



DECEMBER 2019

# SKILLS IMPLEMENTATION PLAN

FOR ADVANCED MANUFACTURING



First Edition – December 2019

The Department of State Development, Manufacturing, Infrastructure and Planning

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# Foreword

**A highly skilled workforce is vital to the future growth of Queensland's manufacturing industry and diversifying the state's economy.**

The government is partnering with industry to drive the growth of the state's manufacturing industry and transition our manufacturing base to advanced manufacturing.

Advanced manufacturing, also known as Industry 4.0, is revolutionising manufacturing with the greater integration of new technologies, robotics, nanoelectronics, design in manufacturing, data analytics and innovative production systems with a highly-skilled workforce to produce high-value customised products.

The adoption of Industry 4.0 will help drive improvements in efficiency and productivity delivered by a highly skilled workforce leading to significant export opportunities and economic growth.

The government is committed to ensuring Queensland's manufacturing industry has the skilled workers it needs to meet the jobs market of the future.

In November 2018, the Premier of Queensland hosted the *Future of Work – Skills and Industry Summit*, to gather important insights into the future of work and skills in Queensland to ensure our workforce is ready for future opportunities.

Building on the summit, in August 2019 the Queensland Government released its plan to strengthen our skills and workforce development responses to meet the needs of industry and employers, and support jobs growth throughout the state: *Skills for Queensland—Great training for quality jobs*.

Through the *Queensland Advanced Manufacturing 10-Year Roadmap and Action Plan* (Advanced Manufacturing Roadmap) and the Manufacturing Ministerial Council we are ensuring Queensland's manufacturing industry has the highly skilled workforce it needs to remain on a strong growth path to become more innovative and globally competitive.

As a key action of the Advanced Manufacturing Roadmap, Jobs Queensland developed an Advanced Manufacturing Skills, Training and Workforce Development Strategy to identify the opportunities and challenges within Queensland's manufacturing industry.

To effectively implement the Priority Action Areas identified in this strategy, we established a joint industry and government Manufacturing Skills Working Group to lead development of this Skills Implementation Plan for Advanced Manufacturing (the Plan).

The Plan aligns with the Our Future State: Advancing Queensland's Priorities initiative; builds upon existing skills initiatives and introduces new targeted programs that will help build the global competitiveness of the state's manufacturing industry.

In particular, the Plan has a strong focus on the ongoing development of regional manufacturing through building regional networks, leveraging investment through the Regional Skills Investment Strategy and implementing a suite of programs through regional Manufacturing Hubs in Cairns, Townsville and Rockhampton.

This Plan focusses on developing skills ecosystems, building leadership, business and workforce capabilities and creating an environment where advanced manufacturing is understood. It will inform the skills requirements of the future.

We are laying the foundations, so today's Queenslanders are ready for the future.



**The Hon. Cameron Dick MP**  
*Minister for State Development,  
Manufacturing, Infrastructure  
and Planning*



**The Hon. Shannon Fentiman MP**  
*Minister for Employment and  
Small Business and Minister for  
Training and Skills Development*



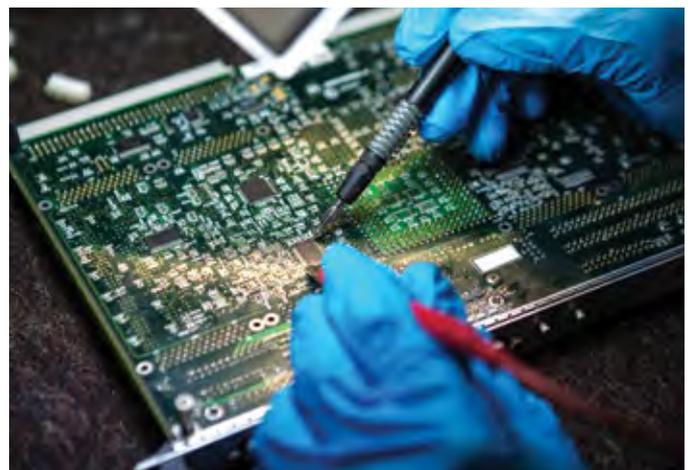


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## CURRENT QUEENSLAND GOVERNMENT ACTIONS

### Activities from the Advance Queensland initiative that will assist manufacturers transition to an advanced state

- » **Advancing Regional Innovation Program** supports the development and increased maturity of regional innovation initiatives.

### Increasing the adoption of leading-edge design, innovation, technologies, processes and practices

- » **Industry 4.0 – the future of manufacturing initiative** assists manufacturers to understand Industry 4.0 through masterclasses with international experts and to prepare a futuremap.
- » The \$46m **Made in Queensland grant program** is supporting manufacturers to adopt new technologies and systems.
- » The **Design in Manufacturing program** is accelerating the incorporation of design principles and practices.
- » The **Digital Connectivity program** is bringing manufacturers closer to their customers and supporting companies to better manage the manufacturing process and product life cycle.

### Positioning the Queensland education system to provide the underpinning knowledge and skills for the workforce of the future

- » The **Advancing STEM in Queensland's state primary school's initiative**, is a \$81.3m investment by the Queensland Government to help primary schools in Queensland to transform learning and teaching, participation and achievement in Science, Technology, Engineering and Mathematics (STEM). Our plan for STEM in Queensland state schools will:
  - » lift participation of students including females and Aboriginal and Torres Strait Islander students
  - » give every state school access to a specialist STEM teacher
  - » ensure every state school offers the Digital Technologies curriculum, including coding and robotics
- » The Department of Education provides support for students to participate in work experience programs, including work sampling, which provides an introduction to work environments or industry, and structured work placement as a component of VET qualifications.

### Resourcing the necessary skill acquisition and training programs to enable manufacturers to secure the high-level skilled workforce for the future

- » The Queensland Government invested over \$69 million in 2018–19 through the **VET investment budget** to provide skills for the manufacturing sector. Government works with industry through stakeholder engagement mechanisms, including regional training networks, to identify opportunities to upgrade leadership and management skills and capabilities in manufacturing workplaces.
- » The **Regional Skills Investment Strategy**, a \$9 million four year initiative introduced in 2017–18 through the VET Investment Plan, aims to support selected regions to identify current and emerging jobs and skills issues and design tailored solutions.
- » **Gateway to Industry Schools Program** is a state-wide industry engagement and workforce development strategy focussed on engaging school students to support the long-term development of a highly skilled workforce in Queensland.
- » Additional funding of \$5 million in 2019-20 for the **Higher Level Skills** program and more innovative pathways to help maximise job creation and employment opportunities across the Queensland economy that will drive productivity outcomes for industry and employers.
- » Supporting under 21s to learn lifelong skills and build careers in industries where the jobs of the future will be through the **Free apprenticeship for under 21s program**.
- » Provide a **Skills Boost** training subsidy for people of all ages to update their skills to go further in their current job or pursue a different career even if they already hold a vocational education and training qualification.

### Providing value-adding initiatives at all stages of the value chain to increase business awareness, opportunity and capability

- » The \$30m **Manufacturing Hubs** have been established in Cairns, Townsville and Rockhampton and are strengthening regional industry and boosting the competitiveness, productivity and innovative capacity of Queensland's manufacturers.
- » **Supply chain capability workshops** are supporting Queensland manufacturers to access new procurement opportunities.
- » **Expanding regional networks** are enabling regional manufacturers to capitalise on existing strengths and create new opportunities that support the sector in regional Queensland.
- » The Queensland Government's skills agenda is outlined in the Queensland Skills Strategy, **Skills for Queensland – Great training for quality jobs** and addresses the growing imperative to prepare all Queenslanders to meet industry and employer needs in the labour market, and to provide opportunities for individuals to continue to skill, re-skill and up-skill throughout their working lives.

### Increasing the diversity of the manufacturing workforce with activities

- » Delivering the **Women in Manufacturing** seminar series and promoting career opportunities in the manufacturing industry to women.
- » The **Advancing Women in Business initiative** has supported 15 organisations, including community groups, to deliver projects to assist women to succeed in business and attain positions of leadership, including in the manufacturing industry.
- » **Advancing Indigenous Business** provides a range of initiatives to maximise opportunities for Aboriginal and Torres Strait Islander businesses to grow, thrive and employ. Advancing Indigenous Business has delivered 15 support programs across the state ranging from full TAFE Queensland qualifications; micro-credential, non-accredited training, business planning and workforce development.
- » The Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP) focuses on enterprise development through the **Moving Ahead** strategy, procurement, supply chain engagement and partnerships, to build and strengthen the business skills of Aboriginal and Torres Strait Islander business owners.

# About the plan

The Queensland Government is collaborating with employers, workers, their unions and the education and training sector to plan for and invest in the skills needed for advanced manufacturing, building on our overarching strategy for skills, *Skills for Queensland—Great training for quality Jobs*.



## VISION

To empower the technological transformation of Queensland's manufacturing industry by attracting, developing and retaining world-class talent and skills.



## INVESTED IN PEOPLE

With a rapid shift toward advanced manufacturing, the government is committed to ensuring that the Queensland manufacturing industry has the skilled people it needs to meet the jobs market of the future.



## INVESTED IN THE FUTURE OF MANUFACTURING

Future growth opportunities for Queensland's manufacturing industry enabled by Industry 4.0, will take manufacturing to a new level focussed on high quality human-centred capabilities that offers stable, diverse and technology-rich careers.

The Manufacturing Ministerial Council established the Manufacturing Skills Working Group in September 2018, to provide the key stakeholder leadership for the development of the Skills Implementation Plan for Advanced Manufacturing.

The Jobs Queensland *Advancing Manufacturing Skills: A Skills Training and Workforce Development Strategy* (the Advanced Manufacturing Skills Strategy) identified challenges and opportunities for the Queensland manufacturing industry<sup>1</sup>. The government response in July 2018 provided a framework to partner with industry and identified priorities through the development of a Skills Implementation Plan for Advanced Manufacturing (the Plan).

The Plan has been developed to support Queensland manufacturers to improve their productive performance and build the skills needed to participate in the journey towards advanced manufacturing.

The Plan addresses the 10 Priority Action Areas (PAA's), in the Advanced Manufacturing Skills Strategy, identifies priorities for government and industry action, and builds on the Queensland Skills Strategy, *Skills for Queensland – Great training for quality jobs*. The Plan will also guide the future work of the Ipswich Regional Roundtable for Advanced Manufacturing, which was established in response to Jobs Queensland's *A Workforce Report and Action Plan for the Manufacturing Industry in Ipswich*.

## THE ADVANCED MANUFACTURING SKILLS STRATEGY HIGHLIGHTS

### 10 KEY PRIORITY ACTION AREAS (PAA'S):

1	Positioning the manufacturing workforce as a key partner in the journey towards advanced manufacturing	6	Strengthening the role of apprenticeships and traineeships and the VET system in supporting skills development
2	Strengthening the business capability of manufacturers	7	Building a highly skilled, adaptable and capable existing workforce
3	Building business management, innovation and productivity at all levels of the manufacturing industry	8	Increasing the diversity of the manufacturing workforce
4	Supporting industry-led ecosystems	9	Positioning manufacturing as a first-choice career
5	Fostering continued industry opportunity growth	10	Facilitating enhanced partnerships and engagement to better prepare new entrants

We are on the cusp of significant change to further strengthen the skills required for a growing sector that embraces digital technology in a culture of continual improvement



## OUR VISION

To empower the technological transformation of Queensland's manufacturing industry by attracting, developing and retaining world-class talent and skills



# MANUFACTURING IN QUEENSLAND

An industry that offers stable, diverse and technology-rich careers

	<p>Women make up one quarter of the manufacturing workforce<sup>2</sup></p>		<p>Manufacturing is the state's sixth largest employing industry<sup>3</sup></p>		<p>Around <b>170,000</b> direct jobs<sup>4</sup></p>		
	<p>Queensland Export \$17.2 billion 2017-18<sup>5</sup></p>		<p>Manufacturing contributing \$20 billion per year to the Queensland economy<sup>6</sup></p>		<p>86% of the workforce is full time<sup>7</sup></p>		<p>The sector comprises around 16,500 manufacturing businesses<sup>8</sup></p>

<sup>2</sup> ABS, 6291.0.55.003, Labour Force, Australia, Detailed, Quarterly, June 2019.  
<sup>3</sup> ABS, 6291.0.55.003, Labour Force, Australia, Detailed, Quarterly, June 2019.  
<sup>4</sup> ABS, 6291.0.55.003, Labour Force, Australia, Detailed, Quarterly, June 2019.  
<sup>5</sup> Gross value-added chain volume measures, based on ABS, 5222.0, Australian National Accounts: State Accounts, 2017-18.  
<sup>6</sup> Gross value-added chain volume measures, based on ABS, 5222.0, Australian National Accounts: State Accounts, 2017-18.  
<sup>7</sup> ABS, 6291.0.55.003, Labour Force, Australia, Detailed, Quarterly, June 2019.  
<sup>8</sup> ABS, 8165.0, Counts of Australian Businesses, FY2017-18.

## MANUFACTURING — A SNAPSHOT

Manufacturing is thriving in Queensland. The industry is a primary contributor to the state's economy and regional development.

Manufacturing is a major employer and contributes over \$20 billion to the economy and exports goods worth more than \$15.8 billion.

Thirty per cent of the industry's economic contribution is derived from regional manufacturing.

Manufacturing in Queensland goes across a diverse range of sectors including aerospace, biofutures, biomedical, defence, mining equipment technologies and services (METS), food and beverage processing, beef processing, craft brewing and rail manufacturing.

Manufacturing is vital to growing and diversifying the economy, by strengthening international competitiveness and creating the jobs of the future.

The industry is moving towards advanced manufacturing by its adaption to Industry 4.0, the fourth industrial revolution, the adoption of robotics and other leading-edge technologies, autonomous systems, digitalisation, connectivity, world's best practice across the supply chain and incorporation of design-led thinking in every aspect of the product lifecycle.

Queensland manufacturing is at the forefront of robotics adoption and establishment of Australia's first Advanced Robotics for Manufacturing Hub strengthens this position.

## MANUFACTURING – CAREER OPPORTUNITIES

The technological changes being adopted by the industry are generating new career pathways and opportunities that will support economic and community growth.

Exciting opportunities are opening up for school leavers seeking a challenging apprenticeship or traineeship. Additionally, university graduates can implement their skills in a growth industry in a variety of challenging professional and technical roles, in a stable industry that cuts new ground on a regular basis.

There are emerging opportunities for existing mature aged workers who have the experience vital to the transition to advanced manufacturing to build new skills, continue in employment longer and mentor younger workers and new entrants to the industry.

This plan has a focus on ensuring that the industry can attract, retain and develop the right people with the right skills at the right time.







**THE OUTLOOK FOR MANUFACTURING IN QUEENSLAND IS POSITIVE**

# MANUFACTURING'S DIVERSE SECTORS AND THE CIRCULAR ECONOMY

Manufacturing in Queensland represents a diverse industry, as reflected in the Queensland Government's suite of targeted priority sector roadmaps and action plans for:



Advanced manufacturing



Aerospace



Biofutures



Biomedical



Defence



Mining equipment technology and services (METS)

## MANUFACTURING – SECTORS

Queensland's manufacturing industry is remarkably diverse.

As such, the Queensland Government works closely with industry to ensure the suite of programs and initiatives available to manufacturing firms reflect that diversity through tailored delivery models and frameworks to achieve practical support and tangible benefits.

The 10-year Roadmaps and Action Plans have been implemented to meet the industry development requirements of advanced manufacturing, aerospace, biofutures, biomedical, defence and mining equipment and technology services (METS).

Strategies are also in place for craft brewing, beef processing and hydrogen. Significant work is also being undertaken to support firms in the rail manufacturing, food processing and resource recovery sectors.

Each of these sectors offer highly-skilled jobs, flexible career pathways and regional opportunities.



THE GOVERNMENT IS ALSO SUPPORTING  
MANUFACTURING GROWTH SECTORS  
ACROSS QUEENSLAND SUCH AS:



Hydrogen



Food Processing



Beef Processing



Craft Brewing



Rail Manufacturing



Resource Recovery

The Queensland Government has established a Regional Roundtable for Advanced Manufacturing in Ipswich to address issues arising from Jobs Queensland's *A Workforce Report and Action Plan for the Manufacturing Industry in Ipswich*. Comprising representatives from all levels of government, the objectives of the Ipswich Manufacturing Roundtable are to:

- » support Ipswich-based manufacturing employers with their current and future skills needs
- » support local job seekers upskill for jobs in the manufacturing industry
- » coordinate activities across all agencies to ensure there is no duplication or gaps in service delivery, starting with a stocktake of local activity.

## MANUFACTURING HUBS



## REGIONAL MANUFACTURING – ENGINE ROOM OF THE FUTURE

As Australia's most decentralised state with the strongest regional network, our regions offer a unique competitive advantage. They are the engine rooms of our state.

Over 30 per cent of Queensland's manufacturing contribution to the economy comes from regional areas. Manufacturing in regional Queensland is growing and employs over 48,000 people.

Consequently, \$30 million is being invested into **Manufacturing Hubs** in Cairns, Townsville and Rockhampton to support regional industry partners create a powerful and influential network, to accelerate the growth of several existing specialised industries and to set a path for the strong future of regional manufacturing.

The new \$18 million Advanced Robotics for Manufacturing Hub (ARM) will support regional manufacturing to adopt robotics, autonomous systems and design to drive increased efficiency and a range of new job opportunities for both new and existing employees.

Food processing is an important industry sector in Regional Queensland and a key focus area of all of the Manufacturing Hub locations in Cairns, Townsville and Rockhampton. According to the Regional Australia Institute, food processing employment is more concentrated geographically than the broader agriculture industry, particularly in the hub locations.

Toowoomba is also a key regional centre with food processing growth and excellent transport infrastructure, led by Wellcamp Airport and innovative activities to increase regional job opportunities in advanced manufacturing.

Precision agricultural solutions, including improved energy efficiency across farms, smart sensors for weed and crop spraying and automated irrigation to improve water utilisation, are being developed collaboratively between industry and research institutions. There are a number of research efforts under way with the existing University of Southern Queensland (USQ) centres for Agricultural Engineering, Centre for Future Materials and Centre for Crop Health, together with the USQ Schools of engineering developing new laboratories for Industry 4.0 development.

The Wide Bay Burnett Region, recognised as the gateway to the Southern Great Barrier Reef, is based around the major centres of Bundaberg, Hervey Bay, Gympie, Maryborough, Kingaroy and Gayndah and possesses significant natural resources. Two-thirds of the state's softwood plantation resources are found in the Wide Bay Burnett's timber and forestry industry, while sugar, fruit, vegetables, nuts and beef are also major commodities.

The Fraser Coast Region has always had a strong diversified manufacturing sector and projects such as the establishment of a \$60 million munitions factory in Maryborough and an aircraft manufacturing plant at the Hervey Bay airport, will help transform the region by creating long-term jobs, boost the region's economic and manufacturing base and provide a solid foundation for growth in education, skills and a diversified workforce. Jobs Queensland's Fraser Coast Workforce Blueprint highlights the importance of developing the manufacturing workforce in the region, and the Jobs Fraser Coast group is coordinating with local, regional, state and commonwealth partners to help enable skills development throughout the region. The establishment of a Gateway to Industry Schools Program—Hub Model at the Maryborough State High School Trade Training Centre will enable a closer relationship between regional schools and the manufacturing industry to provide the talent pipeline needed for these jobs.

A close-up, profile view of a man with grey hair wearing clear safety glasses. He is focused on his work, with his hands positioned on a piece of machinery. The background is a blurred industrial setting with blue lighting. A semi-transparent dark blue box is overlaid on the left side of the image, containing text.

“Establishing Manufacturing Hubs in regional Queensland will be the catalyst to develop industry ecosystems to assist local manufacturers grow their business, become more productive and develop skills and training needed to boost local economies. Investing in people is key to ensuring we have the skilled workforce to embrace the future of manufacturing.”

Peta-Maree Broadley,  
Managing Director — Homefab,  
Manufacturing Ministerial Council member

# SKILLING QUEENSLANDERS FOR WORK

## PATHWAYS TO ENGINEERING PROJECTS

Across 2016–17 to 2019–20, Challenge Employment and Training Limited was awarded a total of \$744,300 under the Community Work Skills program to deliver the “Pathways to Engineering” project each year to disadvantaged jobseekers<sup>9</sup>.

The project assisted participants to complete the Certificate II in Engineering Pathways and Certificate II in Skills for Work and Vocational Pathways, to obtain employment in the engineering and manufacturing sectors around Ipswich. Participants who completed 13 weeks of accredited training and two weeks of vocational placement were assisted to gain their forklift licence and learn how to use tools such as a lathe, horizontal bandsaw and the oxy-acetylene torch. Participants also undertook industry visits to Austral Monsoon, Total Steel and Oz Buckets, (all partners for placing and hiring students completing this project).

Of the 156 participants assisted, 105 successfully completed accredited training. At June 2019, 90 have secured employment, 3 have enrolled in further education and/or training and one has returned to school. These outcomes are expected to increase as Challenge Employment and Training assist participants post project completion. The latest project will commence in November 2019 and will run for 12 months.



<sup>9</sup> Challenge Employment and Training, Pathways to Engineering, [http://www.challengeemployment.org.au/wp-content/uploads/2018/05/SQW\\_September\\_Pathways-to-Engineering\\_180525.pdf](http://www.challengeemployment.org.au/wp-content/uploads/2018/05/SQW_September_Pathways-to-Engineering_180525.pdf)

# Invested in people

With a rapid shift toward advanced manufacturing, the government is committed to ensuring that the Queensland manufacturing industry has the skilled people it needs to meet the jobs market of the future.

Technologies, systems and processes are vital, however it's the human capital that can provide a sustained competitive advantage when primed for continuous learning, and when an enterprise workforce development program is created and sustained.

Throughout Industry 4.0, a highly-skilled, flexible and innovative workforce is a critical driver for continual improvements in productivity, international competitiveness and to ensure Queensland achieves its overarching vision for the state's manufacturing industry.

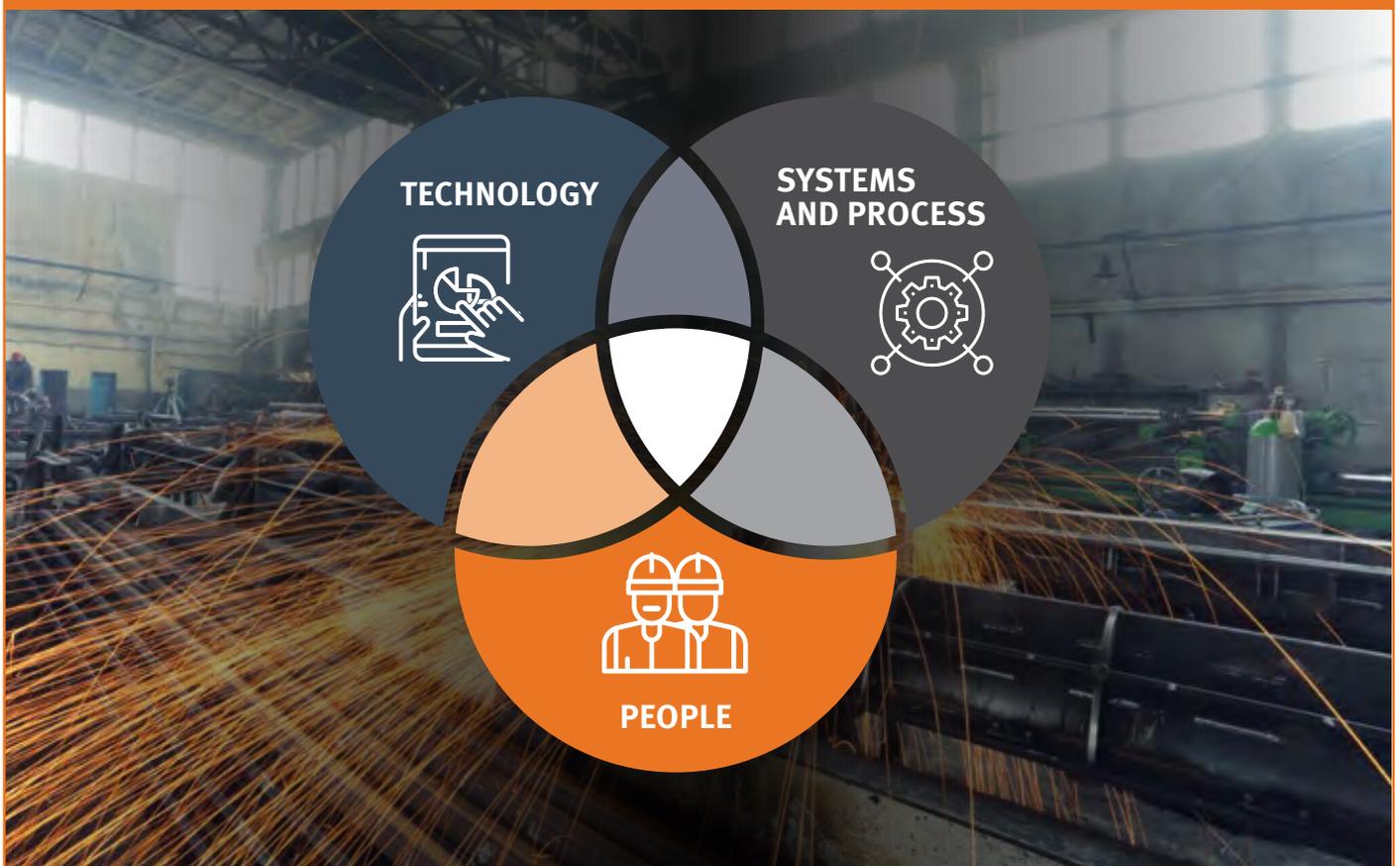
To build the skills needed for the manufacturing jobs of the future, formal skills pathways will remain an essential component of the journey to advanced manufacturing.

However, they are only one of the many avenues to gain the skills for current and future jobs.

In order to shape a high-value manufacturing workforce, managers and leaders of the future must invest in their people. Workplace leadership and the active participation of workers will also be required in the skills needs analysis, workforce planning and development design and implementation of skilling initiatives. Queensland is already training entire workforces in new technologies, capabilities and methodologies such as design-led thinking and agility.

Critical and creative thinking, complex problem-solving and STEM knowledge are important skills that underpin all roles in an advanced manufacturing workplace.

**PEOPLE ARE THE KEY TO EFFECTIVELY DEPLOYING NEW TECHNOLOGIES, SYSTEMS AND PROCESSES**



The Queensland Government is committed to ensuring Queenslanders have access to quality, supportive and affordable training to meet the ongoing skilling needs of industry. Government recognises that vocational education and training (VET) has a critical role in developing the skills of the existing and future manufacturing workforce in Queensland.

Through the VET investment budget, we continue to support the skills required for the growth of the manufacturing sector in Queensland.

In 2018–19 more than \$69 million was invested in training Queenslanders in a wide variety of qualifications relevant to the manufacturing industry. Government works with industry through stakeholder engagement mechanisms, including regional training networks, to identify opportunities to upgrade leadership and management skills and capabilities in manufacturing workplaces.

From 2019-20, a two year Higher Level Apprenticeship pilot will provide new opportunities to partner with industry to develop new pathways that layer specialised skills and knowledge with the traditional apprenticeship model.

PRIORITY TRAINING PATHWAYS FOR THE MANUFACTURING SECTOR INCLUDE:
» Certificate I to Advanced Diploma level training
» Apprenticeships and traineeships under the User Choice program
» Entry-level skills under the Certificate 3 Guarantee program
» Existing workers seeking skills to advance their careers under the Higher Level Skills program.

# \$69m

investment in qualifications relevant to the manufacturing sector



## ADVANCED MANUFACTURING 10-YEAR ROADMAP AND ACTION PLAN

The Advanced Manufacturing 10-Year Roadmap and Action Plan focuses on the government’s approach to transitioning Queensland’s manufacturing industry to an advanced state within a highly competitive and rapidly changing global environment. It reflects the importance for the industry to embrace Industry 4.0 and to strengthen the development of skills for the future of work in the digital supply chain so that,

A range of strategies, initiatives, programs and services from the Roadmap have been delivered, and will continue to be delivered in partnership with employers and unions across the state, including the strategy to drive the ongoing development of a highly skilled workforce.

**“By 2026, Queensland will be an international market leader in the delivery of advanced manufacturing technologies, systems, products and services that are innovative, sustainable and embedded in local and global supply chains”.**

A key aspect of this approach is to lift the profile of manufacturing to inform students, parents and educators about the exciting career opportunities in the manufacturing industry.



# Invested in the future of manufacturing

Future growth opportunities for Queensland's manufacturing industry presented by Industry 4.0, take manufacturing to a new level focussed on high quality human-centred capabilities that offers stable, diverse and technology-rich careers.

Innovative organisations are already redefining individuals' roles and developing the skills and competencies needed for the new level of customised and flexible mass production technologies.

As the industry landscape evolves, the requirement for a leading-edge best practice education and training sector has never been more vital.

Queensland is home to several world class universities and research institutions and TAFE Queensland leads Australia in the delivery of vocational education programs, offering more than 500 practical, industry relevant courses in more than 50 locations.

TAFE Queensland received \$2 million of funding under the Regional Skills Adjustment Strategy specifically targeting the manufacturing sector. This funding will provide 135 experienced welders with the necessary certification to meet the ISO9606 standard, which specifies the requirements for qualification testing of welders for fusion welding of steel. This standard is required for defence manufacturing supply organisations that will be supporting initiatives such as Rheinmetall Defence Australia's \$5.2 billion LAND 400 Phase 2 contract to build 211 combat reconnaissance vehicles.

Queensland's state school system has a strong focus on science, technology, engineering and maths (STEM). STEM skills touch every aspect of today's world and through partnerships with industry, universities, TAFE and the broader community, the effective adoption and incorporation of these skills and knowledge will enable more Queensland manufacturers to transition to Industry 4.0.

To build on these competitive strengths, the Queensland Government has invested \$755 million through the Advance Queensland initiative to grow our regional economies and industry strengths through innovation. This plan has been recognised as an action of significant importance to Queensland's future economy, and therefore highlighted as an immediate action under the *Building our Innovation Economy – Advance Queensland Strategy*. The Queensland Government will investigate the feasibility of a manufacturing and engineering skills centre of excellence.

The Queensland Government is taking a multi-faceted approach to create the environment for manufacturers to transition to an advanced state and support the growth of regional manufacturing sectors, strengthen industry

capability and drive new jobs and innovation.

Establishment of the Manufacturing Hubs in Cairns, Townsville and Rockhampton will provide another mechanism to involve regional communities, build industry ecosystems and strengthen the relationships needed by industry, with universities, VET, schools, students and local communities.

The hubs' locations in local TAFE campuses and CQUniversity are providing opportunities for industry to investigate and adopt world-leading technologies.

Programs and services include business development initiatives, skills development and training programs including business management, lean manufacturing, planning, digital marketing, mentoring and supply chain development.

To gather insights into the future of work and skills in Queensland and ensure our workforce is ready for future opportunities, the Queensland Government hosted the *Future of Work—Skills and Industry Summit* in November 2018.

The summit had strong representation across industry, small business, universities, the training sector, unions and government and gained important insights about preparing for Queensland's future economic opportunities, including Industry 4.0 and advanced manufacturing.

The summit helped inform the development of the Queensland Skills Strategy, *Skills for Queensland – Great training for quality jobs*.



# Robotics

Effectively addressing the challenge of adopting new technologies, processes and practices is critical in the transition to advanced manufacturing.

By leveraging Queensland’s existing research, manufacturing and development of robotics capabilities, the new Advanced Robotics for Manufacturing (ARM) Hub will support the adoption of robotics by Queensland manufacturers. It will bring together SMEs and researchers, in an industry-based learning factory, and will position Queensland as a global leader in advanced robotics and design-led manufacturing.

The necessity of accelerating the uptake of robotics by Queensland manufacturers was emphasised in the Robotics and Automation Advantage report<sup>10</sup>.

There has been strong and positive collaboration between the State Government, industry and unions to ensure Queensland is well placed to deliver the skills and training requirements of the future. This plan not only provides vision and the skills needed for the next generation of Queensland workers, it also provides opportunities for those workers in transition to advanced manufacturing.”

Rohan Webb AMWU Branch Secretary Queensland and NT, Manufacturing Ministerial Council Member



<sup>10</sup>QUT, The robotics and automation advantage for Queensland, June 2018, reference: [https://cms.qut.edu.au/\\_\\_data/assets/pdf\\_file/0006/783861/Synergy-Report.pdf](https://cms.qut.edu.au/__data/assets/pdf_file/0006/783861/Synergy-Report.pdf)



A conclusion of the report was that the ‘most likely’ scenario from adoption of robotics and automation in Queensland over 10 years would be 1.5 per cent per annum growth, an additional \$77.2 billion in Gross State Product and 725,810 jobs created.

The Queensland Government’s strategic skills approach together with the strong education and training platforms, provide the opportunity to build a highly skilled, highly paid manufacturing workforce of the future, comprised of passionate learners who each possess and exhibit a growth mindset.

### Australia’s first robotics hub to drive advanced manufacturing jobs

The \$18 million ARM Hub is being developed in partnership with Queensland University of Technology (QUT) and global leading-edge company Urban Art Projects (UAP).

The ARM Hub will provide practical production and manufacturing advice in a real-life factory environment, enabling Queensland manufacturers to learn cutting-edge robotic technologies and techniques, and develop industry skill and expertise to apply to their own businesses.

All manufacturers across the state will be able to access the ARM Hub, across sectors as diverse as aerospace, biomedical, beef and food processing, defence, mining equipment, technology and services, rail manufacturing and space.



“One of the critical elements to ensuring success of our manufacturing industry is a highly-skilled workforce. The Plan aligns the strategies outlined in the Roadmap for increasing the skills and qualifications of individual workers to grow and develop our manufacturing sector to deliver advanced manufacturing technologies, systems, products and services.”

Shay Chalmers, Director — Strategic Engineering,  
Manufacturing Ministerial Council Member



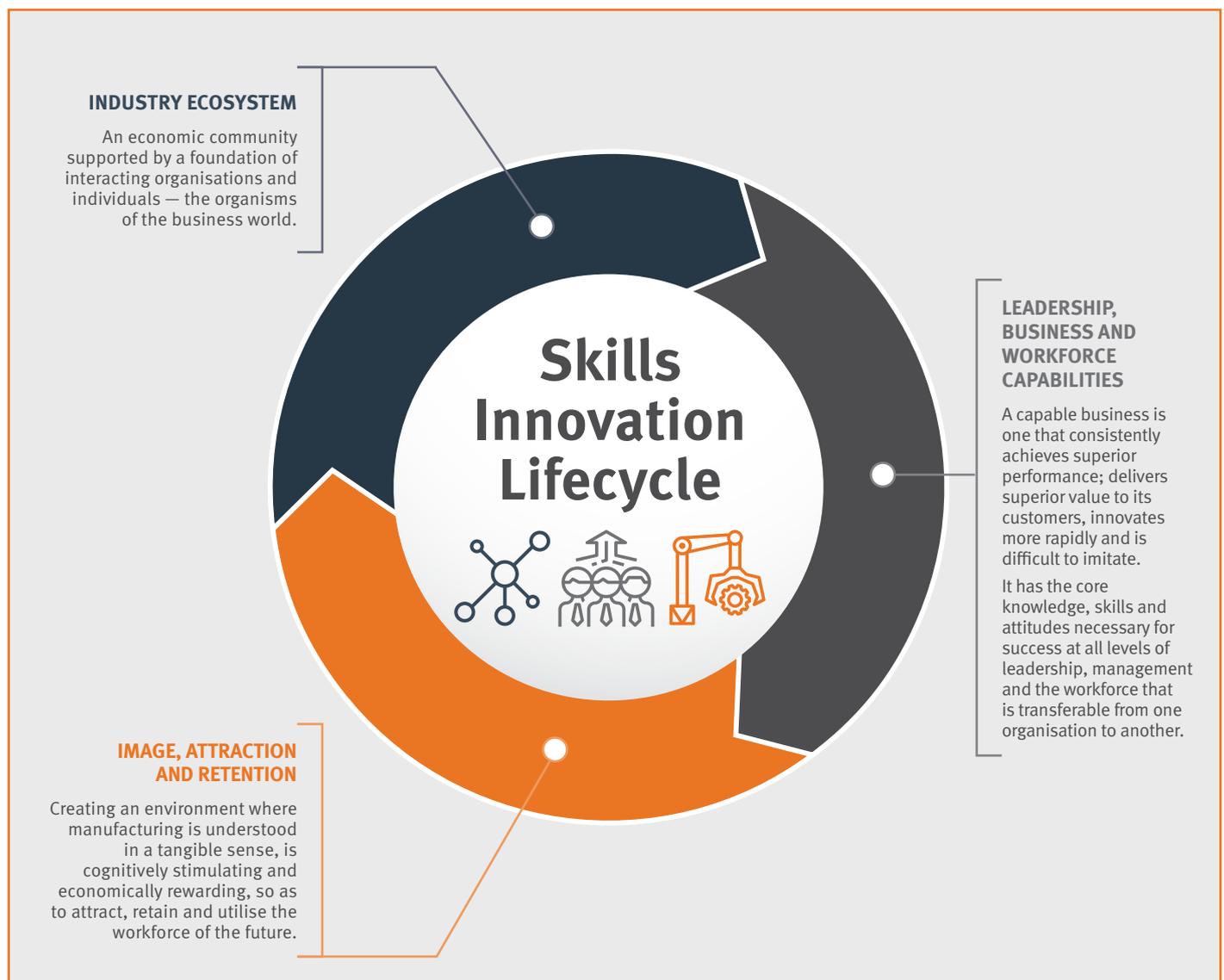
# Skills Innovation Lifecycle

The Skills Innovation Lifecycle is the framework for implementing the 10 Priority Action Areas (PAA's), in Jobs Queensland's *Advancing Manufacturing Skills: A Skills Training and Workforce Development Strategy*.

The Skills Innovation Lifecycle has three elements which represent the connected structural value stream for a continual, contemporary and sustainable industry skilling approach:

- industry ecosystem
- leadership, business and workforce capabilities
- image, attraction and retention.

The elements are described as a lifecycle as they are co-dependent on one another.





“This plan provides a very solid framework to help evolve Queensland’s manufacturing industry towards a new era of advanced technology, higher-level skills and exciting new streams of employment.”

Rebecca Andrews, Head — Queensland, Australian Industry Group, Manufacturing Ministerial Council Member

# Implementation program

## INDUSTRY ECOSYSTEM

An economic community supported by a foundation of interacting organisations and individuals – the organisms of the business world.

» PRIORITY ACTION AREA LINK: 1, 4, 8



### Priority Action

#### POSITIONING THE MANUFACTURING WORKFORCE AS A KEY PARTNER IN THE JOURNEY TOWARDS ADVANCED MANUFACTURING

##### GOALS

- Acceptance by manufacturing workers of the positive benefits of Industry 4.0 and the key role that workers play in the transition to advanced manufacturing.
- Upgrade workplace skills and capabilities (employer and employee) in leadership and change management to support the transition to advanced manufacturing.
- Promote methods to enhance consultation between employers and employees in order to identify skills and training requirements as the industry transitions.
- Government to facilitate and connect stakeholders during the transition to advanced manufacturing.

##### ACTIVITIES

###### Activities 1-9 months

- Utilise the DSDMIP and DESBT Regional Field Officer network to work with industry peak bodies and unions to assist manufacturers with workforce planning, and matters arising from the impacts of technological change and work reorganisation.

###### Activities 9 months onwards

- Conduct workshops and information sessions to promote the positive benefits of Industry 4.0 to the management and workers of advanced manufacturing businesses.

» STAKEHOLDERS - EMPLOYERS, EMPLOYEES, INDUSTRY ASSOCIATIONS, UNIONS AND TRAINING PROVIDERS, FACILITATED BY GOVERNMENT.



## Priority Action

### SUPPORTING INDUSTRY-LED ECOSYSTEMS

#### GOALS

- Industry-led networks established across the state between manufacturers, unions, suppliers, purchasers, startups, research institutions, schools, TAFE, private registered training organisations, government, industry organisations and other stakeholders to:
  - support manufacturers transition to advanced manufacturing through an industry community of practice
  - develop ecosystems that support sustainable regional and community growth and transformation.
- Mechanisms implemented to drive collaboration and partnerships to:
  - access major project opportunities
  - take advantage of collaborative export opportunities
  - address local and niche skilling issues where the provision of training may be a barrier
  - reshoring manufacturing activities.

#### ACTIVITIES

##### Activities 1-9 months

- **Manufacturing Hubs** in Cairns, Townsville and Rockhampton will drive collaboration, network development and benchmarking to best enable sustainable regional manufacturing.
- Continue to assist Queensland manufacturers to increase their knowledge and skill on “how to win business” through business capability and supply chain development programs.
- Promote and deliver targeted and tailored benchmarking programs to assist businesses to measure their performance, process and practices to help them grow and innovate.
- Grow entrepreneurship capability in regional ecosystems through delivery of regional pilots.

##### Activities 9 months onwards

- Work with manufacturing industry stakeholders through Regional Jobs Committees to match training investment with local skill needs.
- Develop and implement a journey to Industry 4.0 supply chain demonstration program in partnership with industry, facilitated through the manufacturing hubs and other bodies.

» STAKEHOLDERS - EMPLOYERS, INDUSTRY ASSOCIATIONS, SUPPLY CHAIN PARTNERS, RESEARCH INSTITUTIONS, SCHOOLS, TRAINING PROVIDERS, UNIVERISTIES, REIGONAL NETWORKS AND GOVERNMENT.





## Priority Action

### INCREASING THE DIVERSITY OF THE MANUFACTURING WORKFORCE

#### GOALS

- Increased participation of women in non-traditional roles within the industry, particularly in management and leadership positions.
- Increased participation of Indigenous workers within the industry, particularly in management and leadership positions.
- Industry is employing an increased percentage of people with a disability.
- Retain older workers, with a focus on mentoring new and existing workers (including apprentices and trainees).

#### ACTIVITIES

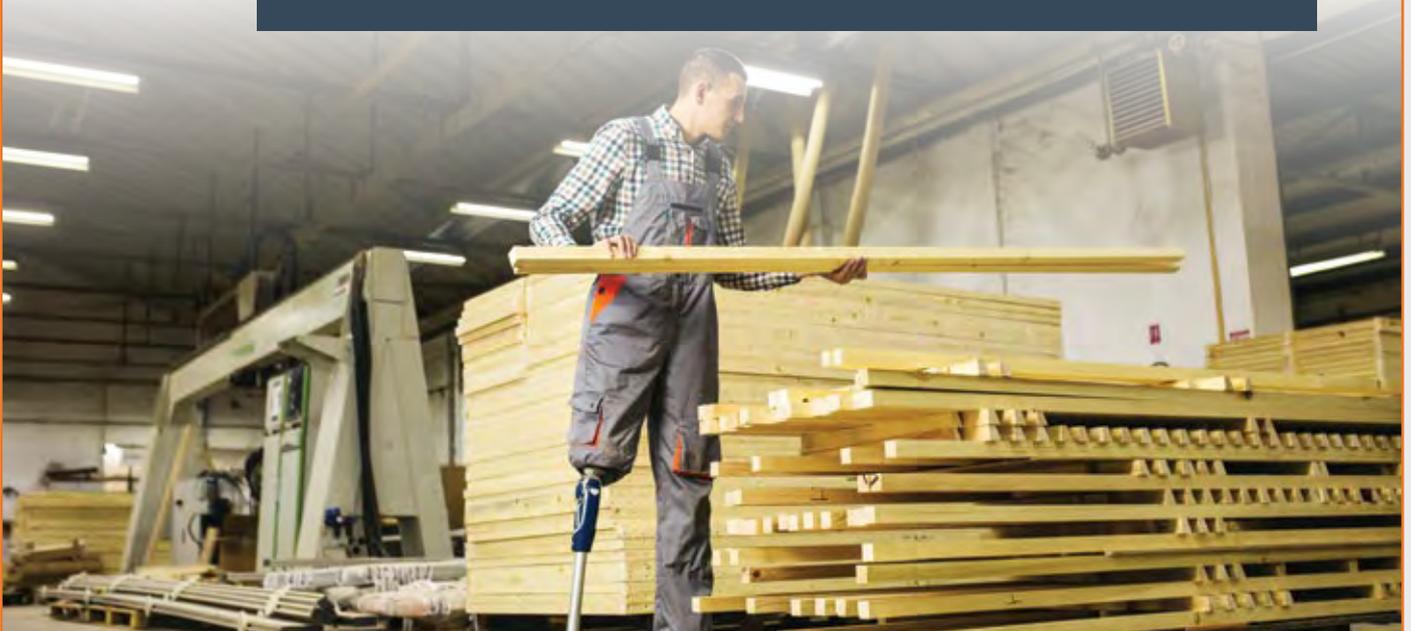
##### Activities 1-9 months

- Promote increased participation in the **Women in Manufacturing** initiatives, eg. Women Who Weld program, to support unemployed women and mothers returning to the workforce.
- Develop a campaign to inform manufacturers of the organisational benefits of a diverse workforce including people with disability and the varied contributions made by these employees. The campaign will also increase awareness of the resources available to attract, support and retain skilled and competent employees.
- Map and promote the diverse career paths in manufacturing including the various entry points and pathways from new entrant to business owners/managers, including role modelling from workers from diverse communities.

##### Activities 9 months onwards

- Improve availability of work readiness/pre-employment training for young people, including Aboriginal and Torres Strait Islander young people, by external organisations.
- Support older workers to adapt to new technologies to enable them to remain in the workforce longer and mentor younger employees and share their skills and knowledge to benefit both younger and older staff in the workforce.

» STAKEHOLDERS - EMPLOYERS, EMPLOYEES, INDUSTRY ASSOCIATIONS, UNIONS, ORGANISATIONS SUPPORTING EMPLOYMENT PATHWAYS AND GOVERNMENT.



## LEADERSHIP, BUSINESS AND WORKPLACE CAPABILITIES

A capable business is one that consistently achieves superior performance; delivers superior value to its customers, innovates more rapidly and is difficult to imitate. It has the core knowledge, skills and attitudes necessary for success at all levels of leadership, management and the workforce and are transferable from one organisation to another.

» **PRIORITY ACTION AREA LINK: 2, 3, 5, 6, 7**



### Priority Action

#### STRENGTHENING THE BUSINESS CAPABILITY OF MANUFACTURERS

##### GOALS

- A strong culture of manufacturing management and leadership development adopted by owners and leadership teams.
- Strong linkages with universities, VET providers and other training institutions to build management and leadership skills and capability.
- Mentoring and coaching adopted widely across the industry.
- Develop best practice principles framework for consultation and change management practices between employers and employees.
- Employers to involve all levels of management and the workforce in workplace change.
- Recognition of industry innovation and capabilities.

##### ACTIVITIES

###### Activities 1-9 months

- Identify and promote the take up of leading executive programs in collaboration with stakeholders, that support leadership and management skills development including change management and innovation management.
- Encourage take up of mentoring and business capability support through programs such as the Queensland Government's **Mentoring for Growth** program, and **TAFE Queensland Small Business Solutions** business growth, leadership and mentoring programs.

###### Activities 9 months onwards

- Form further alliances with global best practice countries and organisations (like the collaboration with Frank Wagner from Fraunhofer IAO) to bring more global thought leaders to Queensland to inform local leaders on best practice.

» **STAKEHOLDERS - EMPLOYERS, EMPLOYEES, INDUSTRY ASSOCIATIONS, UNIONS, GOVERNMENT, TRAINING PROVIDERS, UNIVERSITIES AND REGIONAL NETWORKS.**



## Priority Action

### BUILDING BUSINESS MANAGEMENT, INNOVATION AND PRODUCTIVITY AT ALL LEVELS OF THE MANUFACTURING INDUSTRY

#### GOALS

- Adoption of new business models and processes to increase efficiencies, decrease costs, enhance customer experience.
- Incorporate principles related to the business environment and advanced manufacturing in school, VET and university programs.
- Increase the take up of training programs in competitive systems and practices across the industry.
- Increase the implementation of units of competency and resources on enterprise management and innovation skills.

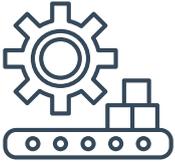
#### ACTIVITIES

##### Activities 1-9 months

- Explore opportunities to incorporate principles related to the business environment and advanced manufacturing in school, VET and university programs related to the manufacturing industry.
- Develop resource material for units of competency on enterprise management and innovation skills that can be added to training programs through the current accreditation system.

» STAKEHOLDERS - EMPLOYERS, EMPLOYEES, TRAINING PROVIDERS, UNIVERSITIES, GOVERNMENT AND SKILLS SERVICE ORGANISATIONS.





## Priority Action

### FOSTERING CONTINUED INDUSTRY OPPORTUNITY GROWTH

#### GOALS

- International links developed to support exchanges at business, individual and worker level.
- Management exchanges established with countries providing potential markets for Queensland manufacturing.
- Access to capability development by businesses and their workforce in areas including exporting, tendering and succession planning.

#### ACTIVITIES

##### Activities 1-9 months

- Investigate management and employee international exchange programs for advanced manufacturers.
- Provide supply chain capability workshops and seminars for manufacturing business owners and managers with a focus on global opportunities.

##### Activities 9 months onwards

- Promote export programs to regional manufacturers and work with TIQ on the content to ensure it meets the emerging requirements of advanced manufacturing businesses and their global markets.

» STAKEHOLDERS - EMPLOYERS, INDUSTRY ASSOCIATIONS, UNIONS, ECOSYSTEMS AND GOVERNMENT.





## Priority Action

### STRENGTHENING THE ROLE OF APPRENTICESHIPS AND TRAINEESHIPS AND THE VET SYSTEM IN SUPPORTING SKILLS DEVELOPMENT

#### GOALS

- Contextualisation of new apprenticeship and traineeship qualifications and alignment of existing qualifications to meet Industry 4.0 requirements.
- Work-based training pathways available for a broad range of professional and technical roles within the industry.
- Increased multi-skilling and dual trade opportunities and pathways – combining traditional manufacturing skills and Industry 4.0 skills to meet future industry needs.
- Promote the direct employment and training of apprentices and trainees to equip the next generation of employees in advanced manufacturing.
- Direct workplace experience and industry visits available for students to foster a quicker take-up of those skills required for their future.

#### ACTIVITIES

##### Activities 1-9 months .

- Work with industry and other relevant stakeholders to develop and implement higher level apprenticeship pathways to support Industry 4.0 in Queensland.

» STAKEHOLDERS - EMPLOYERS, EMPLOYEES, INDUSTRY ASSOCIATIONS, UNIONS, GROUP TRAINING ORGANISATIONS, SKILLS SERVICES ORGANISATIONS, SCHOOLS, TRAINING PROVIDERS, UNIVERSITIES AND GOVERNMENT.





## Priority Action

### BUILDING A HIGHLY SKILLED, ADAPTABLE AND CAPABLE EXISTING WORKFORCE

#### GOALS

- Manufacturers build the skill profile and the skills development culture needed to adapt and transition to advanced manufacturing by accessing:
  - flexible training to support the workforce's adaptability and multi-skilling capabilities
  - upskilling and reskilling opportunities to support the changing skill requirements within the industry
  - modularised training offerings and skill sets
  - nationally-recognised qualifications to increase the transferability of skills across the industry and minimise the impacts of structural adjustment
  - information on the recognition and transferability of skills and capabilities
  - support to build and utilise the foundation skills such as communication, emotional intelligence, adaptability, resilience.

#### ACTIVITIES

##### Activities 1-9 months

- The Queensland Government together with industry and the education and training sector will investigate the feasibility of a manufacturing and engineering skills centre of excellence.
- Explore options with industry to develop Higher Level Apprenticeships that layer specialised skills and knowledge with the traditional apprenticeship model.
- Support the manufacturing sector through investment in training subsidies and remain responsive to the demand-driven training priorities of the industry.

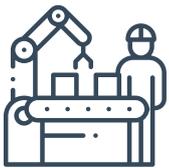
» STAKEHOLDERS - EMPLOYERS, EMPLOYEES, INDUSTRY ASSOCIATIONS, UNIONS, TRAINING PROVIDERS, UNIVERSITIES AND GOVERNMENT.



## IMAGE, ATTRACTION AND RETENTION

Creating an environment where manufacturing is understood in a tangible sense, is cognitively stimulating and economically rewarding, so as to attract, retain and utilise the workforce of the future.

» PRIORITY ACTION AREA LINK: 9, 10



### Priority Action

#### POSITIONING MANUFACTURING AS A FIRST-CHOICE CAREER

##### GOALS

- Manufacturing careers viewed favourably by communities, parents, teachers and students with an acknowledgement that:
  - there are a diverse range of careers in manufacturing
  - digital and technology changes in manufacturing are creating some of the most interesting, technology-rich careers of the future
  - there is a high level of stability in a manufacturing career
  - encourage employers to maintain their workplace (i.e. lunch rooms, amenities, facilities) to the highest standard possible, to ensure the workplace is presentable, comfortable and accessible for all staff and ensures there is minimal differential between blue and white-collar amenities.

##### ACTIVITIES

###### Activities 1-9 months

- Undertake initial research to determine the current views related to the image and profile of the career opportunities within the manufacturing industry.
- Develop a proactive campaign and initiatives, in conjunction with industry stakeholders, to enhance the image and profile of the manufacturing industry in Queensland, the jobs and skills of the future and the rewarding careers offered so it is more appealing to emerging generations.
- Raise the image and profile of the manufacturing industry and its careers, through technology and innovation events and competitions, such as F1 in schools, STEM Punks, drones and coding and robotics in schools and Apprentice A team initiatives.

###### Activities 9 months onwards

- Position the **Manufacturing Hubs** as a key platform in Cairns, Townsville and Rockhampton for promoting careers in manufacturing.
- Form a manufacturing ambassadors' network, with a particular emphasis on young people, women and the young tech pioneers who are reshaping the industry.
- Position the expanded Gateway to Industry Schools Program (GISP) to better support school student participation in VET programs that industry has identified are current and emerging priorities, through schools and industry collaboration.

» STAKEHOLDERS - EMPLOYERS, EMPLOYEES, INDUSTRY ASSOCIATIONS, UNIONS, UNIVERSITIES, SCHOOLS, VET, REGIONAL NETWORKS AND GOVERNMENT.



## Priority Action

### FACILITATING ENHANCED PARTNERSHIPS AND ENGAGEMENT TO BETTER PREPARE NEW ENTRANTS

#### GOALS

- Enhance partnerships and engagement between manufacturers, unions, schools, VET providers and universities to better prepare new entrants for successful careers in the manufacturing industry.

#### ACTIVITIES

##### Activities 1-9 months

- Provide industry virtual and physical site tours, immersion experiences and training in advanced manufacturing skills, new technologies, current industry work practices and industry careers for school teachers, careers advisers, VET trainers and university teaching staff.

##### Activities 9 months onwards

- Support industry to develop 'train the trainer' programs to upskill VET teachers to rapidly expand their skills and knowledge of new technologies and mindsets in the manufacturing industry to provide further opportunities for their students.

» STAKEHOLDERS - EMPLOYERS, EMPLOYEES, INDUSTRY ASSOCIATIONS, UNIONS, EDUCATION AND TRAINING SECTOR, REGIONAL NETWORKS AND GOVERNMENT.





These best practice models are examples of how an industry engagement can achieve our vision of attracting, developing and retaining world-class talent.

## HELIMODS

HeliMods is highly committed to its people and championing the future of aerospace and advanced manufacturing skills and technologies.

A multi-award-winning aerospace technology company on the Sunshine Coast, HeliMods is recognised as a world leader in the helicopter modification and special missions' industry.

Amongst other things, the company offers end-to-end customised design, engineering, manufacturing and airframe integration services. These services transform helicopters to perform a range of critical missions including emergency medical, search and rescue, public safety and disaster relief<sup>1</sup>.



Named the 2018 Telstra Queensland Business of the Year, HeliMods thrives on solving complex and challenging problems and is backed by world-class technologies, facilities and infrastructure.

Led by a dynamic and future-thinking founder with formal qualifications in aviation trade skills, aerospace engineering and business management, the organisation understands the value of a diverse skillset and how much degree-engineering and trades skills complement each other when combined as part of a holistic education.

**HeliMods employs a team of cross-functional specialists, who are predominantly tertiary qualified engineers, supported by aerospace production technicians, licensed aircraft maintenance engineers and operations support staff.**

The company uses cutting edge technologies and advanced machinery driven by highly skilled people to deliver innovative, world-class solutions. The latest in digital manufacturing technologies are continually increasing in complexity, sophistication and capability, often meaning that current trade skills are not equipped to leverage these machines to realise their full potential.

HeliMods addresses this gap by providing comprehensive in-house training and micro-skilling to team members on an ongoing basis. Importantly, technicians and engineers across all levels of the business work together to continuously learn from one another and upskill in multiple areas. This holistic approach has helped HeliMods form a team that can apply skills across diverse tasks within the vertically integrated landscape.

<sup>1</sup>HeliMods, <https://www.helimods.com/about/>

at program and a leading advanced manufacturer can  
ent and skills in Queensland's manufacturing industry.

## GATEWAY TO INDUSTRY SCHOOLS PROGRAM

### ADVANCED MANUFACTURING GATEWAY TO INDUSTRY SCHOOLS PROJECT

Queensland's Gateway to Industry Schools Program—Advanced Manufacturing Gateway to Industry Schools Project (GISP), is part of an industry engagement and workforce development framework to support the long-term development of a highly skilled workforce in Queensland and promote Science, Technology, Engineering, Arts and Maths (STEAM) skills<sup>12</sup>.



Hosted by QMI Solutions, the program provides opportunities for industry and the education sector to work together to develop and implement tailored school engagement approaches and activities for students, local communities and businesses. Students that participate in the program will be exposed to a range of learning experiences that will assist them in their career choices and pathways to employment.

GISP develops and implements a range of manufacturing and engineering-related activities including industrial technology and design, STEAM and advanced manufacturing.

GISP is currently building industry specific Gateway to Industry Schools Program—Hub Models that are specifically aligned to priority areas in the Advanced Manufacturing Roadmap and are creating 'best-practice' models to pipeline talent to industry such as upskilling on the Industry 4.0 journey.

A generic *Gateway Hub for Engineering* is located at Kelvin Grove State College, the *Gateway Hub for Vehicle Manufacturing and Engineering* is located at Glenala State High School. A *Gateway Hub for Advanced Manufacturing* recently opened in the Maryborough High School Trade Training Centre which focuses on rail, timber and sugar manufacturing industries in the region.

Collaborative Gateway Hubs and successful Gateway Day events are helping to reposition manufacturing careers as technology-rich and diverse. They update teachers', young people's and parents' understanding of manufacturing workplaces and advancing manufacturing technologies.

"The GISP gives industry the opportunity to shape the future workforce and inspire a generation who will change it"- Dr James Fielding, Audeara Sound Founder and CEO.

<sup>12</sup> DESBT, Gateway to Industry Schools program, <https://desbt.qld.gov.au/training/employers/gateway-schools>

# Monitoring and reporting

Monitoring the success of the Skills Implementation Plan for Advanced Manufacturing will rely heavily on the contribution and collaboration of stakeholders.

Outcomes of the Implementation program will be reported through the Manufacturing Skills Working Group and measured against Strategy 2 of the Advanced Manufacturing 10-Year Roadmap and Action Plan to *drive the ongoing development of a highly-skilled workforce.*

The Queensland Government will ensure appropriate reporting and advisory relationships with existing government committees, including the Manufacturing

Ministerial Council and Jobs Queensland will continue to forge partnerships and engage collaboratively with industry during the monitoring and implementation of activities.

All actions of the Skills Implementation Plan for Advanced Manufacturing are due to be completed by June 2021, with the Manufacturing Skills Working Group delivering its final report to stakeholders by the same date.





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