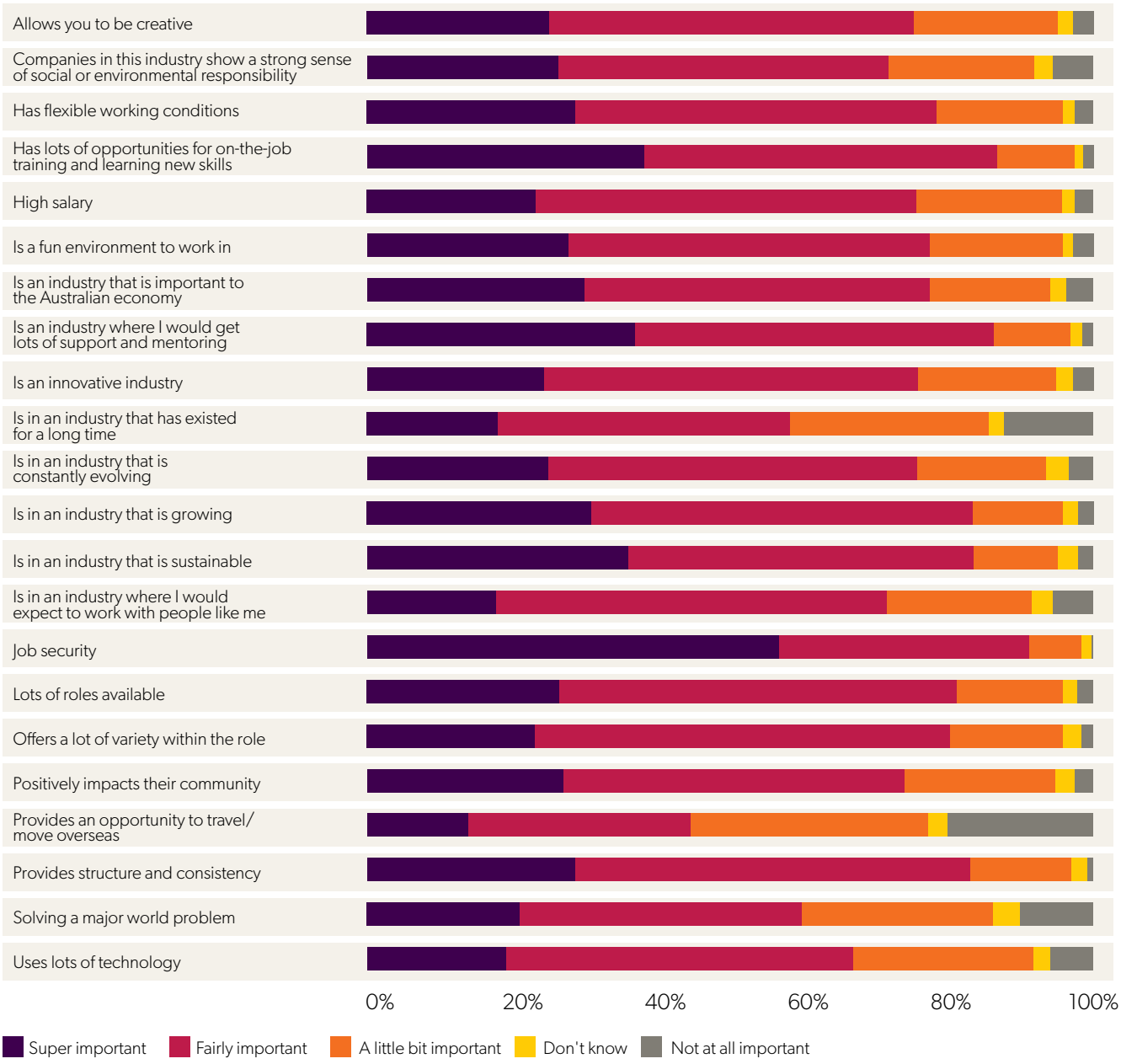
How important are each of the following to you when choosing a career?



Source: AMGC Australian Manufacturing Perception Survey, Behavioural Insight Team analysis.

Exhibit A5 – Australians also prioritise job security for their children

How important are each of the following to you when choosing a career?



Source: AMGC Australian Manufacturing Perception Survey, Behavioural Insight Team analysis.

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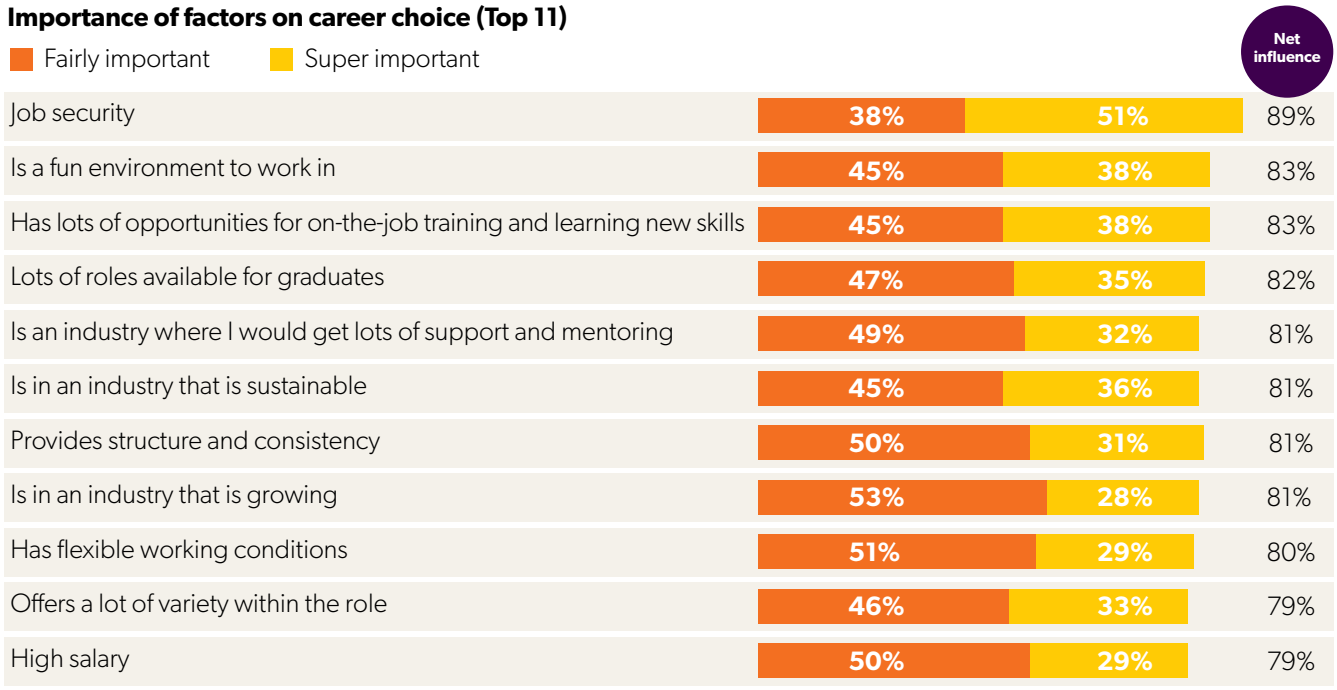
Exhibit A6 – Job security is the top factor when young Australians are choosing a career, followed by a fun environment

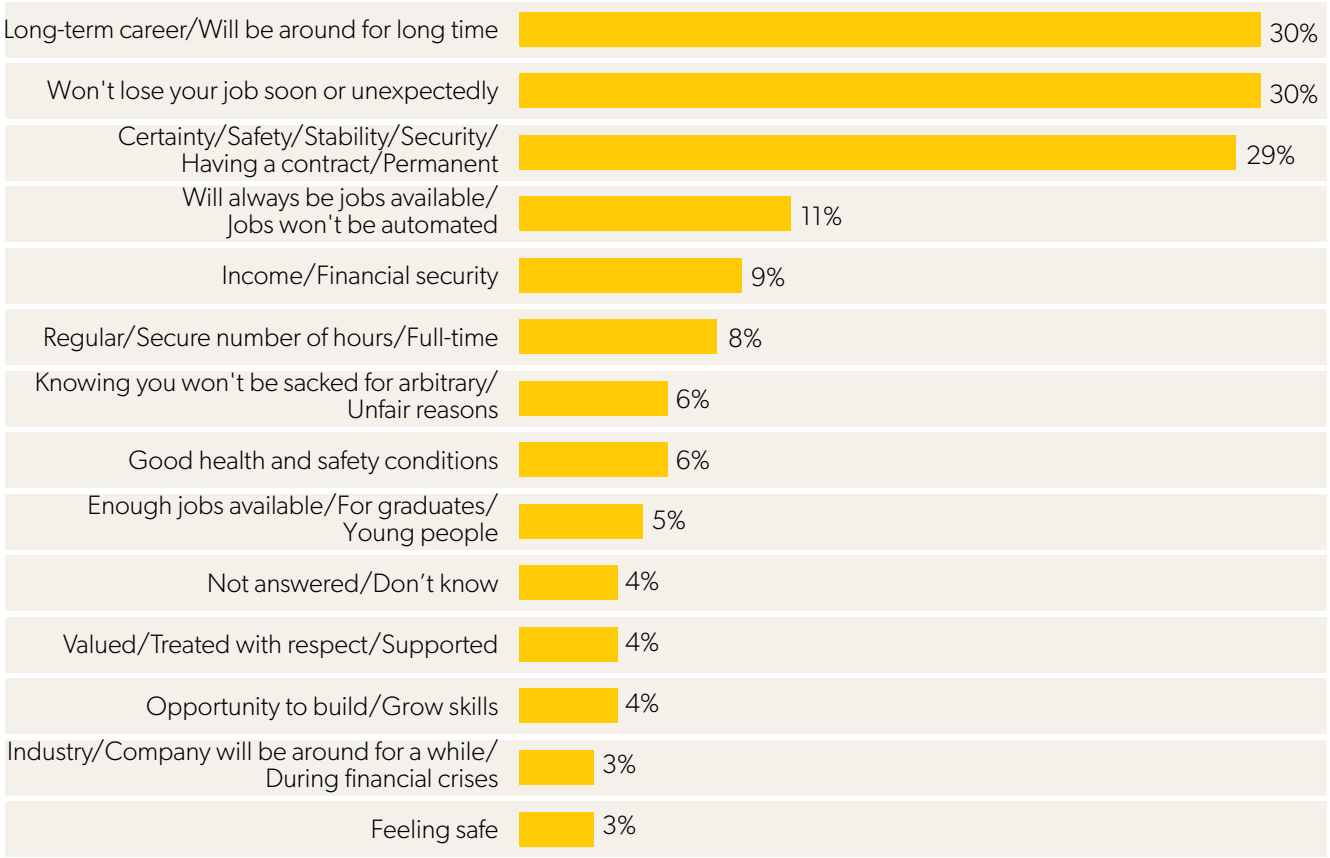


Notes: Q. How important are each of the following factors when choosing a career? Base: Total – 792 done via follow-up study due to data issues
Source: AMGC Young Australian Perception Survey, YouthInsight analysis.

Exhibit A7 – What does 'job security' mean?

Young people are seeking certainty and predictability

What does job security mean? (Top 14)



"Job security is the likeliness of a job to exist in the future in comparison to other jobs. This is particularly important to my generation because of the evolution of technology and robots."

"Means I won't be out of a job suddenly. As long as I am a good worker, I am guaranteed a job. I am also guaranteed a certain amount of hours a week/fortnight/month to ensure I have a stable income."

"That your tenure is guaranteed/secured and that you won't be fired on a whim, for instance if there is an excess of staff to duties. Also one where you are offered part-time or full-time work as opposed to casual work which has no guarantee."

"Stable industry in which I am going to know I'm going to have a job each year with a suitable income to support myself and future family."

"I want to have no stress."

Those under 18 and who work casually or part-time were more likely to want security and predictability – as were TAFE, public school and co-ed students

Notes: Q. You mentioned that job security is important to you. What does the phrase job security mean to you? Please provide as much detail as possible – Coded. Base: All who said job security was important n=802.

Source: AMGC Young Australian Perception Survey, YouthInsight analysis.

Exhibit A8 – Young Australians are prepared to trade short-term for long-term in their career choice

Young people are prepared to trade short-term for long-term in their career choice

WHAT MAKES A GREAT CAREER/SECURE JOB?

Spontaneously talk about their first career role as 'forever' jobs

But when pressed, opportunities for career progression longer term matter more than short-term gains

Similarly, although a good starting salary is desirable, future earning potential is more important to almost all

Some key differences between the university and vocational groups

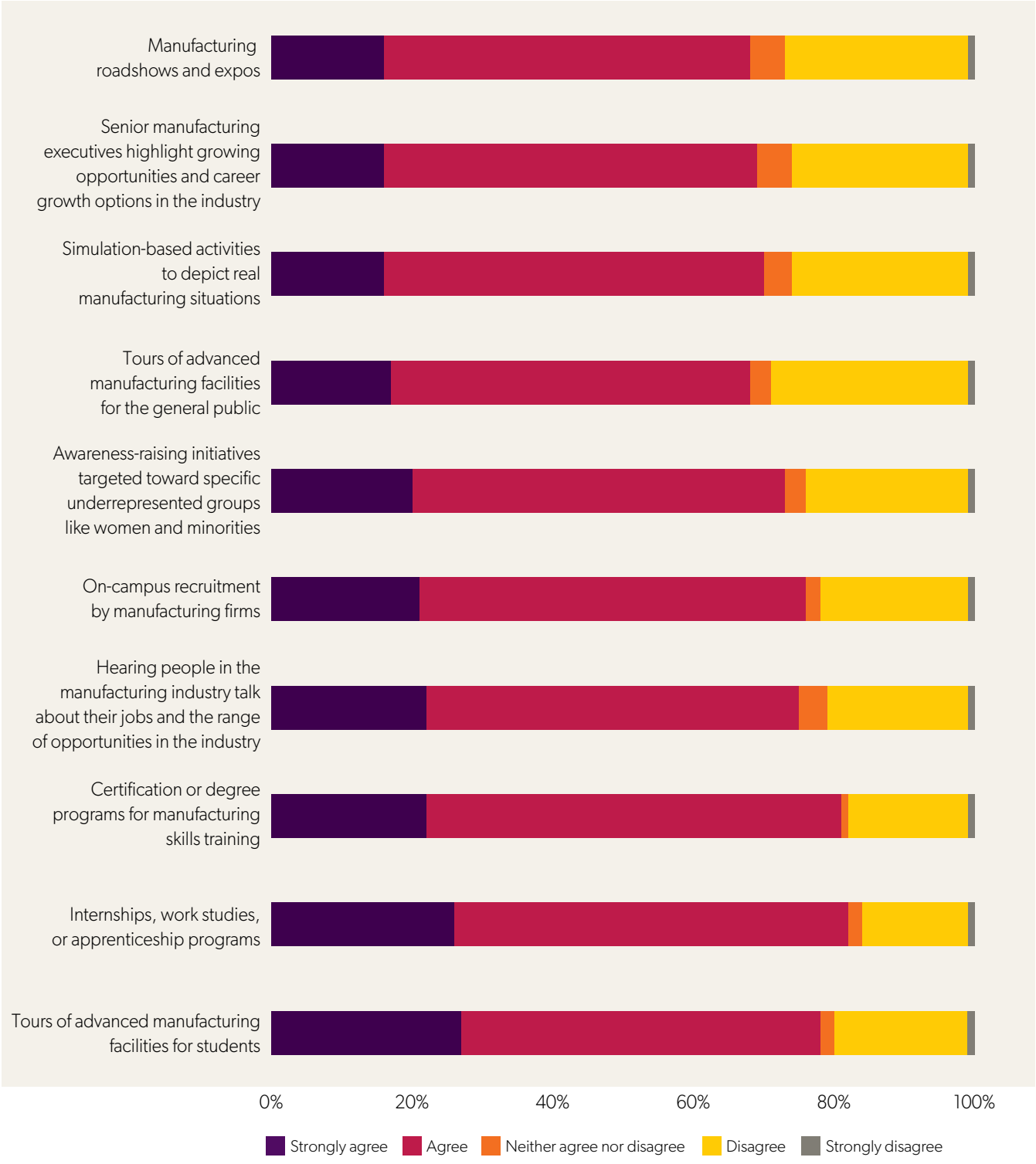
Vocational students more modest in their expectations of what constitutes a good salary – especially starting salary

Job security is about transferable skills to university students, whereas for vocational students it was about being adaptive in their current roles

Need to demonstrate how manufacturing can deliver long-term (where will it take you in five to ten years time) but nuance the message by audience

Exhibit A9 – Ratings of programs that would make manufacturing more attractive to the Australian public

How much do you agree or disagree with the following statements?



Source: AMGC Australian Manufacturing Perception Survey, The Behavioural Insights Team analysis.

Way 1. Recognise Australian manufacturing's strength

- ☑ Manufacturing is valued
- ☑ Product quality is valued

Way 2. Focus on leadership

- ☑ Keep learning
- ☑ Be inclusive
- ☑ Lead by example
- ☑ Stay relevant

Way 3. Plan for change

- ☑ Be proactive
- ☑ Prioritise working on the business
- ☑ Share leadership responsibilities

Way 4. Network and collaborate

- ☑ Reach out to other manufacturers
- ☑ Join supportive industry networks
- ☑ Integrate into supply chains

Way 5. Work with research institutions

- ☑ Develop networks and relationships
- ☑ Come with a plan
- ☑ Share the risks involved in advancement

Way 6. Adopt technology

- Learn what technology exists
- Keep things simple
- Build relationships with global integrators and universities
- Share with other manufacturers

Way 7. Access capital

- Update your business plan
- Assess your credit worthiness
- Learn more about grants

Way 8. Hire the right people

- Hire for skills and culture
- Recruit effectively
- Be an advocate for manufacturing

Way 9. Build your workforce and culture

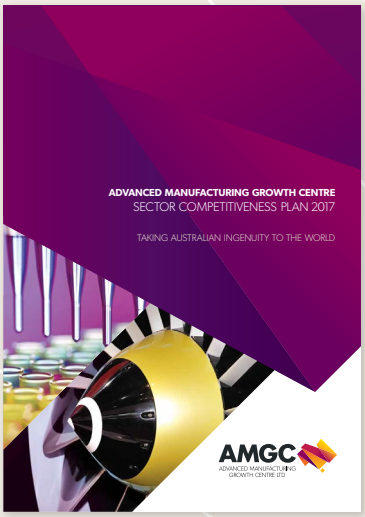
- Prioritise company culture
- Encourage internal job shadowing
- Create an innovative environment

Way 10. Extend your market reach

- Think outside the box
- Incorporate market reach into your strategic plan
- Use your digital presence
- Maximise opportunities at events

OUR PUBLICATIONS

Industry Knowledge Priorities



Sector Competitiveness Plan 2017

A New Definition for a New Era – Defining Advanced Manufacturing Report

Innovation and Science Australia Submission 2017

Submission to the Department of Industry, Innovation and Science 2017

Building Resilience in Australian Manufacturing 2018

Projects Report 2018

Projects Report 2019

Prefab Innovation Hub: Feasibility Study

Learn more

For more information about the Advanced Manufacturing Growth Centre, please visit www.amgc.org.au

Contact us

enquiries@amgc.org.au

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